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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

(Source, TEC 2024)

FOR THE PROPOSED UPGRADING OF DR 3630 ONYATI - ONYUULAYE – ONKUMBULA (70KM), FROM GRAVEL TO LOW VOLUME SEAL (LVS) STANDARD (TAR ROAD)

Prepared for:

DREAM ENGINEERING

5 June 2025

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DOCUMENT INFORMATION	
Title	Environmental Scoping Report (ESR) for the Upgrading of DR3630 Onyati - Onyuulaye – Onkumbula (70km), From Gravel to Low Volume Seal (LVS) Standard (Tar Road)
ECC Application Reference number	**APP- 005774**
Listed Activity	**Activity 10: Infrastructure:** 10.1 The Construction of (b) Public roads **Activity 3: Mining and Quarrying Activities:** 3.2 The Other forms of mining or extraction of any natural resources whether regulated by law or not **Activity 8: Water Resource Development** 8.1 The abstraction of ground or surface water for industrial or commercial purposes
Location	DR3630 (Onyati – Onyuulaye – Onkumbula), Oshikoto Region
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ABBREVIATIONS

DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EIF	Environmental Investment Fund
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Plan
ESR	Environmental Scoping Report
GRM	Grievance Redress Mechanism
I&APs	Interested and Affected Parties
LVS	Low Volume Seal
MAFWLR	Ministry of Agriculture, Fisheries, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
SM	Site Manager
TEC	Tortoise Environmental Consultant

1. INTRODUCTION

1.1 Project Background

The Ministry of Works and Transport recognizes the importance of maintaining a good road network across rural areas throughout the country. Road construction projects are generally intended to improve the economic and social welfare of people. Travelling times can then be reduced with increased road capacity which also lowers the costs of vehicle use, while further increasing access to markets, jobs, education, and health services.

The project entails the proposed upgrading of the road DR3630 gravel road to Low Level Seal (LVS) The total length of the road is approximately 70 km long and will form a vital link to the national road network, through provision of access to communities living along the route.

1.2 Terms of Reference

This document is prepared as part of the Environmental Impact Assessment (EIA) and scoping exercise, aimed at obtaining an Environmental Clearance Certificate (ECC) for the proposed upgrading of DR3630 Onyati - Onyuulaye – Onkumbula (70km), from gravel to Low Volume Seal (LVS) Standard (Tar Road)

Tortoise Environmental Consultants (TEC) is appointed to carry out the requisite scoping assessment and develop an Environmental Management Plan (EMP). The scoping process investigated the potential significant positive and negative biophysical and socio-economic impacts associated with construction activities for the proposed road upgrade. In addition to reporting on the potential impacts, the scoping process also serves to provide an opportunity for Interested and Affected Parties (I&APs) to provide comments and participate in the process.

1.3 Project rationale – need for road construction

The project is vital for improving livelihoods, regional integration, and service delivery in rural areas. The road will provide:

- Improved access to essential social services such as healthcare, education, and administrative facilities. At present community members from Onyaanya, Okankolo & Eengodi constituencies are unable to access school, clinics, markets and hospitals during rainy season.
- Improved access to markets, allowing local farmers and entrepreneurs to transport goods more efficiently and reach broader consumer bases
- Enhanced mobility for government agencies, supporting national objectives related to health, safety, immigration, and security.
- Lower vehicle maintenance and reduced accident rates.

1.4 EIA Regulation

The EIA is regulated by the Environmental Management Act, 2007 and the EIA Regulations No. 30 of 2012, which is administered by the Ministry of Environment Forestry and Tourism (MEFT), through the Department of Environmental Affairs (DEA), which is headed by the Environmental Commissioner (EC).

1.5 Environment versus Economic Development

Namibia's economy is highly dependent on a healthy environment and striking a balance in meeting demands for economic development and maintaining biological diversity remains a priority. Therefore, it is of utmost importance that the environment and development sectors should work together and identify synergies to ensure that natural resources are utilized acceptably and sustainably.

The aim of undertaking environmental assessments is to mitigate negative impacts that would otherwise compromise socio-economic development.

1.6 EIA process

An Environmental Impact Assessment (EIA) is a process of identifying, predicting, evaluating and mitigating the effects (negative impacts) of a proposed project on the natural and human environment.

The EIA process aims to apply the principles of environmental management, reduce negative impacts and provide an opportunity for the public to comment on the proposed activity.

The EIA Process entails the assessment and description of the study area, recommended site or affected environment. The EIA further investigates and identifies potential impacts that may arise from the proposed activity.

For every impact that is deemed significant, mitigation measures will be developed and will be outlined in the Environmental and Social Management Plan (ESMP).

2. PROJECT DESCRIPTION

2.1 Project location and route description

The proposed LVS road will cover 70 km and will pass through three constituencies namely Onyaanya, Eengodi and Okankolo.

