ENVIRONMENTAL SCOPING REPORT FOR

THE CONSTRUCTION TO LOW VOLUME SEAL ROAD STANDARD OF ACCESS ROADS TO SCHOOLS AND CLINICS NAMELY DR 3562: MAKANGA ACCESS ROAD (3.54KM) AND DR 3525: MASIDA ACCESS ROAD (3.05KM) IN ZAMBEZI REGION (6.58KM)

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TABLE OF CONTENTS

List of Figures

List of Tables:

Disclaimer:

1. EXECUTIVE SUMMARY

The Roads Authority of Namibia (RA) appointed Tulipamwe Consulting Engineers (TCE), to perform consultancy services for the construction to Low Volume Seal Road standard of access roads to schools and clinics namely DR 3562: Makanga Access Road (3.54km) and DR3525: Masida Access Road (3.05km) in Zambezi Region (6.58km)

Enviro Management Consultants Namibia was then appointed to conduct a site visit, facilitate the Public Participation Process and identify and assess the environmental impacts this proposed project will have on the socio-economic and bio-physical environment. Furthermore, to compile an Environmental Management Plan to avoid or mitigate any negative environmental impacts and enhance the positive impacts associated with this project.

Due to the poor state of the access roads to education and health care facilities, the existing road will be upgraded to a Low Volume Seal Road for a distance of 6.58km.

The proposed project sets out to stay on the existing road alignment as far as possible and add drainage structures where required by design.

During the EA process the concerns of Stakeholders and all relevant natural environmental considerations were considered.

We are convinced that this project will not have a detrimental negative impact on the environment and that the positive impacts associated with this project will out weight the negative impacts associated with the construction and operational phases of the roads.

2. INTRODUCTION

Enviro Management Consultants Namibia is appointed by Tulipamwe Consulting Engineers, on behalf of the Roads Authority of Namibia, to conduct a site visit to the project areas, assess the environment and compile the Environmental Scoping report indicating the impacts this proposed project will have on the socio-economic and bio-physical environment.

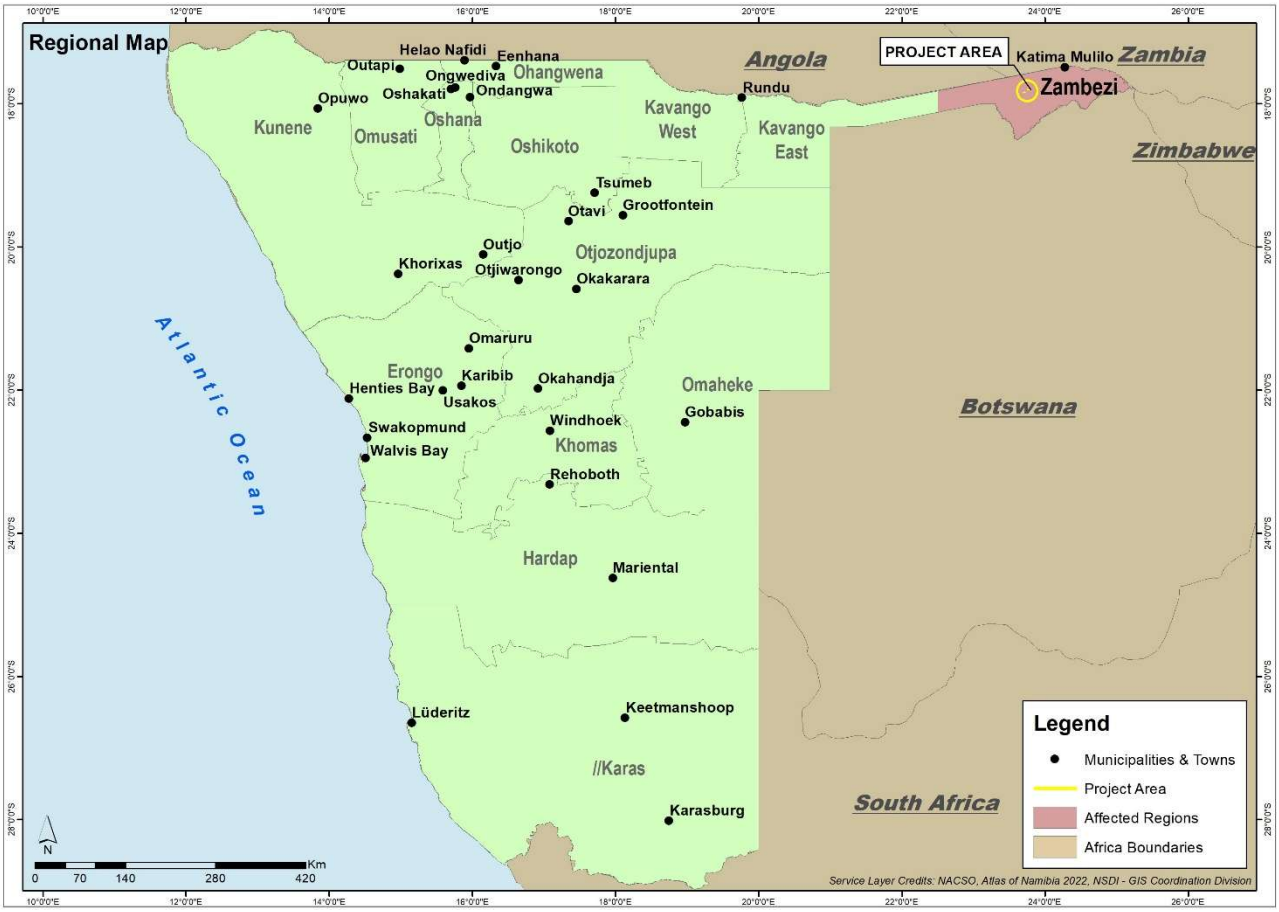


Figure 1: Regional map (Source: M Prickett)

The project is in northeastern Namibia and lies in the Linyanti Constituency in the Zambezi Region. The roads provide access to the villages of Makanga and Masida from the main road T0806 between Kongola and Katima Mulilo.

The objectives of this project can be summarized as follows:

- Improve road user safety,
- Improve road transport efficiency,
- Reduce road user costs,
- Reduce road maintenance costs,
- Improve general road network.

The upgrading will generally entail the following:

- The upgrade to low volume seal,
- The improvement to vertical and horizontal alignment where required,
- The improvement of road width,
- The upgrading of all intersections in accordance with the relevant specifications,
- Improvement of the drainage facilities along the route,
- Improvement of road furniture.

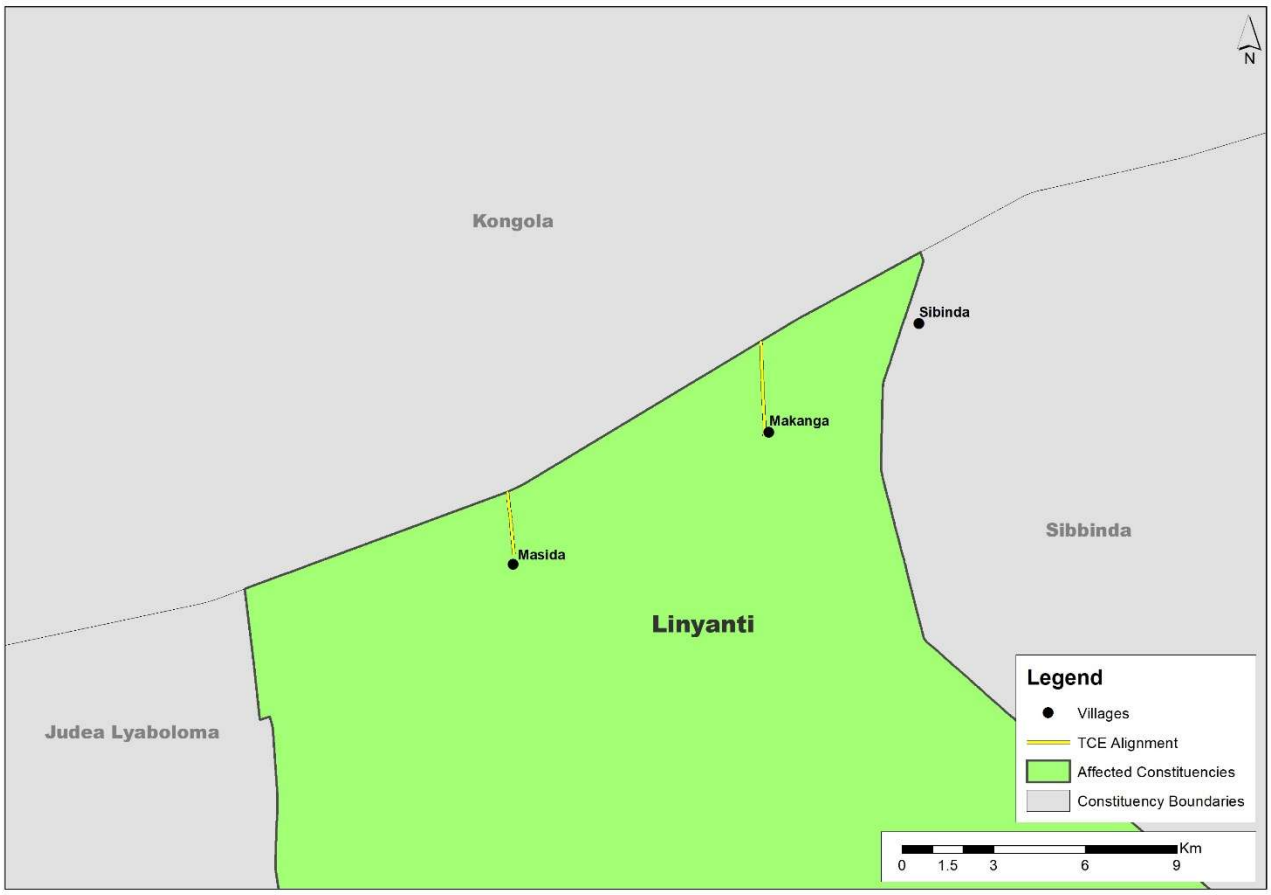


Figure 2. Constituency Map (Source: M Prickett)

This environmental assessment process focuses on two road sections, the access roads to schools and clinics in the Makanga and Masida villages. These roads are namely DR3562 - Makanga Access Road which is 3.54km long and DR3525 - Masida Access Road which is 3.05km long, the total length of the roads that will be upgraded is 6.58km long.

It is the intention of the design team to stay on the existing alignment as far possible therefore limiting the environmental impacts associated with clearing of vegetation and disturbance of communities, people, livestock and wildlife.

The following pictures show the current road conditions.

Figure 3. Photos of current condition of roads (Source: M Prickett)

A site visit was conducted in February 2025, the purpose of the visit was to determine the possible sensitivity of the area. There were no environmental specialist investigations conducted for the purpose of this Environmental Assessment Report.

2.1 RESOURCES REQUIRED FOR THE PROJECT

2.1.1 Borrow Pits

Suitable material is needed for the Subbase and Base layers during the construction of the road. Filling material is also required to ensure the vertical alignment of the road is according to engineering standards required in Namibia.

To achieve the abovementioned, suitable material is required from borrow pits. These pits are opened using various heavy-duty machines and the material is hauled from the pit to the required sections of the road where the material is needed. It is imperative that the material excavated fits the engineering standards required for the construction of the road and is therefore tested on a regular basis.

Another important issue is hauling distance. The borrow pits cannot be situated too far from the section of the road where the material is needed, therefore borrow pits cannot be located too far apart (incurring costs due to hauling).

Two potential G5 borrow pit positions were identified on the proposed new routes on the DR3562: Makanga access road and the DR3525: Masida access road in the Zambezi Region of Namibia. After a discussion with the local RA representative for the area, only a stockpile sample was collected from the area of Masida, as RA does not want to have heavy traffic on the newly built gravel road nearby.

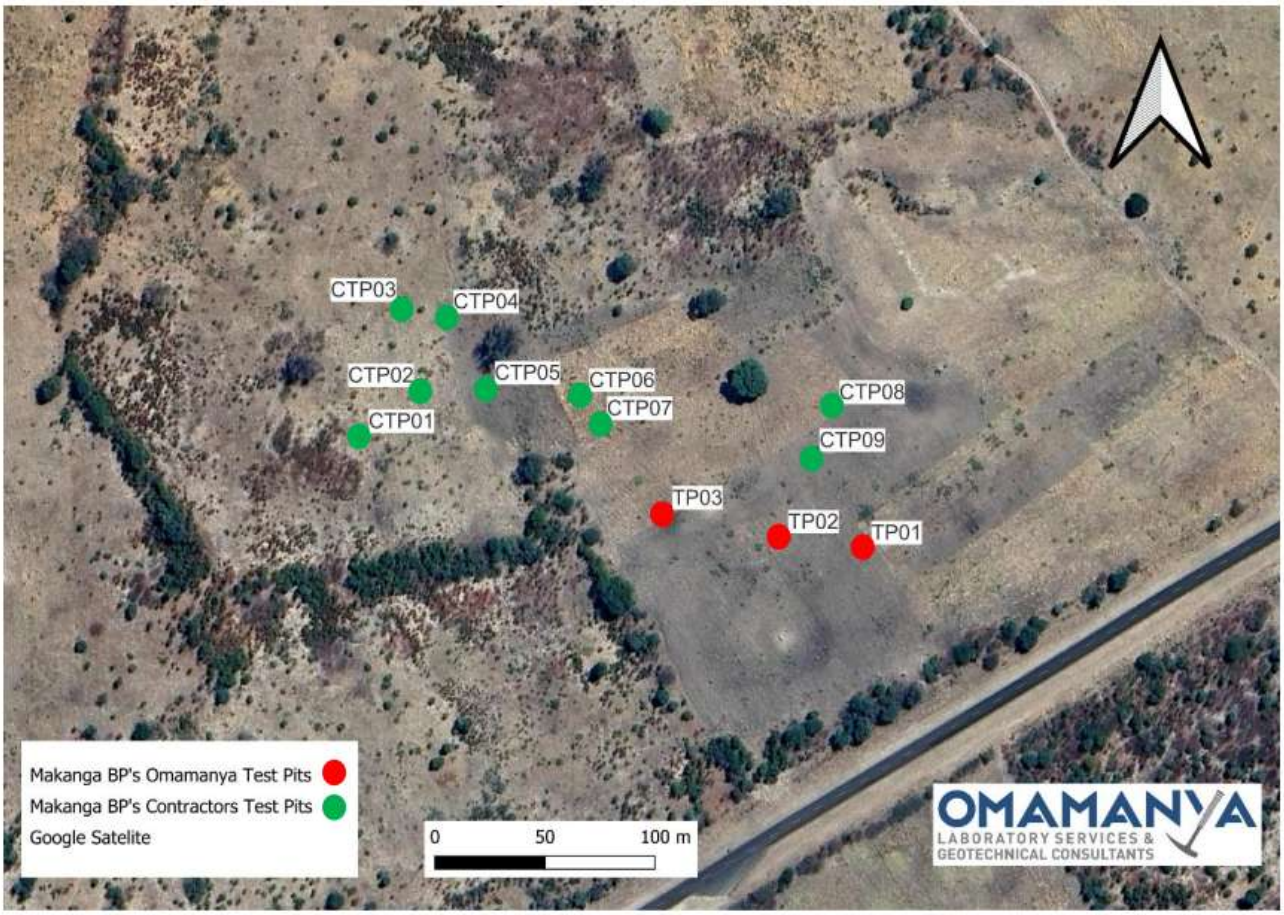


Figure 4. Makanga borrow pit positions (Source: Omamanya Geotechnical Consultants)

Figure 5. Masida borrow pit position (Source: Omamanya Geotechnical Consultants)

The material on site was visually inspected to be of G5 quality in November 2024, however laboratory testing done by GMTS in Katima Mulilo which was completed in February 2025 yielded different results. A list of test pit positions at the identified borrow pit sites for this project is presented under Table 1. The investigation report and test results can be found under **Appendix F**.