GPS coordinates: Latitude -18.075982 S and Longitude 16.531368 E

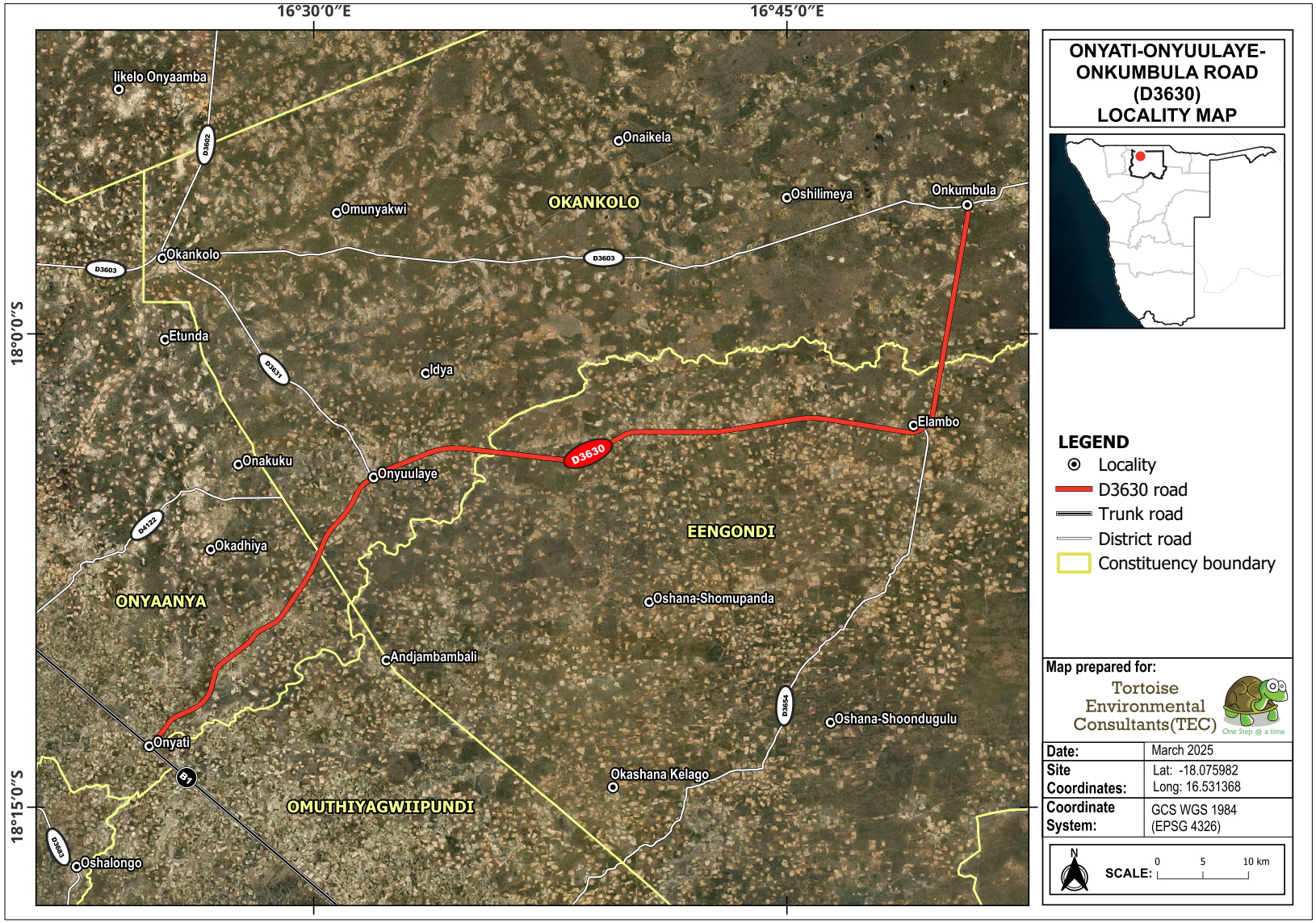

Figure 2-1: DR3630 showing the constituencies through which it will run

2.2 Technical Approach to Road Construction

The proposal is to upgrade the DR3604 from gravel to Lower Volume Seal (LVS) standards.

2.2.1 Road design considerations

2.2.1.1 Design speed

According to the SADC Guideline on Low-volume Sealed Roads, the design speed is generally based on the speed that 85% of drivers are expected to travel under ideal conditions, were road features influence driving behaviour. A higher design speed usually leads to increased construction costs, for instance, in hilly areas, raising the design speed by 20 km/h can double earthwork expenses (Dream Engineering, 2025).

Setting speed limits that significantly differ from the 85th percentile speed can increase accident risk, as drivers typically adjust their speed based on the road's physical layout rather than its posted classification. Therefore, the road environment should be designed to naturally guide drivers to a safe, consistent speed that matches the road's geometry (Dream Engineering, 2025).

Based on this, the appropriate design speed for road DR3630 is set at 100 km/h, derived from the 85th percentile of the national maximum speed limit of 120 km/h, aligning with SADC guidelines (Dream Engineering, 2025).

2.2.1.2 Typical Cross Section Design

Respective data from the projected traffic volumes from the Roads Master Plans, the traffic data from RMS, and the Roads Authority Standard Drawing No. N3050 titled "Standard Bituminious Road Cross Section and Detail", will be used to determine and verify the road lane widths (Dream Engineering, 2025).

Based on the traffic volumes and the Consultant's experience from previous projects of similar nature, the Consultant proposes that the project road have a 6.3m wide surfaced carriageway with two 1.75m wide gravel shoulders. For the purpose of adequate road surface drainage, a camber of 2.5% to both sides is proposed.

The proposed typical cross section is shown below. This is merely a proposal and further investigations will yield accurate determining factors for the cross section which is applicable for the project road.

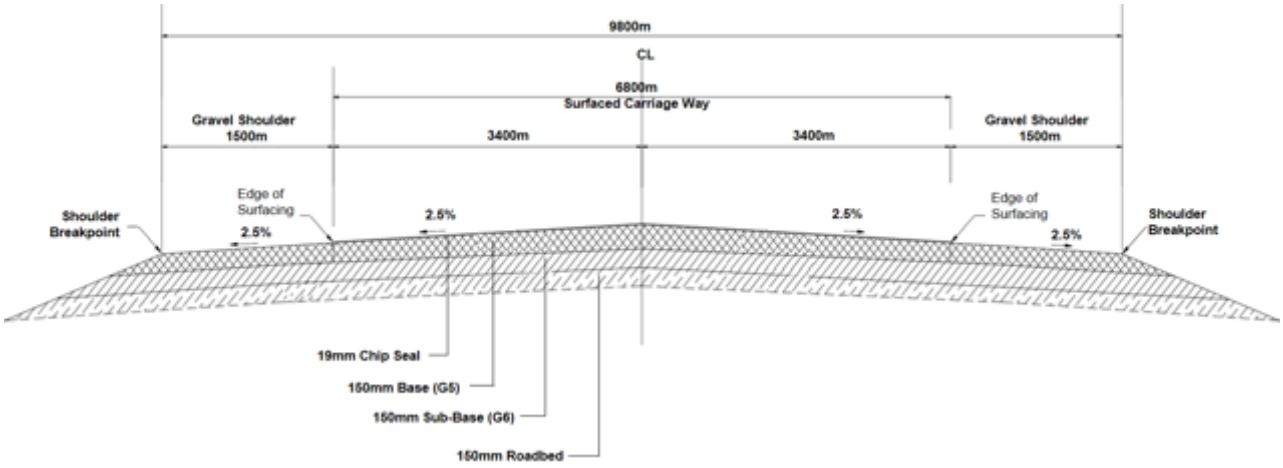

Figure 2-2: Typical Cross Section (Source: Dream Engineering, 2025)

2.2.2 Material Sourcing and Site Investigations

Dolomite Geotechnical Services conducted a materials Survey and a borrow pit prospection study in support of the design and construction supervision of the DR3630 road. The findings of this study are discussed below and in section 3.

2.2.2.1 Centreline survey

- Conducted at 1 km intervals along the 70 km route, totalling 70 DCP (Dynamic Cone Penetrometer) tests.
- Trial pits were manually dug to 1 m depth (or until refusal), logged, and sampled for CBR and indicator tests.
- **Findings:** - Existing gravel layers have mostly washed away, leaving deep, loose, transported fine sands.
  - Soils show moderate to variable CBR values, often requiring replacement or stabilization.

2.2.2.2 Borrow Pit Prospection

- 13 borrow pits (BP01 – BP13) investigated
- Involved gridding, pit excavation (depths from 2.5 to 5 m), material classification, and sampling.
- Conducted during the rainy season, which affected access and sampling in flooded areas.
- Manual gridding with GPS helped overcome the limitations of sandy terrain and poor visibility of subsurface layers.

- **Key observation:** Silcrete gravels (COLTO classes G5 – G9) were prevalent, but depth and quality varied significantly, requiring further confirmation prior to use.

2.2.2.3 Laboratory Testing

- Conducted on both centreline and borrow pits samples
- Conducted according to TMH1 and COLTO standards.
- Tests included: Maximum Dry Density (MDD), Optimum Moisture Content (OMC), CBR, Plasticity Index, and Sieve Analysis.
- Findings showed variability in material quality across pits and alignment sections, necessitating careful selection and potential material blending.

3. INPUT MATERIALS FOR ROAD CONSTRUCTION

This section highlights the key input material needed for the upgrading of the proposed road.

3.1 Supporting infrastructure – input materials

Road construction involves a range of activities that require a host of supporting infrastructure to ensure that the project is completed efficiently and effectively. Effective planning, design, and management are essential to ensure the construction of safe, reliable, and long-lasting roads. The items described below are some examples of supporting infrastructure that is required for upgrading the road.