Table 1. List of test pit positions at the identified borrow pit sites (Source: Omamanya Geotechnical Consultants)

Borrow-pit ID	Road	General Description	Approx. Chainage (km)	Co-Ordinate		Distance from CL (m)	Approx. Area (ha)	Possible Material Quality	Proposed Use
				Lat	Long				
TP01	Makanga Access Road	Test Pit		-17.784308°	23.781451°				
TP02	Makanga Access Road	Test Pit		-17.784261°	23.781094°			G	
TP03	Makanga Access Road	Test Pit		-17.784159°	23.780672°			G6	

CTP01	Makanga Access Road	Test Pit		-17.783831°	23.779297°				
CTP02	Makanga Access Road	Test Pit		-17.783634°	23.779534°			<G9	
CTP03	Makanga Access Road	Test Pit		-17.783269°	23.779460°				
CTP04	Makanga Access Road	Test Pit		-17.783319°	23.779659°				
CTP05	Makanga Access Road	Test Pit		-17.783624°	23.779836°			<G9	
CTP06	Makanga Access Road	Test Pit		-17.783656°	23.780241°				
CTP07	Makanga Access Road	Test Pit		-17.783776°	23.780317°			G	
CTP08	Makanga Access Road	Test Pit		-17.783707°	23.781313°			G6/G7	
CTP09	Makanga Access Road	Test Pit		-17.783912°	23.781228°			G	
1	Masida Access Road	Stockpile		-17.869813°	23.673301°			G6	

Locations of additional borrow pits with potential material were identified by the Consulting Engineer/Contractor and are presented under Table 2 below, these were not part of the original investigation and thus not included in the investigation report from Omamanya Geotechnical Consultants.

Table 2. Additional borrow pits identified (Source: Mr. Bodrick Sinvula (TCE))

Borrow-pit ID	Road	General Description	Approx. Chainage (km)	Co-Ordinate		Distance from CL (m)	Approx. Area (ha)	Possible Material Quality	Proposed Use
	Makanga Fill Borrow Pit			-17.788734°	23.777597°				
	Masida Fill Borrow Pit			-17.835604°	23.702120°				
	Masida Borrow Pit 2			-17.840091	23.708297°				

2.1.2 Construction Water Requirements

Water for construction purposes may be obtained from existing and new boreholes which are found in the surrounding project area.

New boreholes were identified, and drilling was done in January 2025 by the contractor Chikalyomba Investment CC. Locations of new boreholes are presented in Table 3 below.

Table 3. Borehole positions (Source: Mr Bodrick Sinvula/Mr Clyde Besser, TCE)

Site ID	Road	WW	Co-Ordinate		Depth (m)	Yield (m^3/h)	Water level (m)	Basin?
			Lat	Long				
Makanga Borehole	DR3562	NEW	-17.810483˚	23.778176˚	120m			
Masida Borehole	DR3525	NEW	-17.842413˚	23.703669˚	150m			

Any temporary pipelines supplied and laid by the Contractor shall be removed before or at the end of the construction period.

The Contractor shall plan with relevant authorities for procuring, transporting, storing, distributing, and applying water as may be needed for construction and other purposes. The Contractor remains responsible in terms of Clause A 2.2.7 and Clause A 2.2.8 of the Standard Specifications for the supply of water. The early establishment of water sources will be crucial to maximise time for construction of the road.

2.1.3 Residues and Emissions During Construction

Due to the type of activities that are associated with the construction of roads it is very unlikely that any toxic materials will be present on site. The only risk might be hazardous hydrocarbon substances such as fuels (diesel and petrol) and oils used by the construction machines.

Bitumen will be used for sealing the newly constructed roads. Bitumen in itself is a stable hydrocarbon substance, but the "prime" medium is very volatile and should be considered as a hazardous liquid. The cleaning of bitumen tanker nozzles and cleaning of the bitumen trucks always poses a challenge when it comes to environmental management.

Domestic and camp construction wastes generated at the contractor camps can very easily be managed due to the proximity to the existing town of Kongola. Proper waste management principles should be enforced as stipulated by the Environmental and Social Management Plan (ESMP).

Sewage management is a great concern at any construction camp. Proper planning of the sewage facilities should be done at the start of such a project to prevent sewage overflow and contamination of soils and water. The number of workers should be determined, and the sewage facilities planned accordingly. The location of the contractor's camp has been identified.

3. ASSUMPTIONS AND LIMITATIONS

It is assumed that the information provided by the Consulting Team and the information in the Draft Design Report and other relevant documentation used for the compilation of this Environmental Report is accurate and relevant to this date. It is also assumed that the secondary data collected for the bio-

physical and socio-economic environments are true and correct. These include data sources associated with printed books, data available on the internet and other studies as indicated in this report. The Contract determined the available time and funds available to complete this project.

4. DETAILS OF THE APPLICANT AND CONSULTANT

4.1 Details of the Applicant

Applicant	Roads Authority of Namibia
Contact Person	Mr. Pedro Muzumi
Contact Information Telephone: Email:	 +264 81 129 9651 muzumip@ra.org.na

4.2 Details of the Environmental Consultant

The environmental project team from EMCN is led by Rian du Toit. He is an Environmental Assessment Practitioner with more than twenty years' working experience in the field of Environmental Management.

Name	Role in the Project	Qualifications and Experience
Rian du Toit	Environmental Assessment Practitioner	M.A. Environment and Society (University of Pretoria) with more than 22 years' experience in the field of environmental management, mostly related to roads, services, transmission lines and mining right applications.
Maike Prickett	GIS Specialist & Socio-Economist	B.Sc. Information Systems & Geography (UNISA) with more than 15 years' experience in the field of GIS and more than 10 years' experience in socio-economic baseline studies, mostly related to roads, railway, agriculture, tourism and mining projects.

5. LEGAL FRAMEWORK

This section deals with the regulatory requirements that are applicable to this project.

THE NAMIBIAN LEGISLATIVE FRAMEWORK

During the preparation of the Scoping Report, the following legislation and policies were considered:

- Environmental Management Act 7 of 2007 ;
- Environmental Regulations of 2012;

- Roads Authority Environmental Manual of 2014
- Road Ordinance 17 of 1972

The activities listed in Table 1, as contained in Appendix B of the Republic of Namibia's Environmental Regulations, may be applicable and will require Environmental Clearance.

Table 4: Listed Activities in Terms of the Environmental Management Act

Activity No.	Activity Description
10.2	The route determination of roads and design of associated physical infrastructure where - (a) it is a public road. (b) the road reserve is wider than 30 meters; or (c) the road caters for more than one lane of traffic in both directions.

Currently, Environmental Impact Assessments are guided and reviewed by the Directorate of Environmental Affairs (DEA) in the Ministry of Environment, Forestry and Tourism. Guidelines for various projects have been compiled to help improve EIA practice in Namibia. There are several sector laws in Namibia that have relevance to Scoping and EIAs. The following table provides a summary of the relevant sector legislation.

Statute	Provisions	Project Implications
Forest Act 12 of 2001	Provision for the protection of natural vegetation. No regulations promulgated yet. Section 22(1): It is unlawful for any person to "*cut, destroy or remove:* • any living tree, bush or shrub growing within 100 meters from a river, stream or watercourse on land that is not part of a surveyed erf or a local authority area without a license. • Vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilizing the sand or gully.	• Permits should be obtained from Department of Forestry for the removal of protected trees.
National Heritage Act 27 of 2004	Heritage resources to be conserved in development.	All archaeological sites to be identified and protected.
Nature Conservation Ordinance 4 of 1975	Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants	In case there is an intention to remove protected species, then permits will be required.

Statute	Provisions	Project Implications
	without a permit.	
Preservation of Trees and Forests under the Forest Act, 2001.	Protection to tree species.	The Contractor will require a permit to remove any protected trees.
Soil Conservation Act 76 of 1969	Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources. The Minister may direct owners or land occupiers in respect of *inter alia* water courses. No Regulations exist to this effect.	Removals of vegetation cover to be avoided and minimized at all costs. Soil pollution to be avoided.
Water Resources Management Act 11 of 2013	Section 44 states that no person may abstract or use water, except in accordance with a license issued under this Act. Abstraction of water including open waters, aquifer, brackish or marine water. Section 566 states that any drilling to be conducted or enlargement of an existing borehole can only be conducted under a permit issued under the Act. Section 66 states that a person may not discharge any effluent directly or indirectly to any water resource on or under the ground or construct any effluent treatment facility or disposal site unless in compliance with a permit issued under Section 70 of the Act. Where "effluent" means any liquid discharge as a result of domestic, commercial, industrial or agricultural activities.	Obligation not to pollute surface water bodies. The following permits are required in terms of the Water Act: • water abstraction license that will form part of the contract obligations.
Public Health Act 36 of 1919	Provides for the prevention of pollution of public water supplies.	A general obligation for the Contractor not to pollute the water bodies in the area.
Government Notice No 121 of 1969 as amended as well as Government Notice No. 156 of 1 Aug 1997	This is the general health regulations applicable to this project.	The Contractor will enforce the conditions required to ensure the health and safety of the workers.

An important section 30 from the Road Ordinance 17 (1972) clarifies the obtainment of material required for the construction of the roads in Namibia. It states the following:

For the purpose of the construction, maintenance or repair of a proclaimed road the President of Namibia may through his representatives, officers or contractors enter upon any land with any vehicle, tool, material or animal and after the expiry of a period of fourteen days after a written notice of his intention to do so –

(i) has been handed to the owner, lessee or occupier of such land; or

(ii) has been sent to the last known address of such owner, lessee or occupier by registered post; or

(iii) has been left at a conspicuous place on such land he may without any compensation to the owner, lessee or occupier of the land, remove any material which may be necessary for such construction, maintenance or repair from such land or process it on such land and thereafter remove it there from and for this purpose he may build and maintain any access roads which he may consider necessary: Provided that –

(a) nothing shall be removed from any garden or other land usually cultivated, nor within two hundred and fifty metres of any house nor within fifty metres of any kraal;

(b) every excavation, including an excavation for a sample and an experimental pit, shall as soon as possible be filled up or fenced off or shall otherwise be made safe for human beings and animals again to the satisfaction of the owner, lessee or occupier of such land or as the President of Namibia directs.

(c) any road provided for this purpose shall be ripped up in such a way that it cannot be washed away should the owner, lessee or occupier so desire.

(d) the President of Namibia, his representatives, officers or contractors shall, in exercising these powers take every care to prevent damage, injury, loss or inconvenience to the owner, lessee or occupier concerned:

Provided further that the powers granted to the President of Namibia in terms of this section shall only be exercised within the area of a local authority in consultation with the local authority.

A flowchart indicating the entire Scoping/EIA process is shown in *Figure 6* below:

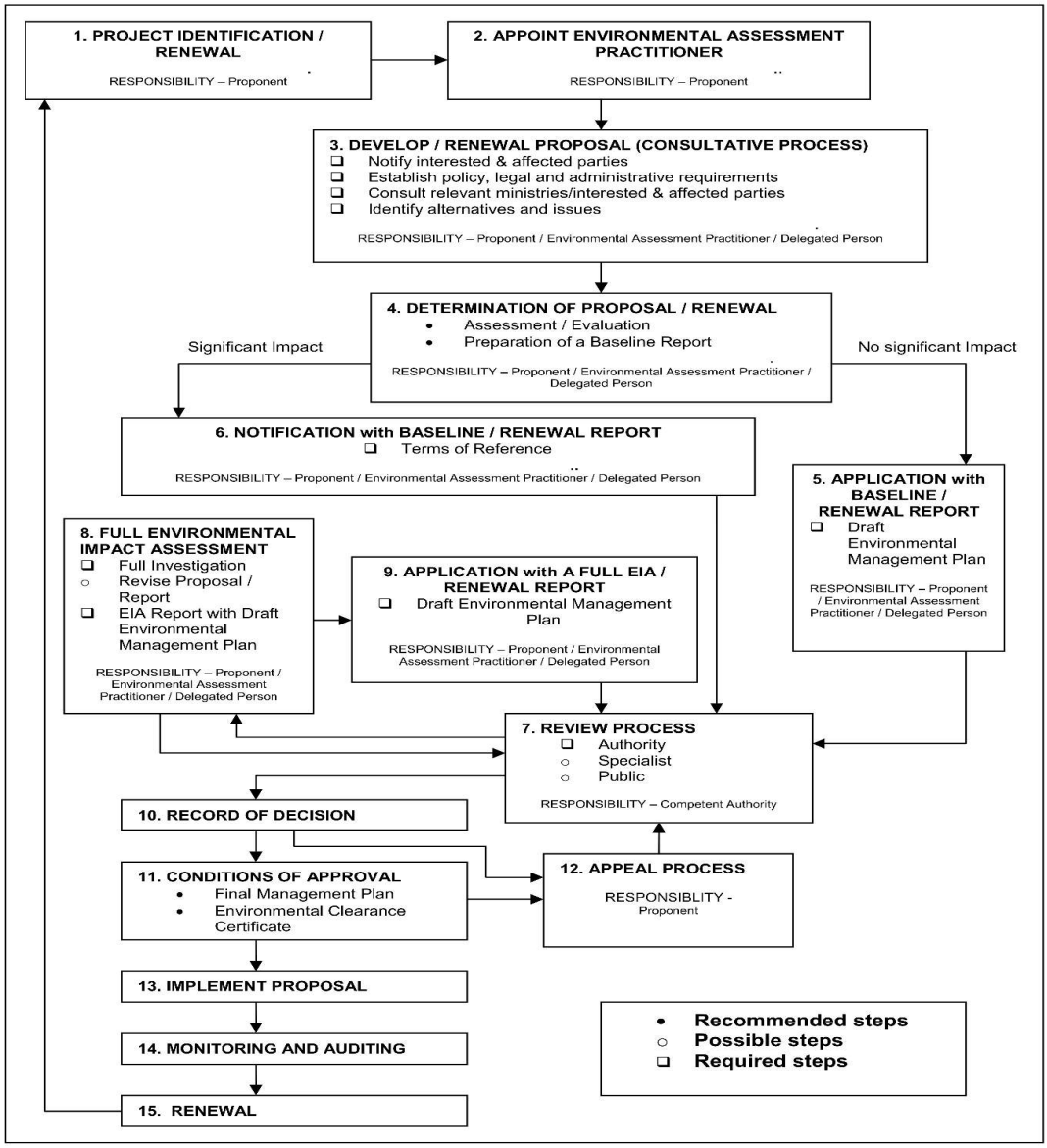


Figure 6. EIA Process

6. METHODOLOGY FOR THE INVESTIGATION

The following methodology was followed for the environmental investigation process as to compile the environmental assessment report:

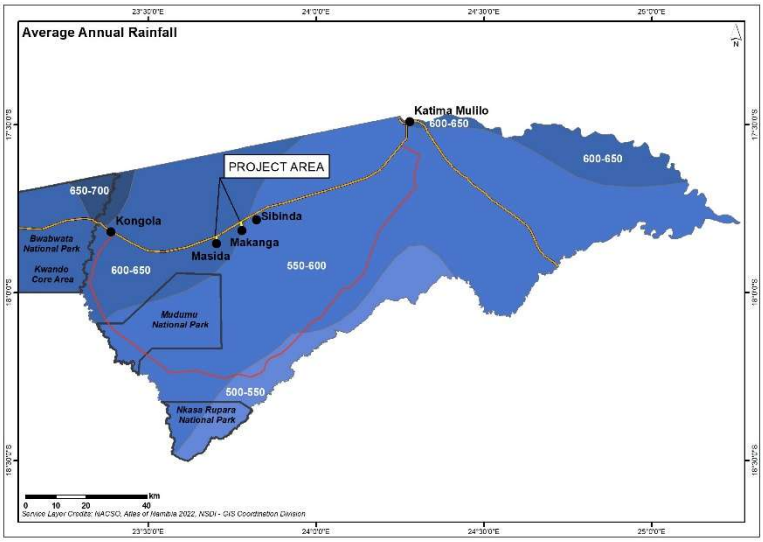
Data Collection and Verification

- ***Stakeholder consultation.*** Stakeholder consultation was done during the period 11th of February to 4th of March 2025. Comments and concerns posed during the meeting surrounding any environmental and social aspects stakeholders considered to be important with regards to the project, have been noted in the meeting minutes are taken into consideration during the impact identification and evaluation process.
- ***Site visit.*** A site visit was conducted at the site to determine the bio-physical conditions of the project area. During the site visit focused attention was given to any environmental aspect that might be significantly affected by the construction and operational phases of the proposed project.
- ***Literature review.*** Existing literature will be obtained relevant to the project area and projects of similar nature.
- ***Obtaining information from team members*****.** Various inputs were received from team members involved in the project. This includes the technical and design team. Liaising with these teams enhances the understanding of the project and therefore focuses the environmental assessment to make it site and project specific.

7. BIO-PHYSICAL AND SOCIAL BACKGROUND

7.1 Climate and Vegetation

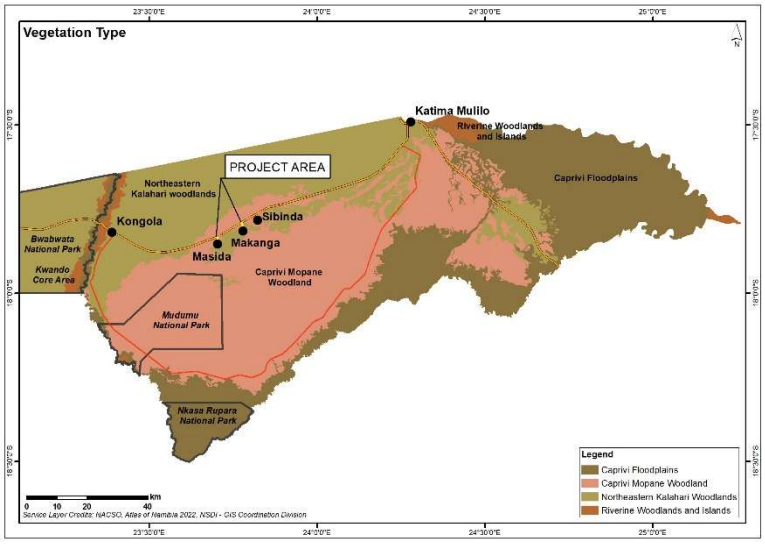
Whilst Namibia is typically characterised as a very arid country, the Zambezi Region is distinctly more tropical than any of the other regions of the country and enjoys higher rainfall, less evaporation and a warmer winter than the rest of Namibia.



Rainfall across the Zambezi Region increases from west to east, with the eastern areas receiving on average 600 mm or more per year, with a median value of between 550 and 600 mm per annum. Almost all of the Zambezi Region's rain falls during the summer months, generally between November and March, with rainfall peaks generally occurring in December, January and February. There is also a general decline in rainfall from north to south.

The coefficient of variation in rainfall for this area, of only about 30 to 40%, is the second lowest in the country which nevertheless means that rainfall is variable both spatially and time-wise from year to year.

Temperatures where the project is situated reach average maximum temperatures of 34 - 36ºC during summer months. Winters are cooler and temperatures can drop to 6 - 8 ºC at night. The average annual temperature range in the project area is between 26 - 28 ºC (Atlas of Namibia Team, 2022).



The biome of the dominant vegetation and plant communities in the project area is classified at the Tree and Shrub Savanna. The Tree and Shrub Savanna is further divided into two biomes (Acacia Tree-and-Shrub Savanna and the Broadleaved Tree-and-Shrub Savanna) in Namibia. Tall, broadleaved tress dominate the wetter more humid areas in northeastern Namibia where our project is located. The Broadleaved Tree-and-Shrub Savanna is divided into 7 different vegetation types of which two types occur in the project area: the Northeastern Kalahari Woodland and the Zambezi Mopane Woodland (Atlas of Namibia Team, 2022).

The biome production rates, plant diversity and plant endemism vary throughout the different biomes and vegetation types. Examples of the vegetation surrounding the project area are presented under Figure 7.

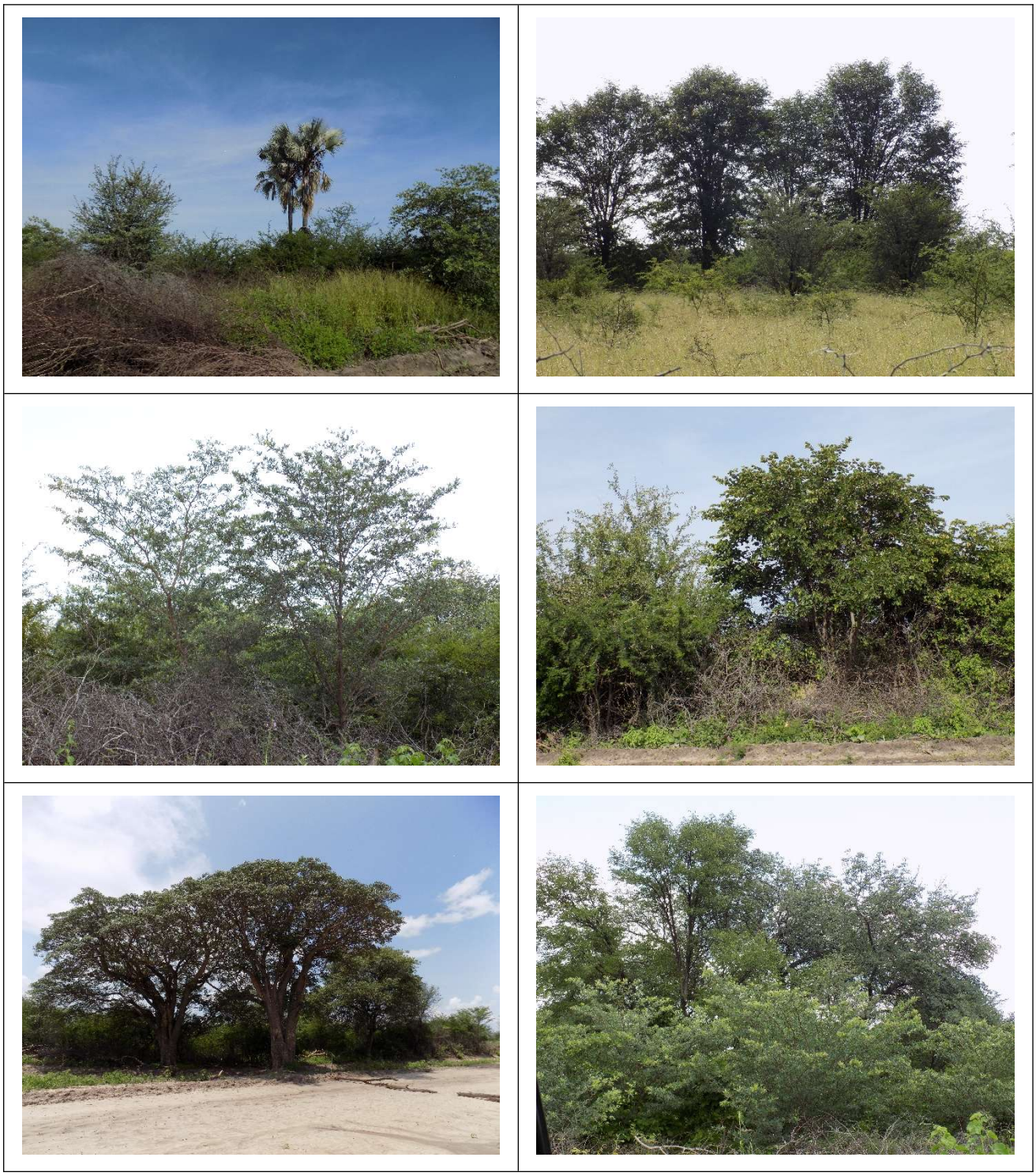


Figure 7. Photos of vegetation in the project area (Source: M Prickett)

7.2 Fauna

The Zambezi Region is home to 15 of the 86 registered communal conservancies across Namibia[1]. "These are institutions on communal lands that are governed by resident conservancy members. These institutions have rights over certain natural resources including wildlife and over tourism within the conservancy, but they are subject to control by the Ministry of Environment, Forestry and Tourism. Conservancies have legally defined boundaries, but they are not fenced (Atlas of Namibia Team, 2022).

A section of the project lies within the Sobbe Conservancy area, this conservancy was registered in 2006 and is home to various wildlife species such as kudu, elephant, roan, eland, plains zebra, warthog, duiker, spotted hyaena, black-backed jackal[1]. The wildlife roams freely across the area, care and caution needs to be taken to avoid unnecessary incidents and activities need to be planned carefully and in consultation with stakeholders to take into consideration the sensitivity of areas and the possible seasonality thereof.

7.3 Flora

The following woodland species dominate the non-floodplain areas found around the project:

Scientific Name	Common Name	Protective Status
Colophospermum mopane	Mopane	Forestry Legislation
Baikiaea plurijuga	Zambezi Teak	Forestry / Near threatened
Burkea africana	Burkea	Forestry Legislation
Terminalia sericea	Silver Cluster Leaf	None
Combretum collinum	Variable Combretum	None
Acacia erioloba	Camel Thorn	Forestry Legislation
Combretum zeyheri	Mukenge	None
Guibourtia coleosperma	False Mopane	Forestry Legislation
Shinziophyton rautanenii	Manketti	Forestry Legislation
Pterocarpus angolensis	Kiaat	Forestry / Near threatened
Sclerocarya birrea	Marula	Forestry Legislation
Ziziphus mucronata	Buffalo-thorn	Forestry Legislation
Acacia nigrescens	Knob-thorn	None
Philenoptera nelsii	Kalahari apple-leaf	Forestry Legislation

Table 5: Dominant flora (Source: Mannheimer & Curtis, 2018)

"Vegetation in the Zambezi Region is influenced by three main factors: soils, flooding and fire. Soil texture, depth, nutrient content, the concentrations of salts and the ability to hold water all affect the kinds of plants found, their vigour and size" (Mendelsohn and Roberts, 1997).

"Water drains through the sand easily, leaching away nutrients and leaving both the sands and many grasses low in nutrients. Floods restrict the growth of most woody plants as they cannot tolerate having their roots inundated. For this reason, areas subject to flooding are dominated by grasslands, with different species growing in areas subject to different frequencies of flooding. Reeds and sedges predominate in the wettest areas, whilst coarse grasses grow on leached sands" (Mendelsohn and Roberts, 1997).

[1]https://www.nacso.org.na/conservancies/sobbe

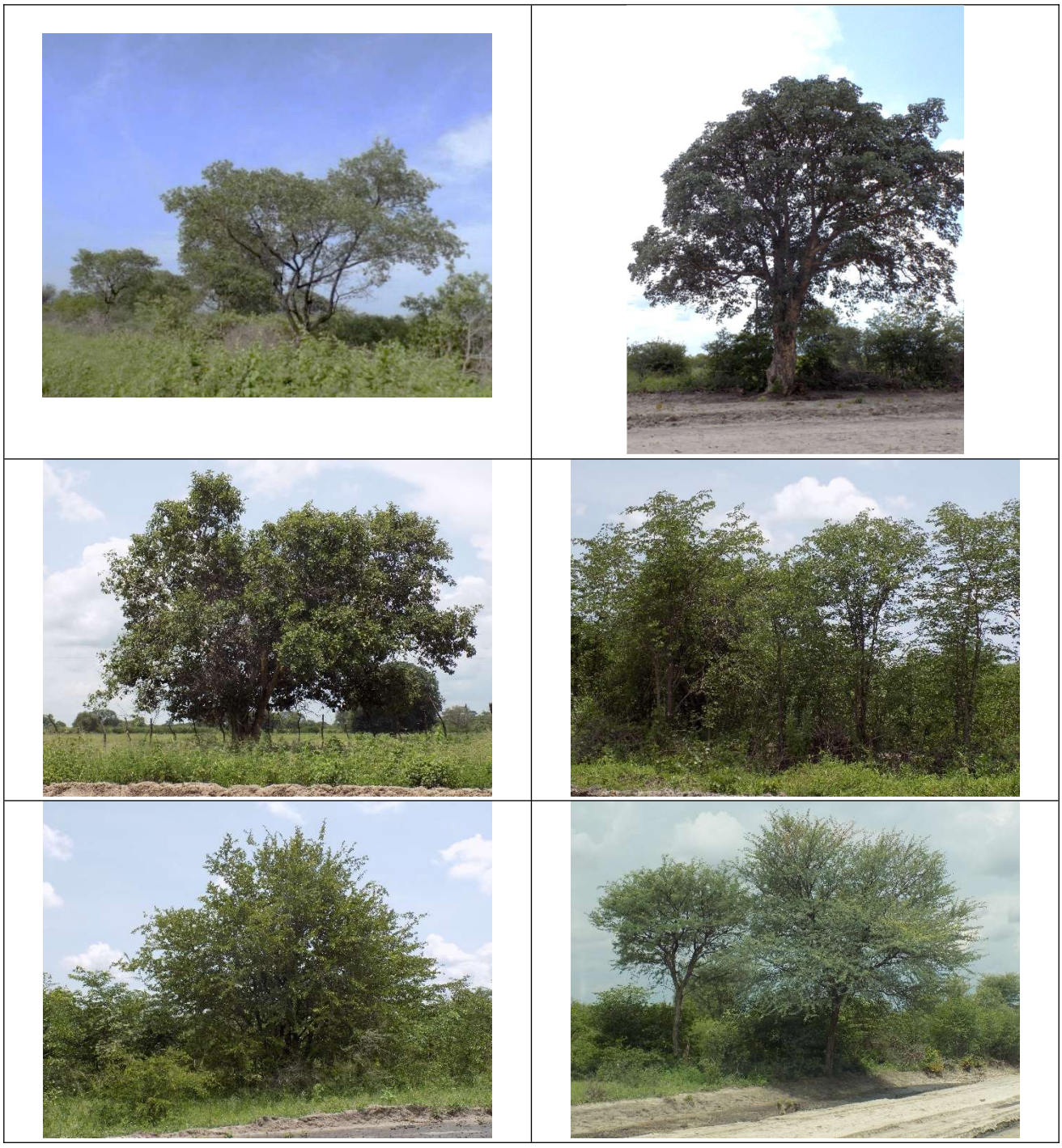


Figure 8. Flora observed during site visit (Source: M Prickett)

The areas surrounding the project are dominated by larger trees and shrubs. The species dominating this area are mentioned in table 2 above. In the photos under Figure 8 the Silver cluster leaf, Camelthorn, Variable Combretum, Apple-leaf, Manketti and Mopane trees can be seen.

In addition to the conservancies in the Region a section of the project area lies within the Masida Community Forest, "these are also governed by resident members who have rights over all types of natural resources, including timber, grasses, wild fruits and animals and over tourism. Community forests often fall within communal conservancies but are managed separately" (Atlas of Namibia Team, 2022)

7.4 Geology and Soils

The Zambezi Region is underlain by Kalahari and Namib Sands of the Kalahari Group, which at 70 million years old to the present, is the youngest major geological division found in Namibia. The sands and sediments which cover this region have therefore been deposited recently in geological terms and account for the uniformity of the landscape.

When southern Africa and South America parted, starting about 132 million years ago, the margins of southern Africa lifted up, leaving a gigantic basin in the centre of the sub-content. Part of this is the Kalahari Basin, which now extends from the Northern Cape, north through Namibia, Botswana and Zambia, and into the area around the Congo River. Over time, the Kalahari Basin progressively filled with sands and water-borne deposits, the nature of which vary, depending on whether the area was subject to a phase of high or low rainfall. Dune fields in the Kalahari Basin have come and gone, with many of the linear dunes in various areas formed during much drier, earlier periods. The alignment of these dunes reflects the direction of the prevailing winds when they were formed. Very few mineral deposits have been identified in the sedimentary layers of the Kalahari Group (after Mendelsohn et. al., 2002).

"Much of the Kalahari consists of sand shaped into dunes by the wind. Heavier soils formed where water has washed down finer particles which accumulate in depressions and between the dunes. Elsewhere, rivers have carved their way through the sands, depositing heavier soils washed down from their catchments. Thus, soils in the valleys of rivers in the Zambezi Region have largely been carried down from the drainage areas in Angola and Zambia".

"The soils at the heaviest end of the spectrum have high clay content and are found in areas which are flooded regularly, i.e. the hydromorphic and organic clay soils. Water does not penetrate these soils, or drain away easily, because the clay is so dense. Areas flooded most frequently hold water for the longest periods, and often have a high content of organic material derived from decomposed reeds, sedges and other plants which grow in water. Depressions which are flooded infrequently often have clays with high concentrations of salts which are left behind as the water evaporates. On the other end of the spectrum are the pure sands. These deep soils do not hold moisture for long, so plants with shallow roots only grow once good rain has fallen".

Soils in the project area are classified as clay-loam and sandy, there are considered to have poor crop production potential. This crop cultivation potential rating is based on production potential, flooding frequency, levels of salt in the soil and how easy it is to work different soils for various crops (Mendelsohn and Roberts, 1997).