3.1.1 Borrow pit investigations for road construction material

Appropriate gravel materials are essential for constructing the various road layers, including the subbase, shoulders, gravel wearing course, and base course. Additionally, fill material is necessary to achieve the vertical alignment required for the designated design speed. To meet these requirements, materials must be sourced from borrow pits. These pits are excavated using heavy machinery, and the extracted material is transported to the designated sections of the road where it is needed. It is crucial that all materials used meet the necessary engineering specifications, which is why regular testing is conducted to ensure compliance.

Another critical consideration is the hauling distance. Borrow pits should not be located too far from the areas where materials are needed, as longer distances increase transportation and operational costs. Therefore, selecting borrow pits within a practical and cost-effective range is essential.

Per the *Materials study for DR3630 (Onyati – Onyuulaye - Onkumbula)*, was done with a focus on borrow pit investigations, sand suitability for construction, borehole/test pit data, and tests conducted.

3.1.2 Sand and gravel for construction

DR 3630 (Onyati – Onyuulaye – Onkumbula) is an existing gravel road. Meaning, there are old borrow pits that were used for the initial construction. The old borrow pits were assessed and the Geotechnical report indicates that some of the borrow pits can be re-used (Dolomite Geotechnical Services , 2025).

The borrow pits investigated for this study predominantly contain silcrete gravels of varying strengths, as indicated by the summarized results above. Most borrow pits exhibit a range of gradations. Notably, several borrow pits (specifically BP01, BP05, BP07, BP10, and BP13) contained well-graded material.

Table 3-1: Successful borrow pits

BP No	Approximate Chainage	Distance to Next BP (km)	Offset From CL (KM)	Material Class	Quantity Available (m^2)	Latitude	Longitude
BP01A	1+600	9	0.4 RHS	G5 (G6)	19682 (14761)	18°12'27.02"S	16°25'34.24"E
BP03	10+600	11.6	0.6 LHS	G6	19443	18° 8'53.61"S	16°28'44.56"E
BP04	22+200	7.7	0.06 LHS	G6	33172	18° 4'1.21"S	16°32'47.06"E
BP05	29+900	7.8	0.71 LHS	G5/G6	25440	18° 3'30.32"S	16°36'59.62"E
BP06	37+800	4.9	0.12 LHS	G6	20736	18° 2'59.79"S	16°41'17.21"E
BP07	42+600	4.2	0.34 LHS	G5/G6	31033	18° 2'42.60"S	16°43'53.11"E
BP08	46+800	4.3	1.7 LHS	G5/G6	49613	18° 1'39.93"S	16°46'12.58"E
BP09	51+300	3.8	0.6 LHS	G5/G6	-	18° 2'46.66"S	16°49'8.02"E
BP10	54+800	12.2	0.75 RHS	G6	10447	18° 1'43.65"S	16°50'12.64"E
BP13	67+000	-	0.23 LHS	G6	20765	17°55'36.68"S	16°51'26.90"E

3.1.3 Water sources for road construction

A reliable water supply is necessary to mix concrete, prepare the road surface during compaction amongst others. Three primary water sources were identified (Dolomite Geotechnical Services , 2025):

- **Boreholes:** There are existing boreholes located at the end of the section in Onkumbula. However, these are currently not utilized by the community due to the high salinity of the water, which makes it unsuitable for domestic and conditionally usable for construction.

  Another option would be to carry out a fresh hydrological assessment to evaluate the potential for drilling new boreholes with diameters specifically designed to support both water storage and usage needs. Although this approach may require substantial initial investment, it could prove to be the most practical solution considering the severe water shortage in the area.

Table 3-2: Identified boreholes near the road

Name	Status	Latitude	Longitude	Remarks
Borehole 1	Active	18° 11' 22" S	16° 26' 43" E	4km from Onyati
				Elevated water tank
Borehole 2	Inactive	18° 04' 20" S	16° 31' 46" E	Onyuulaye
				Saline water
Borehole 3	Inactive	17° 59' 56" S	16° 49' 60" E	Drilled to replace Borehole 4
				Saline water
Borehole 4	Inactive	18° 00' 00" S	16° 50' 01" E	Used for construction previously
				Potable water
				Borehole damaged / collapsed.
Borehole 5	Active	17° 55' 33" S	16° 51' 36" E	Onkumbula Community Borehole
				Potable water
Borehole 6	Active	17° 55' 21" S	16° 51' 28" E	Belongs to NCS (Prison)
				Water purified for use in prison
Borehole 7	Active	17° 55' 52" S	16° 52' 14" E	For Onkumbula school hostel
				Potable water
Borehole 8	Active	17° 55' 46" S	16° 51' 13" E	Herman Nekomba water point
				For Onkumbula Secondary School
				Potable water

- **Surface Water and earth dams:** Another possible option is to explore shallow perched aquifers by excavating large open pits in areas known to retain water.

However, this may prove challenging due to the region's generally dry conditions. Although the initial prospection and centreline investigations took place during the rainy season, the water table was not reached even at depths exceeding 4.5 meters.

Existing borrow pits can serve as preliminary indicators of water availability in various locations, as they may have accumulated water either from the water table or from surface runoff during rainfall. These should be assessed before relying on them as a water source.

Table 3-3: Identified earth dams

Name	Source Type	Latitude	Longitude	Remarks
Old BP03	Earth dam	18° 8'53.61"S	16°28'44.56"E	Next to successful BP area
Old BP04	Earth dam	18° 4'1.21"S	16°32'47.06"E	Next to successful BP area
Old BP05	Earth dam	18° 3'30.32"S	16°36'59.62"E	Next to successful BP area
Old BP06	Earth dam	18° 2'59.79"S	16°41'17.21"E	Next to successful BP area
Old BP07	Earth dam	18° 2'42.60"S	16°43'53.11"E	Next to successful BP area
Old BP08	Earth dam	18° 1'39.93"S	16°46'12.58"E	Excavated dam
Open Pit A	Earth dam	18° 5'42.77"S	16°30'40.04"E	Next to successful BP area
Open Pit B	Earth dam	18° 0'0.86"S	16°50'0.29"E	Next to successful BP area

- **Piped Water:** There are two water pipelines located near Onyuulaye, one about 5 km south of the settlement and another close to the Constituency office. These sources were previously used during the construction of the original gravel road. However, the current capacity of these pipelines to meet the water demands of the planned construction phases remains uncertain.

Table 3-4: Fresh Water Supply Points along the road

BP No	Approximate Chainage	Distance to Next BP (km)	Offset From CL (KM)	Material Class	Quantity Available (m^2)	Latitude	Longitude
BP01A	1+600	9	0.4 RHS	G5 (G6)	19682 (14761)	18°12'27.02"S	16°25'34.24"E
BP03	10+600	11.6	0.6 LHS	G6	19443	18° 8'53.61"S	16°28'44.56"E
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BP10	54+800	12.2	0.75 RHS	G6	10447	18° 1'43.65"S	16°50'12.64"E
BP13	67+000	-	0.23 LHS	G6	20765	17°55'36.68"S	16°51'26.90"E

3.1.4 Accommodation facilities for construction workers

The type of accommodation provided for road construction workers depends on factors such as the project's location, its duration, and the size of the workforce. Given that the construction of the road is expected to last for approximately 24 months, a temporary camp will need to be established. This camp should be outfitted with essential facilities, ablution blocks, and other necessary amenities.