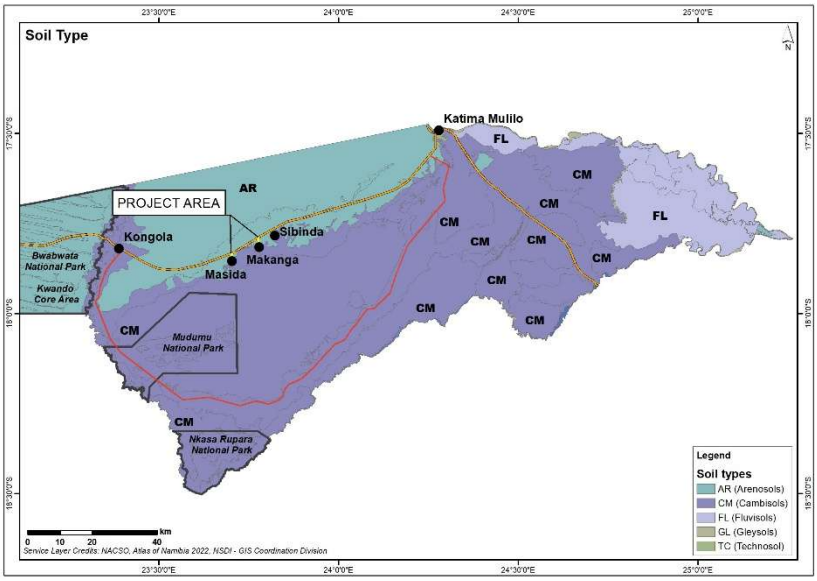


Figure 9. Soil types of the Zambezi Region (Source: M Prickett)

The soil types found in the study area are Arenosols, and Cambisols, with varying soil fertility. The characteristics of the soil types vary greatly and have been summarised in the Table 6 below.

Table 6. Soil types occurring in the study area (Source: Atlas of Namibia Team, 2022)

Soil type	Characteristics
Arenosols (AR)	Deep windblown sands, consisting of quartz and have a loose sandy texture of porous consistency with low water storing capacities and nutrients.
Cambisols (CM)	Young soils showing signs of differentiating into distinct horizons. They form in recent colluvial, alluvial and aeolian parent material or where aridity/low temperatures slow down soil formation. Prevalent in arid and semi-arid environments.

7.5 Archaeology

Next to the access road DR3525 to the village of Masida the memorial site for the late Chatambula Dickson Masida and other comrades tortured and killed in 1968 can be found.

Figure 10. Memorial site for Chatambula Dickson Masida (Source: M. Prickett)

7.6 Surface Hydrology

The Zambezi region is known for perennial rivers carrying water throughout the year.

According to the Hydrogeological Map of Namibia (Christelis, G. et al, 2001). the project area is situated on a moderate potential aquifer situated on unconsolidated to semi-consolidated sand and gravel with locally calcrete deposits. There is no dominant river system in the vicinity of the project.

"Groundwater in the Zambezi Region is mainly tapped from the Kalahari Sequence, which displays variable groundwater properties over short distances". Water tables are generally shallow and boreholes drilled usually only tap into the upper Kalahari layers. The Zambezi Region is divided into five hydrogeological provinces displaying similar and consistent hydrogeological characteristics. The project lies in the Northern Province, where "water quality ranges from Group A to D, with problems caused mainly by sodium, sulphate and chloride, while iron concentrations are generally low".

The vulnerability of groundwater resources with regards to the risk of pollution assessed on the basis of aquifer type, groundwater flow, depth of groundwater and annual recharge for the areas moderate (Christelis, G., et al, 2001). These areas are therefore not very sensitive to groundwater pollution should there not be serious environmental disasters such as sewage works overflow or bulk fuel tanks bursts.

7.7 Population

The Zambezi Region, has a population of 142,373 in 2023, an increase from 90,596 in 2011, making this one of the regions with lower population numbers in the country. In 2023, the growth rate for the region is 3.8% (vs 1.3% in 2011) which is similar to the national growth rate of 3.0% (vs 1.4% in 2011). The urban population in the Zambezi Region increased from 31.3% in 2011 to 33.9% in 2023.

The population density in the Zambezi Region is 9.7 people per km^2, which is significantly higher than the national average of 3.7 people per km^2 in 2023. The number of households in the Region increased significantly from 21,283 in 2011 to 37,286 in 2023, while the average household size decreased from 4.2 to 3.7 over the same period.

The Zambezi Region has a male to female ratio of 97 males per 100 females and nearly half (54.7%) of the population is between the ages of 15 and 59 years, while 39.8% are between the ages of 0 and 14 years and 5.4% are above 60 years of age (NSA, 2024).

7.8 Economy and Livelihood

In 2018, the Labour Force Participation Rate (LFPR) for the Zambezi Region is 66.6 %, which is lower than the national rate of 71.2%.

Main industries by employment in Namibia are agriculture, forestry, and fishing industry (23%); 11.4% are employed in the accommodation and food service industry; 11.1% in wholesale and retail trade; 9.9% activities of households as employers (self-employed); 6.5% in education and 6.2% in both manufacturing and construction (each).

Namibia recorded an unemployment rate of 33.4% (32.5% male vs. 34.3% female) in 2018, which decreased slightly (0.6%) from 2016, while the Zambezi Region had an unemployment rate of 37.7 % which is higher than the national average in 2018. Employment amongst the youth (aged 15 to 34 years) in Namibia was at 35.4%, while 30.3% were unemployed, resulting in a LFPR of 65.8% for this age group.

In the Zambezi Region 49.7% of the labour force (youth 15 – 34 years) were unemployed (47.8% male vs. 51.4% female) (NSA, 2019a).

The average annual consumption (household) and per capita consumption in Namibia in 2015 was N$119,065 and N$28,434, respectively.

The Zambezi Region had a lower per capita consumption (N$ 12,446) than the national average. Average annual household consumption for the Zambezi Region was N$ 55,112.

Households in the Zambezi Region spent 41.5% of their total expenditure on food and beverages and 22.9% on housing.

Poverty is defined as the inability of people to command sufficient resources to satisfy basic needs. Poverty levels remain but have decreased between 2003/2004 and 2015/2016. In 2015/2016, 6.1% (the food poverty line is N$293.10 adult/month) of the Namibian population could not afford to buy the minimum food required per day and 10.7% were severely poor (the lower bound poverty line is N$389.30 adult/month) while 17.4% were poor (the upper bound poverty line is N$520.8 adult/month). In the Zambezi Region 17.7% to 33.4% of people are severely poor, while between 28.0% and 42.8% are regarded as poor, these levels are significantly higher than the national averages and are amongst the highest rates in the country (NSA, 2018).

The main source of income for households in the Zambezi Region is: wages & salaries (37.8%); farming (13.3%); business, non-farming (13.0%) and old age pension (10.1%). Of the households in the Zambezi Region, 84.2% have access to safe drinking water, while only 36.3% have access to electricity for lighting, 79.7% of all households make use of wood/charcoal for cooking. Households with no access to toilet facilities are 77.0% in the region (NSA, 2024).

Land ownership in the Zambezi Region is state owned (incl. communal and protected areas) (Atlas of Namibia Team, 2022).

The Zambezi Region has no commercial farms, only communal land where mainly subsistence agriculture is practiced. Agricultural households (holdings) in the Zambezi Region account for approximately 4% of the population of all households in the communal sector, of these holdings 47.1% were for 'forestry only', 5.8% for 'crop only', 4.7% for 'livestock only' and 4.2% for 'crop and livestock only' (NSA, 2019b).

The economy of the Zambezi Region is essentially driven by the tourism industry (National Parks, lodges, museums, cultural villages, conservancies and hunting concessions), forestry and fishing as well as the transport sector providing a link between land locked countries (e.g Zambia, Botswana) and the port of Walvis Bay through the Trans-Caprivi Highway.

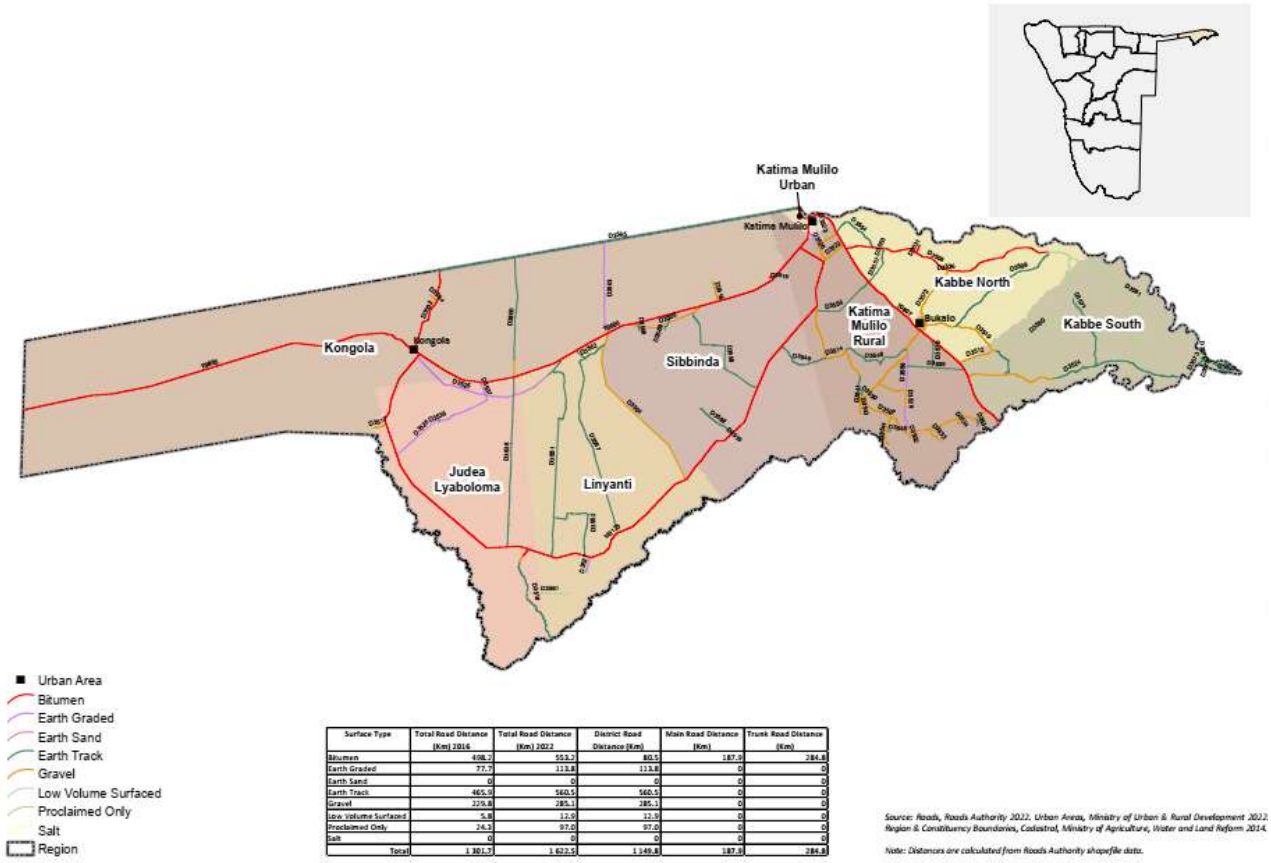
7.9 Road and Rail Infrastructure

Many services are located within the bigger urban areas, while some areas in the region are still relatively underdeveloped in terms of infrastructure.

The road network in the Zambezi Region spans over 1,622.5km in total of which 284.8km are trunk roads, 187.9 km are main roads and 1,149.8km are district roads (some have gravel surfaces and others are earth tracks).

Urban areas such as Katima Mulilo, Kongola and Bukalo provide important supporting services to the transportation industry, such as fuel, motor repair and accommodation.

There is no railway infrastructure in the Zambezi Region (NSA, 2023).



Surface Type	Total Road Distance (Km) 2016	Total Road Distance (Km) 2022	District Road Distance (Km)	Main Road Distance (Km)	Trunk Road Distance (Km)
Bitumen	498.2	553.2	80.5	187.9	284.8
Earth Graded	77.7	113.8	113.8	0	0
Earth Sand	0	0	0	0	0
Earth Track	465.9	560.5	560.5	0	0
Gravel	229.8	285.1	285.1	0	0
Low Volume Surfaced	5.8	12.0	12.0	0	0
Proclaimed Only	24.3	97.0	97.0	0	0
Salt	0	0	0	0	0
Total	1 301.7	1 622.5	1 149.8	187.9	284.8

Source: Roads, Roads Authority 2022. Urban Areas, Ministry of Urban & Rural Development 2022. Region & Constituency Boundaries, Cadastral, Ministry of Agriculture, Water and Land Reform 2014.

Note: Distances are calculated from Roads Authority shapefile data.

Figure 11. Zambezi Region - Road Infrastructure (Source: NSA, 2023)

7.9 Trends and Projects that may influence the Project

The Zambezi Integrated Regional Land Use Plan was commissioned by the Ministry of Lands and Resettlement (MLR) in March 2014 as part of its mandate to undertake landuse planning for the entire country. Visions and objectives that were identified for the Region include:

- Settlements (Urban and Rural) - Improving and enhancing the livelihoods of the rural and urban people by 2025

- Infrastructure - Improved infrastructure such as roads, water supply, energy, schools and agro-industries by 2030
- Livestock farming - To be the leading producer of marketable meat and meat products in the Northern Communal Areas by 2025
- Irrigation and dry-land crop farming - Food security and economic sustainability for local communities by year 2020
- Fishing - Zambezi Regional Fisheries operate at an optimal, sustainable level through community- based management systems by 2020
- Conservation - To sustainably manage and utilise natural resources in the Zambezi Region for the benefit of rural communities, both present and future generation, and to maximise community benefits by 2025.
- Tourism - Zambezi Region is to be one of the major tourism hubs in Namibia and tourism is to be one the major contributors to income of the people for the region by 2025. (Stubenrauch Planning Consultants & Africa Planning Forum, 2015)

7.10 Other Proposed Large Scale Infrastructure Projects

Development of road and air transportation infrastructure in the Region will contribute to the improvement in connectivity and economic activity[2].

8. PUBLIC PARTICIPATION PROCESS

From the start of the project, it was clear that there are not any negative socio-economic impacts associated with this project. Stakeholders are aware of the proposed upgrade of the road and the Engineers communicated the proposed project to the relevant leaders and politicians. The upgrading of the road will have a positive socio-economic effect on the communities.

The public participation process was undertaken in accordance with the principles and requirements of the Namibian Environmental Management Act, No 7 of 2007 and associated Regulations.

The approach to the public participation process was open and participatory with the full involvement of Interested and Affected Parties (IAPs). This approach ensured that reasonable measures were taken to identify stakeholder issues and concerns.

The Methodology for the Public Participation was as follows:

- The first round of public consultation was undertaken by Enviro Management Consultants commencing on the 11th of February 2025 and closing on the 4th of March 2025 and public consultation meetings were held at the Makanga and Masida villages on the 25th of February 2024. The report on this public consultation process, the minutes of the meeting and the attendance register can be found under **Appendix C**. Comments obtained from the meeting minutes have been taken into consideration.

[2]https://www.observer24.com.na/grn-pushes-forward-with-infrastructure-projects-in-zambezi/

The stakeholder list is presented in Table 7 below.

Table 7. List of Stakeholders (Source: EMC)

Stakeholders

Hon. Colonel (Rtd) Lawrence Alufea Sampofu	Zambezi Regional Council
Hon. Matengu Simushi	Zambezi Regional Council
Ms. Regina Ndopu-Lubinda	Zambezi Regional Council
Hon. Ivenne Kabunga	Linyanti Constituency
Mr. Woita Kapumburu	Ministry of Health and Social Services
Mr Alex Sikume	Ministry of Education, Arts and Culture
Ms.Adrenah Mukela	Ministry of Education, Arts and Culture
In addition to the list above the attendance registers from the meeting minutes provide further details of stakeholders, presented under **Appendix C**.	

A list of comments and concerns received during the meeting held at the villages of Makanga and Masida is presented under Table 8.