In addition to housing, specific areas must be designated for storing construction materials and for parking construction vehicles. The operation of heavy machinery such as bulldozers, excavators, graders, and rollers will also require enough space

for manoeuvring. As such, careful consideration must be given when selecting the camp location to minimize disruption to nearby communities.

4. COMPLIANCE AND LEGAL FRAMEWORK

This chapter outlines the regulatory framework.

4.1 Compliance to the EMP

The EMP is binding to the proponent, and all contractors / sub-contractors. This implies that every entity that may have any kind of engagement or involved in/with the activities of the road construction should comply with the EMP throughout the project lifespan. Non-compliance may have serious consequences e.g License withdrawal.

4.2 Environmental Management Act (No.7 of 2007)

Section 27 of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) provides a list of activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (herein referred to as: listed activities). The proposed road construction triggers the following listed activities.

The EMP should conform to the provisions of the Environmental Management Act (EMA), Act No. 7 of 2007 and EIA regulations of 2012 (Government Notice: 30).

The EIA Regulations defines a '*Management Plan*' as:

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

4.3 EMP Requirements

Table 4-1: EMP Requirements as outlined in Section 8 of the EIA Regulations

Requirement
(j) a draft management plan, which includes – *(aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure;* *(bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and* *(cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.*

4.4 Listed Activities

The proposed project triggers a number of Listed Activities as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) (herein referred to as the EMA) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) (herein referred to as the EIA Regulations).

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required. The EIA entails the development of the EIA Scoping Report and Environmental Management Plan (EMP) which should be submitted to the MET as part of the application for the ECC.

Table 4-2: Listed Activities triggered by the proposed project

Listed Activity	Activity Description	Relevance to the proposed project
Activity 3: Mining and Quarrying Activities:	3.2 The Other forms of mining or extraction of any natural resources whether regulated by law or not	Extraction of sand and gravel for road construction purposes.
Activity 8: Water Resource Development	8.1 The abstraction of ground or surface water for industrial or commercial purposes	The construction activities will require water which will be collected from boreholes.
Activity 10: Infrastructure	10.1 The construction of: b) Public roads	The project involves the construction of the DR3604

4.5 Legal Framework Relevant to the EMP

In addition to the EMA and the Environmental Assessment Policy, there exists a host of legal and policy documents and guidelines that must be considered when undertaking an EIA as indicated in table 5.3, below.

The proponent has the responsibility to ensure that the road construction conforms to all relevant National developmental plans and legal framework.

Table 4-3: Policies, Plans and Strategies

Policy / Plan	Relevancy/Summary	Applicability to the Proposed Project
6th National Development Plan (NDP6) and Vision 2030	Outlines the country's national development ambitions, in line with the Harambee Prosperity Plan, and Vision 2030. NDP5 incorporates the principles and recommendations contained in the Stockholm Declaration on the Human Environment (1972) and associated Action Plan, as well as Agenda 21 which merged from the Convention on Biological Diversity, Rio De Janeiro (1992).	The proposed project is a development that forms part of the bigger picture of achieving economic progression, social transformation and environmental sustainability.

Table 4-4: National Statutes

National Statutes	Relevance/Summary	Applicability to the Proposed Project
Environmental Management Act, 2007 (Act No. 7 of 2007)	Promote sustainable use of natural resources based on the principles of environmental management. Regulates environmental clearance certificate for listed activities	Provides the framework for the EIA and development of mitigation measures outlined in the EMP
Pollution Control and Waste Management Bill (in preparation and adopted as best practice)	Intent to repeal the outdated Atmospheric Pollution Prevention Ordinance (11 of 1976).	Aim to regulate and prevent the discharge of pollutants into the environment (land, air and water).
Water Resources Management Act, 2013 (No. 11 of 2013)	Came in force in August 2023. Provide framework for managing water resources based on the principles of integrated water resource management (IWRM)	Section 44 – Regulates water abstraction licenses Section 68 – Prevent water pollution. Section 69 and 72 regulates and licensing of wastewater treatment plants and effluent discharge
Soil Conservation, (Act 76 of 1969) and Amendment (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Through vegetation removal there may be the risk of affecting soil quality.
Forest Act 12 of 2001 Forest Act Regulations 2015	To provide for the protection of the environment and the control and management of forest.	Provision for the protection of protected or endangered plant species.
National Heritage Act, No. 27 of 2004.	The Act provides for the protection and conservation of places and objects with heritage / archaeological significance.	Potential for chance find of cultural heritage or archaeological artefacts
Public and Environmental Health Act (Act No. 1 of 2015)	The Public Health Act aims to protect the public from nuisance or other condition liable to be injurious or dangerous to health	The proponent should ensure that the workers are provided with protective gear to safeguard their wellbeing.
Labour Act No. 11 of 2007	Occupational Health is aimed at the promotion and maintenance of physical, mental and social wellbeing of workers in all occupations.	Prevent or manage work-related hazards and maintain healthy standards at the workplace and protection of workers against exploitations

5. RECEIVING ENVIRONMENT

The environmental baseline for the proposed project has been collected through a desktop study as well as a site assessment.

The assessment is categorised into two categories, the socio-economic aspect and physical and biological environment.

5.1 Socio – Economic Profile

5.1.1 Regional Profile

Oshikoto Region is one of Namibia's fourteen regions located in the northern part of the country. The region covers a total land area of 38 653 km^2 which occupies 4.69% of the country's total land surface. The region is strategically located to attract economic activities and opportunities as it stretches north wards, connecting the communal land and southern commercial areas.

The region has a relatively young population composition, with 31.9% of the population being between 15 and 34 years; while the elderly population aged 60 years and above is recorded at 8.3% (Namibia Statistics Agency, 2024).

5.1.2 Population and Demography

	2011	2023
Population Size		
Total	181 973	257 302
Males	87 066	127 374
Females	94 907	129 928
Annual growth rate (%)	1.2	2.9
Population in Urban/Rural areas, %		
Urban	13.0	18.3
Rural	87.0	81.7
Sex ratio: Males per 100 females	92	98
Population density		
People per sq. km.	4.7	6.7
Age composition, %		
Under 5 years	14.1	14.7
5 – 14 years	25.8	24.8
15 – 34 years	33.9	31.9
35 – 59 years	17.7	20.3
60+ years	8.5	8.3

Table 5-1: Population comparison for Oshikoto in 2011 and 2023

5.1.3 Economic activities

Trade in Oshikoto Region involves formal and informal traders ranging from multinational retail businesses to vendors selling home-made food and many others. Besides informal traders, most of the businesses are wholesalers and outlets as well as small shops, selling basic amenities and foodstuff.

Agriculture plays a vital role in Oshikoto Region's economy. In communal areas, most households practice subsistence farming, while commercial farming primarily occurs beyond the veterinary cordon fence, known as the "red line." Local markets are active in the sale of agricultural products. For many residents, agriculture provides both food for household consumption and income (combination of livestock and crop farming).