Table 8. Comments and concerns from stakeholders (Source: EMC)

Comment/Concern	**Response**
Why has no compensation been paid to the affected landowners yet?	Yes
The people were expecting a meeting on the progress of the road.	Yes
What will happen to the damaged places?	Yes
How did the contractor start without a certificate?	Yes
Are we going through the same compensation process again?	Yes
Will there be a communication structure?	Yes
I understand you need to look at your records, but what about compensation for big trees that have been removed?	Yes
I am affected by the alignment, I have no issue to move, but I would like to know when will compensation be paid.	Yes
What will happen to the affected landowners?	Yes
We are disappointed because we were never consulted before the project started.	Yes
What will be done to the road to Kansoko, are there any improvements planned there?	Yes
What meeting was held earlier if it was not an environmental meeting?	Yes
The electrical poles, what will happen to them?	Yes
What will happen to existing services?	Yes
There was a pipe damaged.	Yes
What is the distance of the road reserve?	Yes
I was not around during the first compensation	Yes

measurements.	
Our home is 1m away from the peg.	Yes
How long does the compensation take?	Yes
There is a peg inside our yard and no one informed us.	Yes
How long is the project going to take?	Yes
Will there be compensation for the Khuta's fence that was shifted?	Yes
Where is the end of the proclaimed road?	Yes
Some yards were recorded and some were not, what happens to these?	Yes
Will the culverts be safe for kids if they hold water?	Yes
Will compensation only be paid at the end of the project?	Yes

The advertisements were placed as follows: The Market Watch sections of the Allgemeine Zeitung, Republikein and Namibian Sun newspapers on the following dates:

1. 11th of February 2025 and
2. 18th of February 2025.

Please refer to **Appendix C** for the proof of placements of the newspaper notices. There were no email comments received after the notifications placed in the newspapers.

PROOF OF PLACEMENT OF NOTICES

First Placement on the 11th of February 2025

TODAY | MURDER, DRUGS AND SUICIDE DOMINATE WEEKEND CRIMES - P4

Namibian Sun — Tells it all

NEWS — Benties Bay residents fed up — 3

NEWS — India marks 76th Republic Day celebrations — 5

SPORT WRAP — Weeks-long sports events lockdown sparks controversy — 1

TUESDAY 11 FEBRUARY 2025 • FORMER SA LEADER RECALLS TIME IN EXILE

2 Republikein Sun Allgemeine Zeitung — Market Watch — TUESDAY 11 FEBRUARY 2025

Katuka continues to empower young Namibian women

Sponsored by Bank Windhoek for the past six years, the 2025 Katuka Mentorship Programme training sessions saw 24 mentors and 26 mentees embark on an empowerment journey.

STAFF REPORTER

As a Connector of Positive Change and a responsible corporate citizen, Bank Windhoek's role is to impact the communities in which the Bank operates. This statement was shared by Bank Windhoek's head of stakeholder engagement, corporate social responsibility and sponsorships, Bronwyn Moody, on Friday, 7 February 2025, at the first training session of the 2025 Katuka Mentorship Programme hosted in Windhoek.

"We are proud to give back to the Katuka Mentorship Programme because we believe that pairing the right mentors with this year's new intake of mentees and the 525 that have come before them is in itself an act of positive change that has the potential to empower young businesswomen who believe in their dreams and write their destiny," said Moody.

Sponsored by Bank Windhoek for the past six years, the 2025 Katuka Mentorship Programme training sessions saw 24 mentors and 26 mentees embark on an empowerment journey. The programme enables and encourages business and professional women to achieve their goals.

The organiser of the Economist Businesswoman Projects, Desere Lundon-Muller, said the engagement and energy during the orientation were incredible, setting the stage for what promises to be a transformative journey throughout the year. Lundon-Muller thanked Bank Windhoek for its invaluable support. "The Bank's commitment to empowering women and fostering personal and professional growth is truly inspiring. This partnership is not just an investment in our programme but a contribution to shaping the next generation of empowered, confident women leaders in Namibia," she said.

The 2025 Katuka Mentorship Programme mentees and mentors pictured at the orientation event.

Two of the mentees, Foide Ngipandulwa and Sevelin Nakaleno, said they are proud to have joined the programme and look forward to becoming better individuals and professionals.

Ngipandulwa, a part-time lecturer at the I-Can Health Training Institute Namibia, shared that she joined the programme because she believes that one cannot grow if they do not step outside of their comfort zones. "I would like to see what is out there and go beyond boundaries to see my potential and growth," she said, adding that she looks forward to a personal transformation this year.

Nakaleno, an economist by profession, said that she joined the programme looking for an environment that could help her achieve her personal goals. "I encourage every woman out there, especially the married ones, to look into joining the Katuka Mentorship Programme so that they can grow into better individuals and professionals," she said, hoping for an exciting transformative journey.

Moody congratulated the mentees on their journey with the Katuka Mentorship Programme, wished them the best and reminded them that the future is bright if they believe in and chase their dreams. The programme, which matches a mentor and a mentee with similar professional or personal interests to share their skills and expertise for a year, has been in existence for the past 24 years. It has produced significant results in the careers of the participating mentees. Close to 600 entrepreneurs and businesswomen have completed the programme.

GIPF APPOINTS CONVILLE BRITZ AS GM FOR STRATEGY

STAFF REPORTER

The Government Institutions Pension Fund (GIPF) this week announced the appointment of Conville Britz as its new general manager of strategy and projects, effective 1 April 2025.

GIPF CEO Martin Inkumbi described Britz as a seasoned financial executive and qualified chartered accountant.

"With over 30 years of work experience, he has a wealth of experience and good understanding of the Fund's mandate, operations and current strategic focus. I remain confident that Mr. Britz will excel in this very important role, tasked with the responsibility of driving the Fund's strategy," Inkumbi said.

"The GIPF will in due course commence with the recruitment process for the GM: Investments position. In the meantime, Mr. Leevi Tshoopara will be appointed as the acting general manager of investment 1 April 2025 for a period of three months, or until a substantive General Manager is appointed, whichever happens first," he added.

Government Institutions Pension Fund general manager for strategy and projects, Conville Britz.

VACANCY ANNOUNCEMENT

The Green Climate Fund (GCF), established in 2010 under the UNFCCC, supports developing countries in addressing the impacts of climate change. Namibia, through the Ministry of Environment, Forestry and Tourism, secured a USD 3 million readiness grant to develop its National Adaptation Plan (NAP). The three-year (2024 – 2027) project entitled "Strengthening Adaptation Planning and Coordination in Namibia" will support the integration of climate change adaptation into national planning and budgeting processes.

The Namibia Nature Foundation (NNF) was founded in 1987 and is one of Namibia's oldest and largest homegrown environmental organisations, with a focus on sustainable development, people and the environment. The NNF will serve as the Delivery Partner for this Project, and in this capacity, the NNF is pleased to offer an excellent career opportunity for interested and qualified candidates to apply for the following position:

ADMINISTRATIVE ASSISTANT

The Administrative Assistant's main objective is to support the NAP Project Coordinator in managing key administrative functions such as procurement, travel & logistics, and event management. This consultancy has the duration of three years subject to an annual performance review.

CLOSING DATE: 20 February 2025 @17h00

The detailed job description can be downloaded under "Join Us" from the NNF website: www.nnf.org.na. Interested candidates should submit a cover letter outlining their experience and interest in the position, CV, and certified qualifications by email to cv@nnf.org.na. Please include "Administrative Assistant – GCF NAP" in the email subject line.

Please note only short-listed candidates will be contacted.

No late applications will be considered.

Previously disadvantaged Namibians, women, disabled persons, and youth are encouraged to apply for this position.

The NNF reserves the right, in its sole discretion, to amend or withdraw the jobs as advertised here.

Notice of Environmental Impact Assessment

The Roads Authority of Namibia (RA), appointed **Tulipamwe Consulting Engineers** to perform the consulting services for the following project:

The Construction to Low Volume Seal Road Standard of Access Roads to Schools and Clinics namely DR 3562: Makanga Access Road (3.54km) and DR 3525: Masida Access Road (3.05km) in Zambezi Region (6.58km)

Enviro Management Consultants Namibia is appointed to conduct the Environmental Impact Assessment and develop an Environmental Management Plan as required by the Environmental Management Act No 7 (2007) and associated Environmental Regulations and further submit the application to the Environmental Commissioner for consideration.

All Interested and Affected Parties (I&APs) are hereby invited to register their interest in the project as stakeholders, in terms of the environmental assessment process, and to give their input, comments or opinions regarding the intended road upgrade. These must be submitted in writing to Enviro Management Consultants by no later than the **4th of March 2025.**

Public Consultation Meetings

Date: Tuesday, 25 February 2025
Time: 10:00 – 12:00
Venue: Mahachana Sub-Khuta, Makanga Village

Date: Tuesday, 25 February 2025
Time: 14:00 – 16:00
Venue: Masida Sub-Khuta, Masida Village

For further information, and to register as an I&AP please contact:
Enviro Management Consultants Namibia
Contact: Ms. Maike Prickett or Mr. Rian du Toit
Fax: 088 626968 | Email: maike@enviromcn.com

South African rand weakens on Trump's new tariff threats

REUTERS

Analysts said South Africa may face further risks after Trump signed an executive order cutting US financial assistance to South Africa on Friday citing disapproval of its land policy and of its genocide case at the International Court of Justice against Washington's ally Israel.

"SA needs to forge a path without US assistance, which this government must've foreseen as a real possibility given its geopolitical position towards Russia, BRICS and Israel/Palestine," said ETM Analytics in a research note.

On the stock market, the Top 40 last traded about 0.1% higher.

South Africa's benchmark 2030 government bond was weaker in early deals, with the yield up nine basis points to 9.155%.

Second placement on the 18th of February 2025

Dinsdag 18 Februarie 2025

Republikein

NS9

Jou land. Jou mense. Jou nuus.

» 'Onwettige wateraansluitings, grondgrype'

2 Republikein Sun Allgemeine Zeitung Market Watch TUESDAY 18 FEBRUARY 2025

Economic Indicators

Exchange Rates *Forward Cover*

Currency	Spot	Currency	Spot	Currency	1M	3M	6M	12M
USD/NAD	18.426	NAD/AUD	0.085	USD/ZAR	18.742	18.167	17.706	18.498
EUR/NAD	19.315	NAD/NZD	0.095	EURO/ZAR	19.222	19.136	19.693	20.315
GBP/NAD	23.172	NAD/BWP	0.745	GBP/ZAR	22.818	22.921	23.099	23.75
NAD/CHF	0.047	NAD/JPY	7.869	ZAR/JPY	8.342	8.498	8.272	7.991

**Effective rate (withholding tax still to be applied)*

DATE: 18/02/2025- 12:55 PM

Save the number 085 785 6231

Send Finance or scan the QR code

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Contact: Ms. Maike Prickett or Mr. Rian du Toit
Fax: 088 626968 | Email: maike@enviromcn.com

COMPANY NEWS IN BRIEF

SPOTIFY TO LAUNCH NEW HIGH-END MUSIC PRO TIER IN 2025

Spotify is considering charging up to US$5.99/month on top of existing subscriptions for a new music streaming service that will include higher-quality audio, remixing tools and access to concert tickets, Bloomberg News reported on Friday.
The company might roll out the "Music Pro" tier this year, the report said, citing sources it did not name.
Spotify is still working through the details, and prices for the new service will vary by geography, with the cost lower in less-developed markets
A Spotify spokesman said by e-mail that the company cannot confirm speculation around the potential details or feature set.
The new service, which would use artificial intelligence for some features, would allow subscribers to mix songs from different artists, the report said, adding that the company has held preliminary talks with major promoters and ticket sellers.
-TECHCENTRAL

SOUTH AFRICA IS SAID TO HALT STARLINK TALKS AS US TENSIONS ESCALATE

Talks over licensing SpaceX's Starlink service in South Africa have stalled over the country's tensions with the Donald Trump administration in the US.
This is according to a recent report in Bloomberg News, which said that "negotiators plan to wait until the dispute between the US and South Africa calms down, with the intention to return to a possible deal at a later stage", Bloomberg reported, citing unnamed sources "familiar with the matter".
SpaceX, which is controlled by US billionaire and Trump ally Elon Musk, has for some time been seeking a licence to operate in South Africa. However, the process has been delayed over a request by SpaceX for "equity equivalents", in terms of which it would not be required to sell a 30% stake in its South African operation but rather to make investments in other ways that advance South Africa's programme of black economic empowerment.
Last year, communications minister Solly Malatsi asked Icasa, the communications regulator which is ultimately responsible for licensing Starlink in South Africa, to consider revising the regulations so that equity equivalents are permitted in the licensing process, particularly to ensure foreign investors are not chased away before they even commit to invest in the country. -TECHCENTRAL

DR CONGO CALLS ON NBA TO DROP SPONSORSHIP DEALS WITH RWANDA

The Democratic Republic of Congo has asked the NBA to end the sponsorship deals of its Basketball Africa League with Rwandan entities, citing the occupation of Rwandan troops in the country's eastern region, according to a memo sent to Reuters.
The memo comes after similar appeals to Formula One, which is in talks with Rwanda to host a race, and soccer clubs including Arsenal, Bayern Munich and Paris St Germain that have sponsorship deals with Rwanda.
"By maintaining ties with a government engaged in violent expansionism, the NBA risks undermining its own credibility and moral standing," foreign minister Therese Kayikwamba Wagner said in a letter to NBA Commissioner Adam Silver.
The memo cited two sponsorship deals in particular, with "Visit Rwanda" and "RwandAir".
When contacted by Reuters, an NBA spokesperson said: "We will continue to follow US government guidance everywhere we operate."
Fighting between the army and Rwandan-backed M23 rebels in eastern Congo has killed thousands since early 2022 and displaced more than 1 million people. -REUTERS

The Democratic Republic of Congo is calling on the NBA to end the sponsorship deals of its Basketball Africa League with Rwandan entities.

ELECTRICITY CONTROL BOARD

MESSAGE OF CONDOLENCE

"In conclusion, I move in the name of our people, to declare that Namibia is forever free, sovereign and independent". H.E. Dr. Sam Nujoma (21 March 1990).

A stalwart, a leader, whose unwavering dedication and commitment contributed towards the political and socio-economic transformation of Namibia. Your passing leaves a void in the hearts of many Namibians, and friends in the diaspora. However, we take comfort in knowing that your legacy will continue, and will guide us towards a brighter future. We join the Namibian Nation in offering our heartfelt condolences to the Nujoma and Kondombolo families.

May your gentle soul rest in eternal peace, Dr. Sam Shafiishuna Nujoma.

Your memory will forever live in our hearts.

HIS EXCELLENCY DR. SAM SHAFIISHUNA NUJOMA
FOUNDING FATHER AND FIRST PRESIDENT OF THE REPUBLIC OF NAMIBIA

+264 61 374 300 info@ecb.org.na | www.ecb.org.na

P.O. Box 2923 Windhoek Namibia 8 Simeon Shixungileni Street, Windhoek, Namibia | Business Hours: Monday - Thursday 08:00 - 17:00 Friday 08:00 - 13:00

9. ANTICIPATED CONSTRUCTION ACTIVITIES

It is important to understand the gist of any project as to understand the possible environmental impacts associated with such a project. The following activities are generically associated with the construction of a road. These activities are kept in mind during the environmental impact assessment process.

- **Site establishment**
  - Demarcation of the site
  - Protection of vegetation and natural features
  - Protection of fauna
  - Protection of cultural historical aspects
  - Topsoil conservation
  - De-bushing and de-stumping
- **Site infrastructure**
  - Structures and accommodation
  - Contractors camp and lay-down areas
  - Batching plants
  - Crusher plants
  - Sand washing plants
  - Nurseries
  - Roads and access
  - Gates and fences
- **Site management**
  - Rubble and waste rock
  - Solid waste
  - Liquid waste
  - Hazardous waste
  - Pollution control
  - Implements and equipment
  - Blasting
  - Air quality
  - Noise control
  - Fire control
  - Health and Safety
- **Borrow pits and quarries**
- **Earthworks**
  - Prospecting boreholes and test pits
  - Excavations and trenches
  - Cut and fill
  - Shaping and trimming
- **Stockpiles, storage and handling**
  - Topsoil
  - Spoil
  - Vehicles and equipment
  - Fuel
  - Hazardous substances
- **Erosion control**
  - Surface water management
  - Erosion protection
- **Control of alien plants**

10. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

A checklist is designed to help users identify the likely significant environmental effects of proposed projects during scoping. It is to be used in conjunction with the Checklist of Criteria for Evaluating the Significance of Impacts.

There are two stages:

- **First**, identifying the potential impacts of projects;
- **Second** selecting those which are likely to be significant and therefore require most attention in the assessment.