5.2 Physical Environment

5.2.1 Climatic Conditions and Rainfall

The Oshikoto Region, like much of Namibia, experiences a hot, semi-arid climate. Annual rainfall ranges between 400mm and 550mm, with precipitation decreasing from the northeast to the southwest (Oshikoto Regional Council , 2023). Tsumeb receives the most rainfall in the region. Temperatures typically range from 22.6°C to 30°C during winter, and between 30°C and 37°C in the hotter months (Oshikoto Regional Council , 2023). Tsumeb has the region's lowest average annual temperature at 22.0°C, while the coldest period is from June to July, averaging around 16.9°C.

5.2.2 Landscape and topography

The project area, like much of northern Namibia, lies within the Cuvelai Basin, characterized by a flat terrain that gently slopes from about 1,150 meters above sea level in the northeast to 1,080 meters at the Etosha Pan in the south (Christelis & Struckmeier, 2011). Specifically, the site is located within the Kalahari Sandveld landscape, which is dominated by savannah woodlands growing on wind-deposited sands accumulated over the past 70 to 56 million years. While generally flat, some areas feature sand dunes shaped by wind activity (Mendelsohn & Jarvis, Atlas of Namibiaa: A portrait of the land and its people, 2002).

In terms of topography, the Oshikoto Region is generally flat with an altitude ranging from 800 to 1,200m above sea level (Mendelsohn et al., 2009). The landscape of the project area falls under the Cuvelai System.

5.2.3 Soils and Geology

The North-central part of Namibia lies in the Owambo Basin, comprising a topographic depression that is filled with sediments (Mendelsohn , el Obeid, & Roberts , A Profile of North-Central Namibia, 2000). There are, however, other rock formations that are found along the rim of the basin, manifesting as hills and low ridges of rock outcrops.

The project area is underlain by thick sandy soils, silty sands and pedogenic material of Kalahari Group. The geological stratigraphy of the basin in the project area comprises of the following strata:

- Recent deposits that fall within the area of the Cuvelai-delta comprises of clayey sand and clay alluvial deposits (transported by water), which are present intermittently within large areas of eolian sand. The sandy and clayey deposits were reworked over time, forming a mosaic of soil types that consist mainly of clayey sodic sand (in the oshanas and depression areas) and sodic sand (in the surrounding higher ground). In principle, the sand remained at the original deposition site, while the silt and clay migrate and concentrates in the depression areas (processes of sheet wash and leaching).

- Kalahari Group: As is typical over vast areas of northern Namibia, Tertiary to Quaternary period unconsolidated deposits of windblown (eolian) origin are present in the whole region. These deposits (sand, calcrete and gravel) are generally thick, varying from 225m to 500m in areas, but may be as thin as 10m in areas where sub-outcrops of the Omingonde Formation, Karoo Sequence occurs (comprising red mudstone, siltstone, sandstone, grit and conglomerate).

5.2.4 Hydrogeology

The project area is located within the Cuvelai-Etosha Basin (CEB), which represents the Namibian portion of the Cuvelai River catchment. The CEB's hydrogeology also includes the regions of Omusati, Oshana, Ohangwena, and parts of Kunene. Groundwater in the project area is mainly found within the porous Kalahari sediments (Christelis & Struckmeier, 2011). In some parts of the basin, these sediments are underlain by bedrock formations such as limestone, sandstone, conglomerate, mudstone, and siltstone, which define the aquifer and lithological characteristics of the CEB (Christelis & Struckmeier, 2011). Groundwater flow in the area generally moves in a south-eastern direction toward the Etosha Pan.

5.3 Biological environment

5.3.1 Vegetation

The vegetation in Namibia's vegetation is largely shaped by rainfall patterns. The northeastern regions, which receive more rain, have greater plant diversity and taller, denser vegetation. In contrast, the western and southern areas, which are drier, feature sparser and shorter plant life.

The dominant vegetation type in the Oshikoto Region is Karstveld, part of the Savanna biome (Environmental Compliance Consultancy , 2025). Tree cover typically ranges from 11% to 25%, with trees averaging 2 to 5 meters in height. The most common plant species are *Colophospermum mopane* (Mopane) and *Terminalia sericea* (Environmental Compliance Consultancy , 2025). Mopane woodlands are especially important as they provide habitat for a variety of wildlife, including birds, insects, and small mammals.

5.3.2 Fauna

The road passes through a communal area where livestock farming is widely practiced. Livestock found in the area are such as goats, sheep, donkeys, cattle and pigs.

6. IMPACT ASSESSMENT METHODOLOGY

6.1 EIA Methodology

The EIA methodology applied to this EIA has been developed using the Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008); international and national best practice; and over 20 years of combined EIA experience. The method of each step in the EIA process is described in the next sections.

6.1.1 Screening

As per the Draft Procedures and Guideline for Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) (Ministry of Environment and Tourism, 2008), the determination of a proposal and if it triggers a Listed Activity in the EMA is the first stage of the EIA process. The proposed project triggers several Listed Activities as per Section 1.4 and therefore an ECC is required.

6.1.2 Alternatives Considered

As stipulated in the Environmental Management Act (EMA) and EIA regulations, alternatives should be considered during the project design, to determine if an alternative site (different locality) or alternative project (different project) would yield better land use productivity or socio-economic benefits.

The road already exists, there are no route deviations and thus no alternatives were considered for this project.

6.1.3 Scope of Assessment

The Scoping Process is a fundamental stage in the EIA process. Through a high-level assessment, the likely effects and severity of effects as a result of the development and operations of a proposed project can be identified. Any likely significant effects are taken forward for further assessment (detailed EIA). This stage is important in the EIA process to enable the assessment to be concise and focus on key issues that are central to efficient decision making.

If no likely significant effects are anticipated, a detailed EIA is not undertaken and a Scoping Report detailing the high-level assessment is submitted as part of the ECC application.

As there was uncertainty around the potential effects and their severity, a scoping process was undertaken for the proposed development. The Draft Procedures and Guideline for Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) (Ministry of Environment and Tourism, 2008) were followed to undertake the scoping stage.

The baseline environment that could be affected by the project was reviewed and potential effects on receptors identified. Receptors under the following aspects were considered (Ministry of Environment and Tourism, 2008):

- Geology and soils
- Topography
- Groundwater and surface water resources
- Environmentally sensitive areas
- Air quality
- Sound levels
- Socio-economics
- Infrastructure services
- Cultural resources
- Project Economics

Embedded mitigation and industry best practice measures were considered in the review and conclusion drawn identifying those effects that needed to be assessed further due to the potential severity and significance.

The findings of the scoping process are presented in chapter 7.

6.1.4 Detailed Impact Assessment

Through scoping, potential significant effects were identified. These potential effects are then considered further to determine the level of significance and identify additional mitigation required to avoid, reduce, or compensate for the effect.

6.1.5 Impact Significance

The level of significance is identified through the assessment process in order to understand the potential severity of the effect and identify appropriate mitigation. The significance of effect after mitigation is also considered during the decision-making.

The significance of an impact is determined by considering and measuring the temporal and spatial scales and magnitude of the project and the specific activities associated with the project.

6.1.6 Impact Assessment Criteria

For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** and **DURATION** will be described. These criteria are used to ascertain the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure/s in place.

The mitigation described in the Scoping Report and EMP would represent the full range of plausible and pragmatic measures.

Table 6-1: **Assessment criteria for the evaluation of impacts**

CRITERIA	CATEGORY	DESCRIPTION
Sensitivity or importance/value of receptor	**High**	Of value, importance or rarity on a national scale, and with very limited potential for substitution; and/or Very sensitive to change, or has little capacity to accommodate a change.
	Medium	Of value, importance or rarity on a regional scale, and with limited potential for substitution; and/or Moderate sensitivity to change, or moderate capacity to accommodate a change
	Low	Of value, importance or rarity on a local scale; and/or Not particularly sensitive to change, or has considerable capacity to accommodate a change.
Extent or spatial influence of impact	**National**	Beyond a 20km radius of the site
	Regional	Within a 20 km radius of the site
	Local	Within a 2 km radius of the centre of the site
	Site specific	On site or within the boundaries of the property
	Zero	
Magnitude of impact (at the indicated spatial scale)	**High**	Natural and/ or social functions and/ or processes are *severely* altered
	Medium	Natural and/ or social functions and/ or processes are *notably* altered
	Low	Natural and/ or social functions and/ or processes are *slightly* altered
	Very Low	Natural and/ or social functions and/ or processes are *negligibly* altered
	Zero	Natural and/ or social functions and/ or processes remain *unaltered*
Duration of impact	**Zero**	Zero time
	Short Term	Up to 18 months
	Medium Term	0-5 years (after operation)
	Long Term	5- 10 years (after operation)
	Permanent	More than 10 years (after operation)
Probability	**Definite**	Estimated greater than 95 % chance of the impact occurring.
	Very likely	Estimated 50 to 95% chance of the impact occurring
	Fairly likely	Estimated 5 to 50 % chance of the impact occurring.
	Unlikely	Estimated less than 5 % chance of the impact occurring.
	Zero	Definitely no chance of occurrence

CRITERIA	CATEGORY	DESCRIPTION
Confidence	Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.
Reversibility	Irreversible	The activity will lead to an impact that is permanent.
	Reversible	The impact is reversible, within a period of 10 years.

6.1.7 Impact Severity

Impact severity = impact significance. The impact significance is determined using the TEC Scale **(below).**

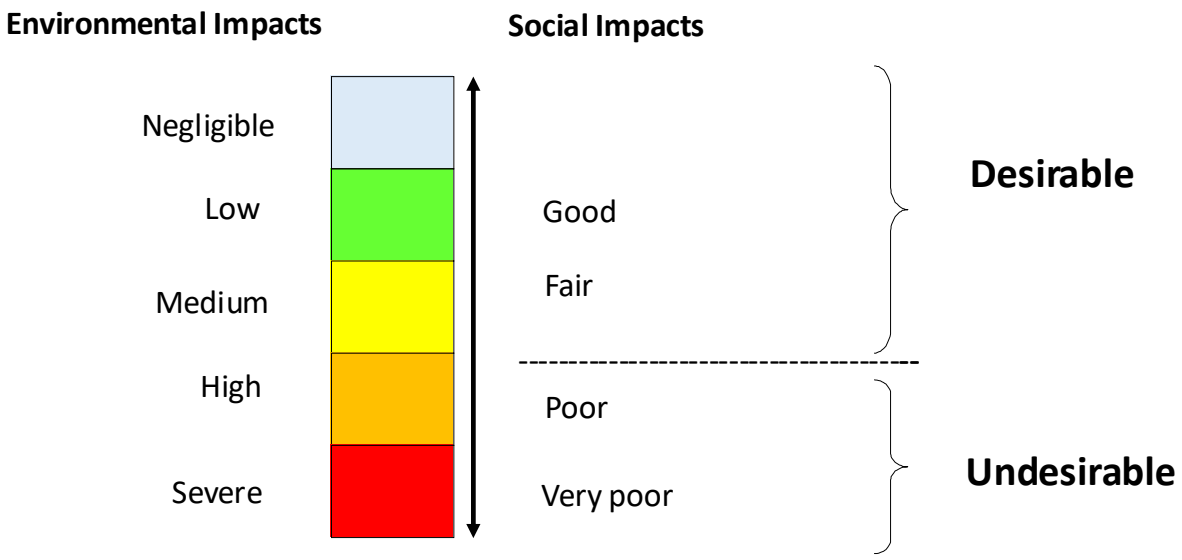

Figure 6-1: Impact Assessment Scale (Source: TEC, 2025)

6.1.8 Impact Significance

The significance of an impact is identified determined by qualifying the potential severity of the effect, before and after mitigation. The impact significance after mitigation should be considered during the decision-making process.

The significance of an impact is determined by assessing the magnitude of scale (both temporal and spatial.

Significance is not defined in the Namibian EIA Regulations, however the Draft Procedure and Guidance for EIA and EMP states that the significance of a predicted impact depends upon its context and intensity and qualified into the following categories, as guided by literature:

- **High**: effects associated with features or resources of national importance and, if lost, cannot be replaced, and thus likely to be key decision-making factors.
- **Medium**: effects associated with the features or resources of regional importance, but which are unlikely to be key decision-making factors.
- **Low**: effects considered to be local importance, but unlikely to be critical to decision-making factors.

Impact significance is determined by multiplying the potential severity of the effect, and qualitative assessment of the receptor sensitivity and magnitude of change. If effects garner a severity score, they are considered to be significant.

For significant impacts, supplementary assessments / Specialist studies may be required to further enhance understanding on the consequences (e.g through modelling or other assessment techniques) and identification of appropriate mitigation measures to reduce the effect.

6.2 Assessment of Cumulative Impacts

The Environmental Assessment Policy in Namibia requires cumulative environmental impacts to be considered in all environmental assessment processes.

Cumulative impacts can arise when a single resource or receptor is affected by more than one impact or activity of the proposed project. For example, the view of a local resident's property could be altered through the construction phase of the proposed development and noise levels could increase due to excavation activities. In isolation, the impacts may be insignificant, however when combined, the impacts on the local resident may result in a significant impact.

Cumulative impacts may also arise as a result of the combination of two or more projects on the same receptor. The receptor could be affected by the same activities of these projects resulting in the same impact or by completely different activities resulting in different impacts. An example of this is as follows; dust generated during the construction stage of the proposed project may not cause a significant effect in isolation; however, a sensitive receptor (e.g. local resident) may be significantly impacted when dust from the proposed project is combined with noise generated from other projects.

A high-level cumulative impact assessment has been undertaken for the proposed project as part of the scoping phase as the anticipated effects are expected to be local and of minor significance. If effects were determined to be significant, a detailed EIA would be required.

6.3 Mitigation Measures

For each impact assessed during the scoping phase and detailed assessment, mitigation measures are identified to reduce and/ or avoid negative impacts. These mitigation measures are also incorporated in the EMP to ensure that they are implemented throughout the lifespan of the proposed project.

The EMP forms part of the Scoping Report, and upon project approval, the implementation thereof, would become a binding requirement.

6.3.1 Mitigation Hierarchy

Actions to mitigate a potential impact can be done in as systematic manner as guided by what is referred to as Mitigation Hierarchy (Figure 4.1).

From the onset, the positive impacts of the proposed project should be **enhanced**, however, where an impact in is inevitable, the following sequence should be followed.