A useful way of identifying the potential impacts of a project is to identify all the activities or sources of impact that could arise from construction, operation or decommissioning of the project, and to consider these alongside the characteristics of the project environment that could be affected, to identify where there could be interactions between them. The two parts of the Scoping Checklist have been developed to assist in this process.

Start with the checklist of questions set out below. Complete Column 2 by answering:

- yes - if the activity is likely to occur during implementation of the project;
- no - if it is not expected to occur;
- ? - if it is uncertain at this stage whether it will occur or not.

For each activity for which the answer in Column 2 is "Yes" or "?", refer to the second part of the Scoping Checklist which lists characteristics of the project environment which could be affected, and identify any which could be affected by that activity. Information will be used about the surrounding environment in order to complete this stage. Note the characteristics of the project environment that could be affected, and the nature of the potential effects in Column 3.

Finally, use Checklist of Criteria for Evaluating the Significance of Impacts to help complete Column 4.

This will identify those impacts which are expected to be significant. The questions are designed so that a "yes" answer will point towards a significant impact. It is often difficult to decide what is or is not significant but a useful simple check is to ask whether the effect is one that is of sufficient importance that it ought to be considered and have an influence on the development consent decision.

PART 1 OF THE SCOPING CHECKLIST: QUESTIONS ON PROJECT

CHARACTERISTICS

1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in t locality (topography, land use, changes in water bodies, etc)?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	The quarry operations will temporarily alter the land use, land cover and, for the borrow pits - topography of the area.	Low significance because of possible mitigation measures that can be implemented. Rehabilitation of borrow pits normally returns the land use to its original state.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Clearing of vegetation for construction operations influencing the vegetation, soils and topography.	Clearing of vegetation is always regarded as significant when it comes to road construction. However, mitigation measures can reduce the significance of the impact.
1.3	Creation of new land uses?	No	The new road will be built mostly on the existing alignment.	Low significance.
1.4	Pre-construction investigators egg boreholes, soil testing?	Yes	New boreholes drilled and areas tested for suitability of construction material.	Low significance if land use is returned to its original state
1.5	Construction works?	Yes	During construction aspects such as tourism, social, soil, surface water, vegetation, wildlife and geology can be affected.	Flooding in the area is a real risk for road construction. The change in water bodies might be significant if proper planning during the design phase of the road is neglected. Fauna and Flora will be impacted, proper planning and precautionary measures need to be put in place to limit negative impact. Other aspects will not be significantly impacted.
1.6	Demolition works?	No		
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	A temporary construction camp is constructed at a location near the project site, where water and waste management are the most important activities that need to be mitigated.	Should these activities not be managed, it might have a negative impact on the soils, water and health and safety of the contractor workers. No permanent changes to the area are predicted. Proper planning should be done in consultation with stakeholders.
1.8	Above ground buildings, structures or earthworks including linear structures cut and fill or excavations?	Yes	The above ground earthworks will be regarded as primarily for the road construction.	It is anticipated that the impact will not be significant due to the flat topography of the area.
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		

1.12	Coastal structures egg seawalls, piers?	No		
1.13	Offshore structures?	No		
1.14	Production and manufacturing processes?	No		
1.15	Facilities for storage of goods or materials?	Yes	Possible storage of machines and bulk fuel.	The storage of goods or materials can be mitigated therefore limiting the significance.
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	No		
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	Yes	Construction of a bypass and a limited traffic increase due to movement of construction vehicles.	Low significance.
1.19	New road, rail, air, water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	The current alignment will be followed.	The significance will be low due to the scale and current alignment to be used.
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	Yes	There will be temporary bypasses constructed.	The significance is likely to be low due to the temporary nature of the activities.
1.21	New or diverted transmission lines or pipelines?	Yes	Sections of transmission and pipelines will be relocated.	Proper planning and consultation with stakeholders should be applied, to limit negative impacts on the community therefore reducing the significance.
1.22	Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	New structures installed where required by topography and design.	Should proper planning and consultation with local stakeholders be applied, negative impacts on the hydrology of the flood plain should be limited therefore reducing the significance.
1.23	Stream crossings?	No		
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	Water will be extracted for the construction phase of the project.	Water from boreholes will be used but the significance will be low.
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The road will impact on the surface patterns.	The significance will be low due new structures added along the existing alignment.
1.26	Transport of personnel or materials for construction, operation or commissioning?	Yes	Surface characteristics.	Proper planning of movement of personnel and materials should be done in consultation with stakeholders.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		

1.29	Influx of people to an area in either temporarily or permanently?	Yes	Temporary influx of construction workers.	The significance is estimated to be low if rules and regulations set out for staff are enforced and adhered to.
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	Yes	Surface disturbances always impact on the biodiversity of an area.	There might be low significant impact on the genetic diversity, however special care and consideration should be taken to limit disturbance.
1.32	Any other actions?	No		

2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
2.1	Land especially undeveloped or agricultural land?	Yes	During construction, geological materials will be used for the filling. Soils will be affected and might therefore impact negatively on land.	The significance is low. The existing alignment will be followed with some possible small adjustments. Removal of material for construction is limited to pre-determined sites, reducing the significance.
2.2	Water?	Yes	Water is used for domestic and construction purposes.	The available water will be used but the significance is expected to be low.

3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Yes	Hydrocarbons always pose a risk to the environment.	Water and soils are normally affected by spillages of hydrocarbons. The significance might be high without mitigation measures.
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (eg insect or water borne diseases)?	No		
3.3	Will the project affect the welfare of people eg by changing living conditions?	?	There is always a risk of altered quality with regards to living conditions of the adjacent people and the environment. This is with reference to HIV/AIDS.	The significance of such risks can be mitigated, ensuring low impact significance.

3.4	Are there especially vulnerable groups of people who could be affected by the project eg hospital patients, the elderly?	Yes	There is always a risk of people considered to be vulnerable to be affected, considering that clinics are located in the project area.	The significance of such risks can be mitigated, ensuring low impact significance
3.5	Any other causes?	No		

4. Will the Project produce solid wastes during construction or operation or decommissioning?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
4.1	Spoil, overburden or mine wastes?	Yes	Spoils will be generated during construction affecting the aesthetics appeal of the area.	No. This activity can be mitigated very successfully. Low significance.
4.2	Municipal waste (household and or commercial wastes)?	Yes	Domestic waste will be generated.	No. The domestic waste can be managed.
4.3	Hazardous or toxic wastes (including radioactive wastes)?	Yes	Used oils and old batteries.	Mitigation measures are important to manage the handling and disposal of used oils and old batteries.
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	Yes	Sewage is produced at the construction camp.	Sewage is always a very important impact that might have a negative impact on soils, water and health and safety.
4.7	Construction or demolition wastes?	No		
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	Yes	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	No. The scale of contamination is very limited and can be mitigated.
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		

5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	Yes	Gasses such as Nox and Sox are deposited in the air from the machines.	No. The quantity of these gasses will not impact negatively on the environment.

5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	No		
5.4	Emissions from construction activities including plant and equipment?	Yes	The movement from vehicles will generate dust and gaseous emissions.	The impacts might be significant if not managed properly.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Dust from mineral handling and transport.	Yes. Dust might be a nuisance to receptors.
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?	No		
5.8	Emissions from any other sources?	No		

6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
6.1	From operation of equipment eg engines, ventilation plant, crushers?	Yes	The mining of borrow pits and production/construction equipment produces noise and vibrations.	No. The ambient receptors are minimal. The Health and Safety within close distance must be noted.
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	Construction might produce noise.	Low significance.
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	The hauling trucks will produce noise and vibration.	No. The impact is very local and is not significant.
6.6	From lighting or cooling systems?	No		

6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?	No		

7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters groundwater, coastal waters or the sea?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	Yes	Spillage of oils and other hydrocarbon may affect the water and soil.	No. Mitigation measures will limit the risk and therefore the significance.
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	Yes	Effluent at the construction site might impact negatively on the surface water, soils and health and safety of the workforce.	Should the sewage not be properly managed the negative impact might be significant.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	Gasses from the machines.	No. The volumes of emissions are limited.
7.4	From any other sources?	No		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No		

8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	No		
8.2	From events beyond the limits of normal environmental protection eg failure of pollution control systems?	No		
8.3	From any other causes?	No		

8.4	Could the project be affected by natural disasters causing environmental damage (eg floods, earthquakes, landslip, *etc)?*	Yes	Floods are a possibility, considering the landscapes that are traversed by the project and could affect the human environment.	The significance might be low due to proper warning systems.

9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
9.1	Changes in population size, age, structure, social groups etc?	Yes	An increase in population numbers is a possibility if people are drawn to services, young and old.	The significance might be positive medium.
9.2	By resettlement of people or demolition of homes or communities or community facilities eg schools, hospitals, social facilities?	Yes	Possible relocation of homes, fences or fields as per design recommendation.	The significance might be medium due to the Compensation Policy that needs to be adhered to.
9.3	Through in-migration of new residents or creation of new communities?	Yes	In-migration is possible if access to social services is improved.	The significance might be positive medium.
9.4	By placing increased demands on local facilities or services eg housing, education, health?	Yes	Possible increase in people visiting schools and clinics due to improved accessibility.	The significance might be positive medium due to possible infrastructure upgrades
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	The larger community will benefit from the construction phase.	The significance might be positive medium due job creation.
9.6	Any other causes?	No		

10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	?		

10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment eg: • supporting infrastructure • housing development • extractive industries • supply industries • other?	?		
10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	?	Unlikely	
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

PART TWO OF THE SCOPING CHECKLIST: CHARACTERISTICS OF THE PROJECT ENVIRONMENT

For each project characteristic identified in Part 1 consider whether any of the following environmental components could be affected.

Question - Are there features of the local environment on or around the Project location which could be affected by the Project?

- Areas were identified that could be regarded as sensitive with reference to bio-diversity or historic importance.
- There is a possibility of features of high historic or cultural importance.
- Surface drainage patterns will be addressed through proper engineering design.
- Local fauna and flora in the immediate surroundings of the project.
- Tourism.

Question - Is the Project in a location where it is likely to be highly visible to many people?

These roads are access roads to villages (incl. schools and clinics), connecting them to the main tar road between Kongola and Katima Mulilo.

Question - Is the Project located in a previously undeveloped area where there will be loss of Greenfield land?

No, the roads will be constructed on the existing alignment.

Question - Are there existing land uses on or around the Project location which could be affected by the Project?

There will be a few borrow pits that will be opened but will not affect the existing land uses significantly.

Question - Are there any plans for future land uses on or around the location which could be affected by the Project?

No, but improved access might encourage further development.

Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?

Some homesteads are affected by the construction and will have to be relocated/moved out of the road reserve.

Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project?

Yes. Monument/grave sites shall be avoided. Impacts on agricultural land and homesteads to be mitigated.

Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project?

There are no scarce resources found around the project that could be influenced by the construction or operational phases of these projects, but there are fauna and flora species (trees) that are protected by Legislation, impacts should be mitigated. Water is a resource that should be managed properly.

Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?

There are existing borrow pits in the vicinity of the project area.

Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?

Yes, flooding is a possibility during the rainy season. No other environmental problems are envisaged.

Question - Is the Project likely to affect the physical condition of any environmental media?

Yes, although the road will mainly follow the existing alignment, home owners/fields encroaching on the road reserve will have to be relocated and payment for materials for layer works as discussed.

Question - Are releases from the Project likely to have effects on the quality of any environmental media?

- The air quality might deteriorate due to dust generation during construction but will improve during operation.
- The quality of soil might deteriorate without proper management.
- Acidification of soils or waters will probably not occur.
- There will be some noise generated during the construction and operational phase of the road, but will be limited to the site.

Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally?

- The project will use fossil fuels in liquid (diesel).
- Water will be used for dust suppression, construction and domestic use.
- The quarrying activity extracts minerals on a non-renewable basis.

Question - Is the Project likely to affect human or community health or welfare?

- The quality of air will be affected due to construction activities and hauling. Even though this is the case, human health might not be problematic.
- No mortality or morbidity might be experienced by human receptors.
- The project will have a positive impact on the economic conditions of the local communities and the region.

In the Scoping checklist, the significance must be indicated. To facilitate this procedure, the following questions were considered during the rating:

Questions that were considered to determine significance:

1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the effect be unusual in the area or particularly complex?
4. Will the effect extend over a large area?
5. Will there be any potential for trans frontier impact?
6. Will many people be affected?
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8. Will valuable or scarce features or resources be affected?
9. Is there a risk that environmental standards will be breached?
10. Is there a risk that protected sites, areas, features will be affected?
11. Is there a high probability of the effect occurring?
12. Will the effect continue for a long time?
13. Will the effect be permanent rather than temporary?
14. Will the impact be continuous rather than intermittent?
15. If it is intermittent will it be frequent rather than rare?
16. Will the impact be irreversible?
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

10.1 Environmental Impact Assessment Summary

The following environmental impacts were identified during the assessment procedure as described above. The impacts are classified as either positive or negative and the significance ratings as low, medium and high.

Activity	Aspect / Impact	Positive / Negative	Significance
Land use / topography, and land use cover.	The quarry operations will permanently alter the land use, land cover and, for the borrow pits - topography of the area.	Negative	Low
Clearance of existing land, vegetation and buildings.	Clearing of vegetation for construction operations influencing the vegetation, soils and topography.	Negative	Low
Creation of new land uses.	The existing land use will change from agricultural or residential to road (land use).	Negative	Medium
Construction activities.	During construction aspects such as social, soil, surface water, wildlife (fauna) and vegetation (flora) and geology can be affected.	Negative	Low
Temporary sites used for construction works or housing of construction workers?	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be mitigated.	Negative	Low
Above ground buildings, structures or earthworks including linear structures cut and fill or excavations.	The above ground earthworks will be regarded as primarily for the road construction. Permanent changes will take place (land use).	Negative	Low
Facilities for storage of goods or materials.	Pollution of soils and water.	Negative	Medium
New road, rail or sea traffic during construction or operation?	Limited traffic increase due to movement of construction vehicles.	Negative	Low
Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers.	This aspect is a concern for this project. The road is built through various landscapes each with their own characteristics.	Negative	Low
Changes in water bodies or the land surface affecting drainage or run-off?	The road will impact on the surface patterns.	Negative	Low
Influx of people to an area in either temporarily or permanently	Migration of people might impact on the socio-economic structure of the area. The risk of HIV/AIDS may increase due to the temporary influx of construction workers.	Negative	Low

Loss of native species or genetic diversity?	Surface disturbances always impact on the bio-diversity of an area.	Negative	Low
Resources such as land and water.	Very limited land will be affected due to the construction of the road on the existing alignment.	Negative	Low
	Water is used for domestic and construction purposes.	Negative	Medium
Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Hydrocarbons always pose a risk to the environment.	Negative	Medium
Will the project affect the welfare of people eg by changing living conditions?	The proposed route will impact positively on people due to improved transport conditions.	Positive	Medium
Pollution on site (domestic and construction waste).	Pollution of the natural environment (soil and water).	Negative	Low
Sewage sludge or other sludge from effluent treatment?	Sewage is produced at the construction camp.	Negative	Medium
Contaminated soils or other material.	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	Negative	Medium
Emissions from combustion of fossil fuels from stationary or mobile sources.	Gasses such as Nox and Sox are deposited in the air from the machines.	Negative	Low
	The movement from vehicles will generate dust and gaseous emissions.	Negative	Medium
Could the project be affected by natural disasters causing environmental damage (eg floods, earthquakes, landslip, *etc)?*	Flooding is a possibility during the rainy season.	Negative	Medium
By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	The regional community will benefit from the construction phase through employment opportunities.	Positive	Medium
Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	New roads will be constructed which will benefit the communities by improving access to villages.	Positive	Medium
Will the project lead to development	Access improvement to the villages and facilities will benefit the local and regional communities.	Positive	Medium

11. ANALYSIS OF ALTERNATIVES

The following alternatives were considered during the planning phase of the proposed project:

11.1 Horizontal alignment of the roads:

It was decided for this project that the existing horizontal alignment will be followed. By deciding this, the following impacts will be limited associated with the construction of a new road:

- Minimal impact on the natural environment (trees, soils, rivers, etc);
- Adding culverts accommodating the surface water drainage patterns;
- Minimal impact on socio-economic activities ~~(tourism, graves, etc);~~
- Minimal disturbance of structures (houses, power lines, water lines, etc);
- Limiting disturbance of fauna and flora to the absolute minimum.

11.2 Construction Method

The use of heavy duty machines were the only considered means of construction.