Impact avoidance: This step is most effective when applied at an early stage of project conceptualization and planning. It can be achieved by:

- Not undertaking certain projects or elements that could result in adverse impacts;
- Avoiding areas that are environmentally sensitive; and
- Putting in place preventative measures to stop adverse impacts from occurring.

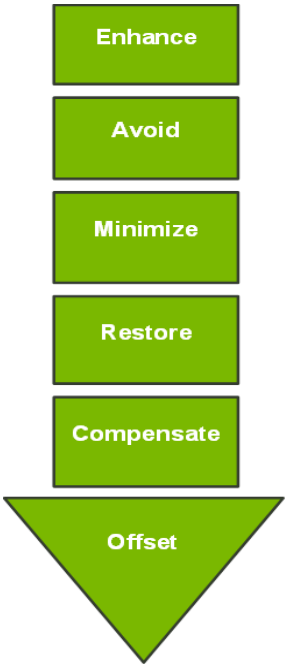

Figure 6-2 - Mitigation Hierarchy

Impact minimisation: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- Scaling down or relocating the proposal;
- Redesigning elements of the project; and
- Taking supplementary measures to manage the impacts.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- Rehabilitation of the affected site or environment, for example, by habitat enhancement;
- Restoration of the affected site or environment to its previous state or better; and
- Replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

7. ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT

7.1 Socio-Economic Impacts

Namibia has one of the highest unemployment rates in the world. According to the Namibia Statistics Agency (NSA, 2025), the official unemployment rate in 2024 is estimated at 37% of the labour force, and the majority (47%) of the unemployed is the youth (including graduates from Universities and Vocational Training Centres).

However, economists from independent institutions dispute the Government or NSA's estimate of 37%, arguing that NSA has changed the "Unemployment Definition" and that the unemployment rate in Namibia is much higher. In a Newspaper Article dated 01 February 2025, Tannan Groenewald from Cirrus Capital data and analytics, argues that if the broad definition of unemployment historically used is applied, only about 46.2 of the working-age population is employed and the true unemployment stands at 54.8%.

7.1.1 Improved access to essential services

Impact category	Access to essential services

Negative impacts	Key mitigation measures to maintain or improve +ve impacts
• Poor access to clinics, hospitals and schools • Poor road conditions is high risk for accidents • Prolonged travel time • High vehicle maintenance	• Improved access to clinics, hospitals and schools • Reduced accidents • Reduced travel time

Before Project Commencement							After Project Completion						
Impact type	Extent	Magnitude	Duration	Probability	Confidence	Significance	Impact type	Extent	Magnitude	Duration	Probability	Confidence	Significance
+Ve	Local	Medium	Medium-term	Very likely	Sure	Very poor	+Ve	Local	Medium	Long-term	Definite	Certain	Good

Monitoring			
Monitoring Aspects	**Frequency**	**Responsibility**	**How**
• Community access and feedback	Annually	Local authority Proponent	Surveys and traffic records

7.1.2 Short-term employment opportunities

Impact category	**Road Construction will create Short-term Employment Opportunities for locals**

Negative impacts	**Key measures to maintain or improve +ve impacts**
• High unemployment • Poor livelihoods • Breeding ground for crime (livestock theft, house / cuca shop break-ins, robberies – restricted community movements)	• Prioritise job opportunities for locals during the construction phase • Provide on-site training and fair wages

Before Project Commencement							**After project commencement**						
Impact type	**Extent**	**Magnitude**	**Duration**	**Probability**	**Confidence**	**Significance**	**Impact type**	**Extent**	**Magnitude**	**Duration**	**Probability**	**Confidence**	**Significance**
+Ve	Local	Medium	Medium-term	Very likely	Sure	Very poor	+Ve	Local	Medium	Long-term	Definite	Certain	Fair

Monitoring			
Monitoring Aspects	**Frequency**	**Responsibility**	**How**
• Number of new employment opportunities created • Number of local people employed • Compliance with labour laws	Quarterly	Contractor / Site manager Ministry of Labour / Contractor	Employment records and database Labour inspection reports

7.1.3 Rural Development and Local economic growth

Impact category	**Establishment of new businesses and increase in investment opportunities**

Negative impacts	**Key measures to maintain or improve +ve impacts**
• Poor road condition unattractive for businesses development • Poor local economy, household incomes and livelihoods	• Establishment of new businesses • Improvement in household incomes and livelihoods • Stimulate micro-enterprises and increase demand for local goods.

Before Project Commencement							**After project Completion**						
Impact type	Extent	Magnitude	Duration	Probability	Confidence	Significance	Impact type	Extent	Magnitude	Duration	Probability	Confidence	Significance
+Ve	Local	Medium	Medium-term	Very likely	Sure	Poor	+Ve	Local	Medium	Long-term	Definite	Certain	Good

Monitoring

Monitoring Aspects	**Frequency**	**Responsibility**	**How**
• Income levels and livelihood improvements • Number of new businesses established	Annually	Local authority Proponent	Household surveys and physical observations

7.2 Construction related impacts

7.2.1 Vegetation clearance

Impact source	Site clearance and excavation with heavy and mobile equipment	**Key Mitigation Measures:** • Adhere to site vegetation clearance checklist / procedure • i.e. avoid removal of protected tree species which do not directly affect the construction • explore option to relocate and replant some plants such as aloe plants
Classification	Vegetation clearance	
Potential Negative Impacts: • Unselective removal of protected tree species currently on project site		

Without Mitigation							**With Mitigation**						
Impact type	Probability	Extent	Duration	Severity	Reversible	Significance	Impact type	Probability	Extent	Duration	Severity	Reversible	Significance
-ve	Definite	Local	Short-term	Severe	No	Medium	-ve	Definite	Site specific	Short-term	Low	Yes	Low
Qualitative assessment							**Qualitative assessment**						

Monitoring Program			
Monitoring Aspects	**Frequency**	**Responsibility**	**How**
• Number of trees species removal versus species saved • Number of trees or plant species relocated and successfully replanted	Weekly / Monthly	Site manager Authority (Environmental Compliance Officer)	Physical observations

7.2.2 Water Demand

<table>
<tr><td colspan="2">Impact source</td><td colspan="7">Water abstraction for construction activities</td><td colspan="7" rowspan="2">Key Mitigation Measures:
• Abstraction volumes to be within licensed and sustainable limits.
• Conduct borehole testing to determine borehole yield and optimum water abstraction rates.
• Allow borehole resting for recharge</td></tr>
<tr><td colspan="7">Potential Negative Impacts:
• Over-abstraction</td></tr>
<tr><td colspan="7">Without Mitigation</td><td colspan="7">With Mitigation</td></tr>
<tr><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td></tr>
<tr><td>-ve</td><td>Definite</td><td>Local</td><td>Short-term</td><td>Severe</td><td>No</td><td>Severe</td><td>-ve</td><td>Definite</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>Yes</td><td>Low</td></tr>
<tr><td colspan="7">Qualitative assessment</td><td colspan="7">Qualitative assessment</td></tr>
<tr><td colspan="14">Monitoring Program</td></tr>
<tr><td colspan="5">Monitoring Aspects</td><td colspan="3">Frequency</td><td colspan="4">Responsibility</td><td colspan="2">How</td></tr>
<tr><td colspan="5">• Water abstraction volumes</td><td colspan="3">Weekly / Monthly</td><td colspan="4">Contractor / Proponent