11.3 Construction Materials

Various areas were prospected to identify suitable materials for the construction of these roads. The availability of suitable material is very important and various alternative sites have been identified for these materials.

11.4 The "No-Go" Option

If this option is executed the status quo of the environment will prevail. The current road will deteriorate to such an extent that it will not be usable.

12. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Program (ESMP) will be implemented during construction. The ESMP is intended to bridge the gap between the Environmental Impact Assessment (EIA) and the implementation of the project, particularly with regard to implementing the mitigation measures recommended in the Environmental Impact Assessment (EIA). Monitoring, auditing and taking corrective actions during implementation are crucial interventions to successfully implement the ESMP.

The ESMP details actions to ensure compliance with regulatory bodies and that environmental performance is verified through information on impacts as they occur.

ESMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated ESMP aims and objectives. Through monitoring and auditing, feedback for continual improvement in environmental performance must be provided and corrective action taken to ensure that the ESMP remains effective.

12.1 ESMP Administration

Copies of the ESMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

12.2 Roles and Responsibilities

The implementation of the ESMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase.

Engineer's Representative (ER)

The Engineer will delegate powers to the Engineer's Representative (ER) on site who would act as the Employer's implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ESMP. The Engineer also has the responsibility to approve the appointment of the Environmental Control Officer (ECO).

Any on-site decisions regarding environmental management are ultimately the responsibility of the ER. The ER will have the following responsibilities in terms of the implementation of this ESMP:

- Controlling that the necessary environmental authorizations and permits have been obtained by the Contractor.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO (Environmental Control Officer) where necessary.
- Taking appropriate action if the specifications are not followed.

- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Recommending and issuing fines for transgressions of site rules and penalties for contravention of the ESMP.
- Advising on the removal of person(s) and/or equipment not complying with the specifications.
- Auditing the implementation of the ESMP and compliance with authorization on a monthly basis.
- Undertaking a continual review of the ESMP and recommending additions and/or changes to the document after completion of the contract.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be a competent person from the staff of Contractor to implement the on-site environmental management of this ESMP by the Contractor. The ECO shall be on site daily and the ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorizations and permits have been obtained.
- Maintaining open and direct lines of communication between the ER, Employer, Contractor and interested and affected parties (I&APs) with regard to environmental matters.
- Convening and facilitating public meetings.
- Regular site inspections of all construction areas with regard to compliance with the ESMP.
- Monitoring and verifying adherence to the ESMP, monitoring and verifying that environmental impacts are kept to a minimum.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.

12.3 Environmental Awareness Training

Before any work is commenced on the Site, the Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the ESMP. The Contractor shall liaise with the Engineer during establishment phase to fix a date and venue for the training and to agree on the training content.

The Contractor shall provide a suitable venue and ensure that the specified employees attend the course. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the ER with a copy of the attendance register. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the ESMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this ESMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.
- The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

12.4 Public Participation and Grievance Mechanisms

An on-going process of public participation shall be maintained during construction to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way. Public meetings to discuss progress and any construction issues that may arise shall be held at least every two months and more regularly if deemed necessary by the ER. These meetings shall be arranged by the ECO but shall be facilitated by the ER. The Contractor shall present a progress report at each public meeting. All I&APs that participated in or were informed during the EIA shall be invited to each of the public meetings.

12.5 Environmental Mitigation Measures

The following mitigation measures are sufficient to reduce or avoid negative impacts associated with the construction of a road. It is based on the activities mentioned in this report that will occur during the construction phase of the project:

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
12.5.1 MANAGEMENT AND MONITORING	To ensure that the provisions of the ESMP are implemented during construction.	a. The environmental and social consultant shall ensure that all aspects of the ESMP are implemented during construction. b. The environmental and social consultants shall attend regular site inspections and meetings and minutes shall make provision for reporting on every aspect of the ESMP.	Environmental and social consultant together with the ECO.
12.5.2 COMMUNICATION AND STAKEHOLDER CONSULTATION	To ensure that all stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the consultant and client.	a. The Contractor shall appoint an ECO from the construction team to take responsibility for the implementation for all provisions of this ESMP and to liaise between the contractor, client and consultants. The ECO must be appointed at least 14 days after the site-handover. b. The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP. c. The contractor shall implement the environmental awareness training as stipulated in Section 14.3 above. d. The Contractor shall liaise with the social and environmental consultants regarding all issues related to community consultation and negotiation as soon as possible after construction commences.	Contractor/ Environmental and Social Consultant to monitor.
12.5.3 HEALTH AND SAFETY	To ensure health and safety of workers and the public at all times during construction.	a. The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction. b. The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule should be updated and distributed to all stakeholders. c. Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer, MEFT and Roads Authority.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		d. The Contractor must adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing, failing which the Contract may be suspended until corrective actions were taken. e. Dust protection masks shall be provided to task workers if they complain about dust. f. Surface dust will be contained by wetting dry surfaces periodically with a water bowser, sprinkler system or any suitable method. This applies for the construction site as well as all the roads. g. Dust at the crusher shall be suppressed by adding water sprayers at the distribution points on the various stages. h. Potable water shall be available to workers to avoid dehydration. This water shall be of acceptable standards to avoid any illness. At least 3 litres of drinking water per person per day shall be made available during construction. i. The contractor shall enforce relevant Health and Safety Regulations for specific activities related to the construction of a road. These activities include working with hazardous chemicals, moving equipment and traffic safety, elevated and overhead work, fall protection and noise. j. The applicable PPE shall be issued for the protection of the workforce: **i. Eye and Face Protection** ▪ Safety glasses or face shields are worn any time work operations can cause foreign objects to get in the eye. For example, during welding, cutting, grinding, nailing (or when working with concrete and/or harmful chemicals or when exposed to flying particles). Wear when exposed to any electrical hazards, including working on energized electrical systems. ▪ Eye and face protectors – select based on anticipated hazards.	monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		ii. Foot Protection ▪ Construction workers should wear work shoes or boots with slip-resistant and puncture-resistant soles. ▪ Safety-toed footwear is worn to prevent crushed toes when working around heavy equipment or falling objects. **iii. Hand Protection** ▪ Gloves should fit snugly. ▪ Workers should wear the right gloves for the job (examples: heavy-duty rubber gloves for concrete work; welding gloves for welding; insulated gloves and sleeves when exposed to electrical hazards). **iv. Head Protection** ▪ Wear hard hats where there is a potential for objects falling from above, bumps to the head from fixed objects, or of accidental head contact with electrical hazards. ▪ Hard hats – routinely inspect them for dents, cracks or deterioration; replace after a heavy blow or electrical shock; maintain in good condition. **v. Hearing Protection** ▪ Use earplugs/earmuffs in high noise work areas where chainsaws or heavy equipment are used; clean or replace earplugs regularly. k. The contractor shall also comply with relevant Labour Laws as stipulated by the Labour Act of Namibia. l. The contractor shall compile a Health and Safety Management Plan for this	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		project. This plan shall be implemented and forms part of the contractors contractual obligation.	
12.5.4 CONSERVATION OF THE NATURAL AND HISTORICAL ENVIRONMENT	To minimise damage to soil, wildlife, vegetation and historical resources during the construction phase. This includes soil crusting, soil erosion and unnecessary wildlife habitat or vegetation destruction. Management of water (domestic and construction).	a. At the outset of construction (or during construction as may be applicable), the ECO and the contractor shall visit all proposed borrow-pits, haul roads, access roads, camp sites, and other areas to be disturbed outside the road reserve. Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. b. Detailed instructions and final arrangements for protection of sensitive areas, keeping of topsoil and rehabilitation of disturbed areas shall be made, in line with the guidelines in this document. The ECO shall be consulted before any new areas are disturbed which have not yet been visited. c. No off-road driving shall be allowed, except on the agreed haul and access roads. d. Vegetation shall be cleared within the road reserve as necessary for the construction of the road, while trees with a trunk diameter exceeding 500 mm (1 meter above ground) shall be left intact. The reserves on either side of this corridor may not be cleared of vegetation, unless permission is given to do so for detours or access roads. This measure is subjected to the Roads Authority of Namibia specifications with regards to the road reserve. e. A prescribed penalty will be deducted from the Contractors payment certificate for every mature tree removed without approval. f. No trees may be felled or live wood in the project area removed by any member of the construction team, including sub-contractors. Unauthorised harvesting of endemic flora and forest products and collection of firewood is strictly prohibited. Contravention of this arrangement is liable for a prescribed penalty. g. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that trees and/or branches have been broken down willfully and unnecessarily, or that any plants have been collected illegally, by any of the staff or sub- contractors. h. Trees that need to be trimmed should be done so with the right equipment and	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		aesthetical acceptable. The use of any type of saw is obligatory and the branches of trees will not be broken off by the use of other machinery. i. Where topsoil is available, this must be stockpiled separately in 1,00 m high piles and this used to cover the damaged areas outside the road reserve such as access roads to borrow pits, and clearing and grubbing areas. j. Where compaction has taken place in disturbed areas, these areas must be ripped and covered with topsoil separately kept for this purpose. k. Poaching or collecting of wild animals is prohibited. l. The killing of any animal (reptile, bird or mammal) is prohibited. m. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that any of his staff or sub-contractors are involved in trapping, hunting or any kind of collecting of animals in the vicinity of the work sites. Offenders will be handed to the authorities for prosecution. n. Pipelines for the pumping of construction water shall as far possible run within the road reserve and along existing tracks and other roads. o. Water will not be allowed to be wasted. This includes water required for construction and domestic purposes.	
12.5.5 BORROW PIT MANAGEMENT AND REHABILITATION	To ensure proper soil management (combat soil erosion and promote biological activities). Preserve and manage natural vegetation and wildlife habitat. To ensure health and safety around the borrow pits (decommissioning phase). To stimulate ecological processes after	a. The removal of material at borrow-pit sites shall be focused where the least significant vegetation exists. If material is only available around significant mature trees (more than 500 cm circumference – 1 meter above ground), clusters of trees should be preserved while suitable material is excavated around them. A 3 meter buffer must be conserved around the cluster of mature trees. The ER shall visit all proposed borrow-pit areas and indicate where and how material may be removed, before works commence. **A cluster constitutes 5 or more trees in close proximity (within 20m radius).** b. The Contractor shall use safety tape to mark these tree clusters as to avoid confusion or miss-understandings. c. The Engineers and surveyors must draft a plan for approval before commencement of a borrow pit. This plan must indicate the required resources	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
	decommissioning (to stimulate vegetation and other biological activities). To establish borrow pits which is aesthetically pleasing after decommissioning.	and sensitive areas that may not be mined (indication of the mature trees). d. The borrow pit areas will be clearly marked by using brightly painted markers. These markers will demarcate the area where materials might be removed and stored. e. All borrow-pits must be rehabilitated. f. The contractor shall liaise with the nominated community representative(s) regarding whether their borrow-pits shall be shaped as water reservoirs during rehabilitation. g. At those borrow-pits not to be shaped as reservoirs, topsoil (the top layer of organic material, even if the topsoil in non-existent, the top layer of organic material) at borrow pits shall be stockpiled separately and the stockpile maintained for use at the end of the contract to rehabilitate the borrow pits. h. The top soil shall be marked as to inform the machine operators that the material is top soil and should be left alone for rehabilitation purposes. i. The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 33° (1:3) and evenly spreading the top soil over the slopes to allow for the growth of new vegetation. j. All spoil material at the borrow pits shall be neatly shaped and no loose material (oversized) will be left inside the borrow pits. k. Access to borrow pits shall be controlled (using gates or manned positions). l. The borrow pit floor shall be levelled evenly as part of rehabilitation. m. A Borrow Pit Rehabilitation Plan will be compiled indicating the rehabilitation schedule (time-frames) for the various borrow pits to be rehabilitated. n. After the borrow pit has been rehabilitated, the Rehabilitation Checklist will be completed and signed by the relevant parties (See Appendix B).	
12.5.6 WASTE AND POLLUTION MANAGEMENT	To avoid contribution to potential surface and groundwater pollution. To avoid contribution to	a. Construction rubble and other waste generated during construction will be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area will be identified and clearly marked. b. The temporary domestic waste site will be fenced off with access control to the	Contractor will ensure the mitigation measures are enforced at his own

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
	potential soil pollution. To ensure that sound waste management practices are adhered to during construction.	area. c. Adequate separate containers for hazardous and domestic waste will be provided on site and at the construction camp. d. The workforce will be sensitised to dispose of waste in a responsible manner and not to litter. e. Waste bins will be placed in and around the construction site to facilitate proper waste management. f. No waste may remain on site after completion of the project. g. Toilet facilities will be available in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males. The toilets should be such that it can be transported for various site selections and to be emptied at an approved sewage site. No person should have to walk more than 1km for the use of a toilet. h. A demarcated vehicle service area will be provided. This area will have an impermeable floor, oil trap and dedicated wash bay area. All used water will first run through the oil trap before the effluent is allowed to exit. The oil trap will be cleaned on a regular basis to ensure its efficiency. i. Servicing of vehicles is only permitted in the demarcated vehicle service area, except for large immobile vehicles which may be serviced on site, on condition that oils and lubricants are prevented from spilling through the use of drip trays or other suitable containers. j. Drip trays will be available for all vehicles that are intended to be used during construction. These trays will be placed underneath each vehicle while the vehicles are parked. The drip trays will be cleaned every morning, and the spillage handled as hazardous waste. k. Machines operating during the day that shows signs of excess leaking (verified by ECO or ER) should be withdrawn from the task and repaired by the contractor.	expense. The ECO will monitor.
		l. Oil, lubricants, and other hazardous materials will be stored in separate containers (concrete liner, container, or metal or plastic drip tray) and stored for transport and disposal at an approved waste disposal site or for collection by an	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		oil recycling company such as WESCO Salvage (this company collects significant quantities of oil from central locations throughout the country). m. Fuel tanks on site will be properly bunded. The volume of the bunded area will be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area will be impermeable and the sides high enough to achieve the 1.5 times holding capacity. There will be a valve installed in the bunded area to allow rainwater drainage. n. Foam fire extinguishers will be in close proximity to fuel kept on site. There will be trained personnel to handle this equipment. At least two extinguishers will be placed at every fuel storage area. Fire extinguishers shall also be placed at the workshop or any other area where the risk of fire exist. All fire extinguishers shall be mounted on a pole with relevant signage indicating the presence of the extinguishers. o. Bitumen batching areas will make use of drip trays to prevent unnecessary spillage of any bitumen products. Cleaning of spray nozzles should be done on the bypass (if it is gravel) or any other section of the road that is in use. This serves as a dust suppressor. p. Accidental spillage of bitumen, oils and other hydrocarbons will be cleaned immediately. The contaminated soil will be suitably disposed of in a container suitable for hazardous waste. q. Disposal of bitumen only in designated/preapproved sites/areas.	
12.5.7 REHABILITATION OF CONSTRUCTION SITE, SERVITUDES AND CLEARED AREAS (WHICH INCLUDES	To rehabilitate the site office, work sites, servitude areas, tracks and other areas disturbed during construction as close to their original state as reasonably possible.	a. All bunded areas, equipment, waste, temporary structures, stockpiles etc. must be removed from the camp and work sites. b. All disturbed areas shall be reshaped to their original contours; as close as possible to the natural conditions before construction commenced, including the road reserve, detours, construction camps, and temporary access routes. c. Alien vegetation that occurs in the project corridor must be weeded. d. All cuttings must be shaped with a slope to provide a natural appearance, without having to destroy significant vegetation on top of the slope (this applies to big trees as mentioned in the ESMP only).	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
STOCKPILES)		e. Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase.	

12.6 Non-Compliance

A) Procedures

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

- The ER shall issue a notice of non-compliance to the Contractor through the ECO, stating the nature and magnitude of the contravention.
- 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, through the ECO, shall provide the ER 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.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the Engineer shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the Engineer 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 with regard to or arising out of interpretation of the conditions of the ESMP, disagreement regarding the implementation or method of implementation of conditions of the ESMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- The Engineer shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remedial measures.

B) Offences and 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:

a. within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the Specification;

b. environmental damage due to negligence;

c. the Contractor fails to comply with corrective or other instructions issued by the ER within a specific time;

d. the Contractor fails to respond adequately to complaints from the public or stakeholders.