Authority (Environmental Compliance Officer)</td><td colspan="2">Physical observation and measurements</td></tr>
</table>

7.2.3 Sand and Gravel Mining

<table>
<tr><td colspan="2">Impact source</td><td colspan="7">Sand and gravel for construction (excavation)</td><td colspan="7" rowspan="2">Key Mitigation Measures:
• Smoothen the borrow pit edges to ensure that the angles are not steep sloped, but rather gentle sloped at less than < 30° slope angles.
• Borrow pit edges should be gentle so that the is no tipping point, where people or livestock can fall in. Meaning even if the is water, people and livestock can go in with minimal danger.</td></tr>
<tr><td colspan="9">Potential Negative Impacts:
• Dangerous Vertical / Steep borrow pit slopes (>30°)
• Risk of animals and people falling into the pits (tipping slopes)
• Steep slopes make it difficult for animals and people to move in and out and the borrow pits
• Risk of drowning or getting stuck in mud (especially during rainy season when pits fill with water)</td></tr>
<tr><td colspan="9">Without Mitigation</td><td colspan="7">With Mitigation</td></tr>
<tr><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td></tr>
<tr><td>-ve</td><td>Definite</td><td>Local</td><td>Short-term</td><td>Severe</td><td>No</td><td>Severe</td><td>-ve</td><td>Definite</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>Yes</td><td>Low</td></tr>
<tr><td colspan="9">Qualitative assessment</td><td colspan="7">Qualitative assessment</td></tr>
<tr><td colspan="16">Monitoring Program</td></tr>
<tr><td colspan="6">Monitoring Aspects</td><td colspan="3">Frequency</td><td colspan="4">Responsibility</td><td colspan="3">How</td></tr>
<tr><td colspan="6">• Steepness of borrow pit edges
• Safety measures (signage/ fencing)</td><td colspan="3">Monthly</td><td colspan="4">Contractor / Site manager
Authority (Environmental Compliance Officer)</td><td colspan="3">Physical observations
Community feedback</td></tr>
</table>

7.2.4 Dust

Impact source	Site clearance, excavation with heavy mobile equipment and transportation of sand	**Key Mitigation Measures:** • Adhere to site standard/safe operating procedure (cover trucks when transporting sand) • Identify and implement appropriate Personal Protective Equipment (PPEs) as a result resort to prevent or reduce exposure to workers • Dust suppression • Speed limit as per existing site policy
Potential Negative Impacts: • Employee exposure to contaminated dust since area is already disturbed site • Dust emission to environment with potential increase background dust emission		

Without Mitigation							**With Mitigation**						
Impact type	Probability	Extent	Duration	Severity	Reversible	Significance	Impact type	Probability	Extent	Duration	Severity	Reversible	Significance
-ve	Definite	Local	Short-term	Severe	No	High	-ve	Definite	Site specific	Short-term	Low	Yes	Low
Qualitative assessment							**Qualitative assessment**						

Monitoring Program			
Monitoring Aspects	**Frequency**	**Responsibility**	**How**
• Dust fallout and dust chemical analysis • Workers exposure to dust • Community dust complaints	Weekly / Monthly	Contractor / Site Manager Authority (Environmental Compliance Officer)	• Laboratory analysis • Use of respirable dust samplers, PPE audits • Complaint registers

7.2.5 Noise from Earthmoving Equipment

<table>
<tr><td colspan="2">Impact source</td><td colspan="5">Excavation works</td><td colspan="7" rowspan="2">Key Mitigation Measures:
• Where possible, install silencer in machinery exhaust to reduce noise levels
• Avoid working late at night or under bad weather (heavy rain or wind)
• Provide earmuffs to workers in high-noise zones
• Prevent abnormal noise from earthmoving machinery (below the recommended noise levels of -85dB (A)).</td></tr>
<tr><td colspan="7">Potential Negative Impacts:
• Abnormal and excessive noise is not just a nuisance, but can lead to health issues (hearing, poor sleep, fatigue, etc)</td></tr>
<tr><td colspan="7">Without Mitigation</td><td colspan="7">With Mitigation</td></tr>
<tr><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td><td>Impact type</td><td>Probability</td><td>Extent</td><td>Duration</td><td>Severity</td><td>Reversible</td><td>Significance</td></tr>
<tr><td>-ve</td><td>Definite</td><td>Local</td><td>Short-term</td><td>Severe</td><td>No</td><td>High</td><td>-ve</td><td>Definite</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>Yes</td><td>Low</td></tr>
<tr><td colspan="7">Qualitative assessment</td><td colspan="7">Qualitative assessment</td></tr>
<tr><td colspan="14">Monitoring Program</td></tr>
<tr><td colspan="4">Monitoring Aspects</td><td colspan="3">Frequency</td><td colspan="4">Responsibility</td><td colspan="3">How</td></tr>
<tr><td colspan="4">• Noise levels (dB) near machinery
• Worker exposure
• Community complaints on noise</td><td colspan="3">Monthly</td><td colspan="4">Contractor / Site Manager
Authority (Environmental Compliance Officer)</td><td colspan="3">• Decibel meter readings
• PPE compliance audits
• Maintain log of complaints</td></tr>
</table>

7.2.6 Contractors camp

Classification:	Contractors Temporary Camp Domestic Waste (Solid and Wastewater)						**Key Mitigation Measures:** • Adequate solid waste management *(contain – drums / bins, sort, burn combustible materials and recycle non-combustible materials)* • Awareness on the impacts of open defecation *(stench smell, used toilet papers blown by the wind all over the place, food contamination by flies, potential water contamination from faecal waste, etc)* • Recommend Flushing toilets with provision of a containerized septic tank, honey sucked for disposal at approved oxidation ponds, or • Adequate pit latrines: Ventilated (closed air-vent), slab (removable), toilet pot (closed)						
Scale	The number of workers is yet to be determined upon project commencement. The project duration is 24 Months.													
Potential Negative Impacts: • Lack of ablution facilities – leading to open defecation, environmental pollution (scattered human waste), stench smell and washing of faecal waste into water streams • Long-drop toilets – not suitable for bigger groups (>50 people) over long period at one site (e.g 24 months) • Poor solid waste management – throw away culture														
Without Mitigation							**With Mitigation**							
Impact type	Probability	Extent	Duration	Severity	Reversible	Significance	Impact type	Probability	Extent	Duration	Severity	Reversible	Significance	
-ve and +ve	Definite	Local	Long-term	Medium	Yes	**High**	-ve	Definite	Site specific	Short-term	Low	Yes	**Low**	
Qualitative assessment							**Qualitative assessment**							
Monitoring Program														
Monitoring Aspects					**Frequency**		**Responsibility**				**How**			
Adequate Ablution facilities Containerised septic tank Wastewater collection schedule and records Waste bins, collection schedule and records					Weekly		Contractor / Site Manager Authority (Environmental Compliance Officer)				Physical observations Records			

8. CONCLUSION

The environmental assessment employed standard EIA Methodology, National regulatory framework and best practices.

Appropriate mitigation measures have been identified for all social and environmental receptors.

On that basis, TEC recommends issuance of an ECC, on conditions that the management and mitigation measures specified in the ESMP are implemented and adhered to.

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