Penalties for the activities detailed below, will be imposed by the ER on the Contractor and/or his Subcontractors:

a. Actions leading to erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%
b. Oil spills	A penalty equivalent in value to the cost of clean-up operation plus a N$ 3000 fine per occurance.
c. Damage to indigenous vegetation	A penalty equivalent in value to the cost of restoration plus N$ 15 000
d. Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus N$ 15 000
e. Damage to cultural sites	A penalty to a maximum of N$100 000 shall be paid for any damage to any cultural/ historical sites
f. Damage to trees	A penalty to a maximum of N$15 000 shall be paid for each tree removed without prior permission, or a maximum of N$5 000 for damage to any tree, which is to be retained on site.
g. Damage to natural fauna	A penalty to a maximum of N$15 000 for damages to any natural occurring animals.
h. Any persons, vehicles, plant, or	N$5,000

	thing related to the Contractors operations within the designated boundaries of a "no-go" area	
j.	Litter on site	N$5,000
k.	Deliberate lighting of illegal fires on site	N$ 5,000
l.	Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance	N$5,000
m.	Sewage leaks from any toilet or sewage drain /tank	N$10,000

- Penalties may be issued per incident at the discretion of the Engineer. The Engineer will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.
- For each subsequent similar offence the fine may, at the discretion of the ER, be doubled in value to a maximum value of N$10, 000.
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.
- In the case of a dispute in terms of this section, the Engineer shall determine as to what constitutes a transgression in terms of this document.

12.7 Grievance Mechanisms and Processes

A grievance is a concern or complaint raised by an individual or a group within communities affected by activities related to the operations of an organization. Such impacts could be from activities on implementation of a particular project by public or private entity. A grievance is raised because of the uncomfortable and unacceptable state perceived will occur or actual by an individual or group or a community, result of an introduced event to a particular area.

A grievance mechanism is described as a project instrument that aims to give stakeholders or interested and affected parties (I&APs) the right to report all project-related inadequacies, the right to denounce any kind of human rights violation or detrimental event of the project and to request redress or cessation of the detrimental event.

The instrument when implemented allows resolving grievances of affected individuals or communities at earliest localized level or within project's immediate domain, preventing escalation to unmanageable levels. This will resultantly benefit the aggrieved parties and the proposed project implementors.

The Contractor shall draft such a document indicating the process towards seeking redressal of grievances at different scales of operation.

12.8 Environmental Monitoring and Auditing

Environmental audits should be conducted at least once every three months during construction. Benefits derived from the audit process might include:

- identification of environmental risk;
- development or improvement of the environmental management system;
- avoidance of financial loss;
- avoidance of legal sanctions;
- increase in staff awareness;
- identify potential cost savings;
- improve dealings with employees, environmental groups, the community, regulators, media, shareholders, or insurance & finance institutions; and
- establish a history of environmentally responsible operations, e.g. through environmental incident reports, environmental monitoring & recording, & reporting to committees or Authorities.

Commonly, the environmental audit of a site will cover all management procedures, operational activities & systems, and environmental issues. The environmental audit will be compiled objectively and be conducted by an independent, competent entity.

13 CONCLUSION AND RECOMMENDATIONS

This project does not pose significant environmental risks due to the fact that the existing alignment will be followed. The various negative impacts associated with the construction of roads can be mitigated through effective implementation of the Environmental and Social Management Plan.

Waste management, pollution prevention and control as well as effective borrow pit rehabilitation will prevent any significant long term negative effects associated with this project.

Upgrading of this road will increase the safety of road users due to the improved road surface.

Vehicle operating cost will be reduced due to the new road surface therefore having a positive financial effect on the road users.

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Other citations were done in the document with references.

APPENDIX A

DAILY QUESTIONS

CONSTRUCTION SITE MONITORING CHECKLIST

Construction site name_____

Environmental/Safety/Health Site Officer Name_____

Date_____

CHECK THE FOLLOWING DAILY ON THE CONSTRUCTION SITE AND AT THE CONTRACTOR'S CAMP				
Category 1: Personal Protective Equipment (PPE), construction site safety, access control and hazardous substance handling				
	Question	**Yes**	**No**	**If no, describe action taken**
1	Have all labourers working today, including sub-contractors, been fully trained in proper health and safety procedures?			
2	Have you conducted a hazard assessment of the worksite and the planned construction activities for today with the Site Foreman and reviewed the EMP/PHPSAP to identify any new issues that might come up during the day?			
3	Are all labourers and staff wearing the required Personal Protective Equipment (PPE)? Minimum PPE includes: € Hard hat € Safety shoes € Overalls Certain operations require additional PPE, such as: € Eye protection/goggles/visors € Face masks € Gloves € Ear plugs /ear muffs € Harnesses			
7	Are all hazardous substances (eg fuel, paint, oil containers, cement etc) stored in an area marked by			

	danger tape or in a locked room away from public access?			
8	Are any visitors or suppliers expected to visit the construction site today? If so, ensure sufficient PPE is available for their use and that the visitors register is signed when they arrive.			
9	Are labourers and equipment a safe distance away from power lines?			
10	Are extension cords and portable tools in good condition?			
11	Is the first aid kit fully stocked and accessible in case of emergency?			
Category 2: Excavations, stockpiles, storage areas and general housekeeping				
	Question	**Yes**	**No**	**If no, describe action taken**
12	Have all excavations been demarcated with barrier tape (minimum requirement) or fencing if the excavation is deeper than 2m?			
13	If a trench is more than 2m deep, is there a form of protection, such as: € Sloping or benching € Trench box or shield € Shoring			
14	Is any stockpiling taking place today? If so, ensure the stockpile is placed in an area approved by the Site Foreman and that the height does not exceed 2m and that the slopes are not steep. Is the area demarcated with barrier tape?			
15	Are all storage areas neat and tidy with no machinery, vehicles, poles, materials or nails sticking out which may cause an injury or cause someone to trip up? Have the storage areas been demarcated with barrier tape?			
16	Is the construction site in general safe and neat with no waste lying around?			

Category 3: Solid waste management				
	Question	**Yes**	**No**	**If no, describe action taken**
17	Are there sufficient covered waste containers in place on the construction site and in the Contractor's camp in which to store waste material?			
18	Is waste (including construction waste) being disposed of in a designated disposal area and secured to prevent soil contamination (eg plastic lining underneath the waste pile) or covered to prevent it being blown off site?			
19	Have you checked to ensure waste is not being burnt or disposed of in pits on the site?			
20	Are there any signs of accidental/negligent spills of bitumen, fuel, oil, cement, paint etc visible on the site? If so, ensure spillages are cleared and the waste is containerised for subsequent disposal. Such waste should be treated as hazardous and be appropriately sealed prior to disposal.			
21	Is waste being disposed of off-site today and is it being sent to an approved site? Note the name of the site and keep a record of approximate waste volumes or bags taken for disposal. Waste may be separated for later recycling if this is taking place at the disposal site.			
Category 4: Water management				
	Question	**Yes**	**No**	**If no, describe action taken**
22	Are all water taps and points functioning properly and has a paved surface been provided beneath the tap/water point to prevent erosion and channel water to a catch pit?			
23	Is cement mixing taking place within a bunded area, where excess water drains to a lined pit? Are cement mixing trays being used in confined areas?			
24	Are there any flooded areas at the site? If so, have stormwater systems been installed to manage the water drains? If groundwater is encountered in an excavation or pit, ensure the Site Foreman, RE and			

	Environmental Consultant in the Consulting team are consulted about remedial action.			
Category 5: Social aspects				
	Question	**Yes**	**No**	**If no, describe action taken**
25	Have community representatives been consulted about any concerns related to the construction?			
26	Are HIV/AIDs and other health posters/leaflets being displayed at the work site and have sufficient condoms (male and female) been made available? Does any new material need to be ordered?			
27	Is the general hygiene and waste management at the Contractor's camp acceptable?			
28	Is all potable water and wastewater systems working properly on the construction site and in the Contractor's camp?			
29	Have any records been kept of accidents, work related illnesses or injuries that may have occurred today?			
Category 6: Other (e.g. access roads, borrow pits, dust and noise pollution)				
	Question	**Yes**	**No**	**If no, describe action taken**
30	Are any construction/delivery vehicles using the access roads to the construction site or the borrow pits today? If yes, ensure no impacts have occurred at these locations as a result.			
31	Are construction activities causing any dust pollution? If so, ensure mitigation measures are implemented as per the EMP.			
32	Is construction or Contractor's camp activities causing any noise pollution? If so, ensure mitigation measures are implemented as per the EMP.			
33	Did any training (including for HIV/AIDS) or "toolbox talks" take place today? If so, has a record of attendance and the training provided been kept?			
34	Are there any other environmental aspects not mentioned above that should be mentioned for the record – eg tree/vegetation removal, rehabilitation etc?			

35	Are all records pertaining to environmental management updated and on file?			

Notes in Respect of Category 1

- Ensure all excavations are secure by being sealed off with barrier tape. Should access to the excavation be required by staff, or for vehicles, machinery, building supplies or equipment, then the barrier tape should be erected nearby to prevent access to the wider construction area where the excavation is located. If the excavation is deeper than 1.5m, then consideration should be given to installing fencing or a more secure and permanent barrier to prevent access.
- All materials, machinery and equipment should also be stored in secure areas, which as a minimum have been sealed off with barrier tape. Hazardous substances (such as fuel, cement, paints etc) should be stored in structures which can be either locked or to which general access can be prevented. Adequate safety signage should be in place (and on notice-boards) to warn about use of hazardous substances or equipment.
- No poles, planks or building/waste materials should be left outside of secure/safe storage areas unless in use. Such materials should not be placed where they can be tripped over or stacked such that they could jab passers-by. Sharp ends and nails should not be protruding. Stockpiles should not exceed 2m in height.
- Vehicles and machinery should be inspected daily to check they are not spilling any fuel or oils. Where leaks are detected, they should either be sealed or drip trays placed under the point where leaks are occurring.
- At the end of the working day, the construction site should be inspected to ensure all the above mentioned matters are addressed.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 2

- Ensure all labourers and staff are wearing the required Personal Protective Equipment (PPE). The minimum requirement is a hard hat and safety shoes. Safety glasses, visors, dust masks and gloves should be worn for activities such as welding and grinding. Scaffolding should be in place where labourers are working at a height of greater than 2m. Should gloves or a hard hat be difficult to wear for more intricate jobs (eg painting above head height), then they should still be kept at hand for use when such a task is complete. A standard overall should be worn by all employees for easy identification. Site Foremen and Team Leaders should set an example with the wearing of PPE.
- All sub-contractors should be inducted and trained regarding the EMP and they should also wear PPE.
- All visitors to the construction site should sign-in in a register, be issued with PPE and be inducted on safety matters. A record of such activity should be kept.
- No open fires should be allowed except where this is permitted for cooking and warmth purposes. Firewood should not be sourced from the environment next to the construction site.
- Ensure any fire-fighting extinguishers and first aid kits are accessible and fully operational. Emergency services contact numbers (police, ambulance, fire brigade etc) should be on hand.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 3

- Adequate waste containers should be placed on site to prevent littering. The construction sites should

be regularly checked to ensure waste has not been left to blow around the site. Waste containers should also be capable of being closed or sealed off to prevent waste from being blown around.

- If waste can be recycled or reused in the region, then waste on site can be separated into different containers to assist in this regard. At some waste disposal sites, recyclers may be present who retrieve certain wastes for reuse. If this is noted, then separation of waste on the construction site may be warranted.
- When waste is taken to a landfill site for final disposal, if the site does not issue a record of the waste disposed, then keep a record at the construction site of the amount/volume of waste taken to the disposal site.
- No waste should be burned on site or in the waste containers, except in the case of paper and wood which can be safely burnt for fires used for cooking or warmth.
- Any spills of fuel, paint or other potentially hazardous substances should be cleaned up immediately and the waste containerised. This waste should ideally be taken to a hazardous waste site if one is available; alternatively, it should be adequately sealed for disposal at a general waste disposal site. Maintenance and washing of vehicles and equipment should take place on a hard impermeable (and preferably bunded) surface.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 4

- Potable water should be seen as a scarce resource and not wasted. Taps should not be left open. Leaking taps should be repaired. Water should not be allowed to run away from the ground beneath the tap and erode the soil. A hard surface should be installed beneath taps and any flow of water from the area beneath the tap should be safely channeled to plants or to an area where it does not present a hazard.
- Stormwater needs to be managed during the wet season. It should not be allowed to drain into excavations, nor should it be allowed to flood areas where materials and equipment are stored. A plan should be in place to manage stormwater and this must be approved by the RE and the environmental specialists in the Consulting Team.
- Should groundwater be intercepted during excavation work or during construction activities in the wet season, the Site Foreman and RE should be informed and a plan to protect the groundwater table must be approved by the RE and the environmental specialists in the Consulting Team. Any water pumped out from excavations or construction areas must be safely disposed of with the approval of the Site Foreman and RE.
- All wastewater from construction activities and the Contractor's camp must be channeled to lined pits. This includes wastewater from vehicle wash-down and maintenance areas, from areas used to wash tools and brushes used in concrete mixing and painting and from showers and cooking areas.
- Toilets and sanitation facilities should be checked daily for health reasons and records kept of when such facilities are emptied or replaced. Soap, toilet paper and other cleansing materials should be kept in stock.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 5

- Records should be kept of all complaints received from members of the public or local community. Key stakeholders such as headmasters of schools and community representatives should be consulted on a regular (preferably daily) basis to confirm there are no problems as a result of construction activities. The nature of any complaints should be noted together with the action taken to address the problem, including action to prevent a recurrence of the problem.

- Any observations where local community members' (or schoolchildren at school construction sites) behaviour interferes with construction staff and construction activities, or where construction staff behaviour affects community members/schoolchildren, should be noted and brought to the attention of the Site Foreman. Local livestock and wild animals should be left undisturbed.
- A supply of male and female condoms should be kept on site and records kept of when they are issued or supplies are replaced.
- Ensure posters, pamphlets and information about HIV/AIDS, STDs, TB and general health are readily available on site and placed on notice-boards.
- Records should also be kept of the number of women employed on site and any incidents where they feel they are being discriminated against in terms of access to facilities etc.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 6

- Access roads should not be allowed to become seriously damaged or unusable as a result of construction activities.
- Borrow pits (sand mining) and the access roads to them should be restored and left safe after use.
- Any disturbances resulting in excessive dust or noise generated as a result of construction activities should be noted and mitigation measures implemented as per the EMP.
- Ensure sensitive areas (eg watercourses, boreholes, oshanas, graveyards, neighbouring land uses, mature trees and areas of undisturbed vegetation) are taped off from the construction areas and educate the staff that such areas are off-limits.
- Ensure all safety, health and environmental awareness/training records are up to date.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

NB. Note that completion of the checklist each day does not absolve the on-site safety, health and environmental representative(s) from ensuring all conditions in the EMP/PHPSAPs are adhered to. If in doubt about actions to take, consult the full EMP/PHPSAP documents which should be kept on site.

APPENDIX B

Borrow Pit Rehabilitation Checklist

Date: _____

Borrow Pit Name and Number: _____

Location (road-km / GPS coordinates): _____

The above borrow pit shall only be handed over once all of the listed criteria have been met by the contractor.

Item No.	Description	Comments	Complies
			Yes / No
1.	The floor is level and no man made topographical high or low points are present in the borrow pit		
2.	The site in and around the pit is clear of any illegal dumping of foreign material, spoils and construction waste		
3.	Gradients of the pit slopes are less than 18 degrees (1:3) and are finished perpendicular to the slopes to prevent water erosion		
4.	The slopes are covered with overburden/top soil, if available, with a thickness of not more than 300 mm		
5.	Available dead vegetation is placed on the slopes of the borrow pits		
6.	The berm of excess soil outside the pit is not higher than 1.0 m, sloped 1:3 and min. 3.0 m away from the edge of the pit and min. 9.0 m away from any structure		
7.	There are no walls or steps present in or around the borrow pit, if so, then the pit has been fenced off according to spec.		
8.	All alien vegetation has been removed from the floor, the slopes and berms of the pit		

Land Owner: _____ _____
(Name) *(Signature)*

Contractor: _____ _____
(Name) *(Signature)*

Consultant: _____ _____
(Name) *(Signature)*

Client: _____ _____ *(Name)*
(Signature)

APPENDIX C

Public Participation Process

APPENDIX D

Curriculum Vitae of the Compiler

APPENDIX E

Existing Services to be Relocated

APPENDIX F

Borrow pit investigation report and test results