ENVIRONMENTAL SCOPING REPORT

2024

CONSTRUCTION OF A 35 KM LOW VOLUME SEAL ROAD – DR 3524 - NAKABOLELWA VIA MBALASINTE TO KASIKA

ZAMBEZI REGION

Rian du Toit

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Project Name:	**CONSTRUCTION OF A 35 KM LOW VOLUME SEAL ROAD -DR 3524 - NAKABOLELWA VIA MBALASINTE TO KASIKA ZAMBEZI REGION**
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1. INTRODUCTION

Enviro Management Consultants Namibia is appointed by the Roads Authority of Namibia, to conduct a site visit, 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.

This environmental assessment process aims at the construction of a low volume seal road DR3524 from Nakabolelwa via Mbalasinte to Kasika (Zambezi Region) with a total length of approximately 35 km. This road is phase two of DR3524 which is a gravel road already constructed up to Nakabolelwa. This phase will then extend a further 35 km via Mbalasinte to Kasika near Impalila Island.

A site visit was conducted during the month of March 2018 to determine the possible sensitivity of the area. Even though there are numerous plants, the current road alignment has been designed to minimize the negative impacts on the vegetation of the area.

A new alignment has been identified for this road and is based on existing tracks. During the site visit it was evident that numerous informal tracks are present in the area linking the settlements of Nakabolelwa, Ivilivinzi, Mbalasinte and Kasika, subsequently the Community of Impalila Island. It is not only the settlements that are connected but also schools, clinics, Police stations, lodges and Public Institutions.

A full Public consultation was done by visiting the communities alongside the route. The Community is very optimistic and excited about the proposed road.

2. POLICY, LEGAL AND ADMINISTRATIVE 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 1: 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.	• Permits should be obtained from Department of Forestry for the removal of protected trees.

Statute	Provisions	Project Implications
	• 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.	
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 without a permit.	In case there is an intention to remove protected species, then permits will be required.
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.

Statute	Provisions	Project Implications
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.

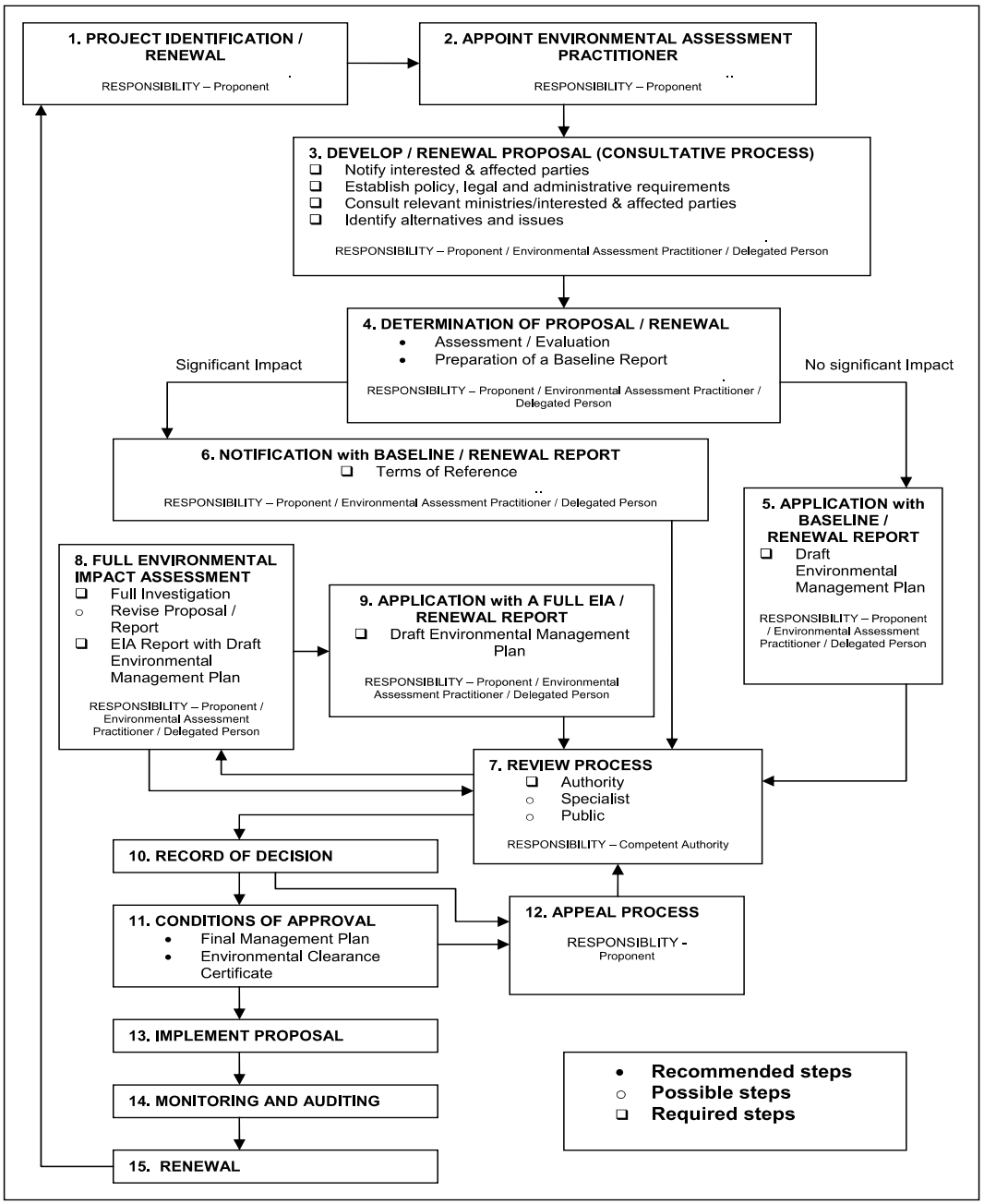
(c) any road provided for this purpose shall be ripped up in such a way that it cannot be washed away should the owner, lessee or occupier so desire.

(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 4below:*

Figure 1: EIA Process



3. METHODOLOGY FOR THE INVESTIGATION

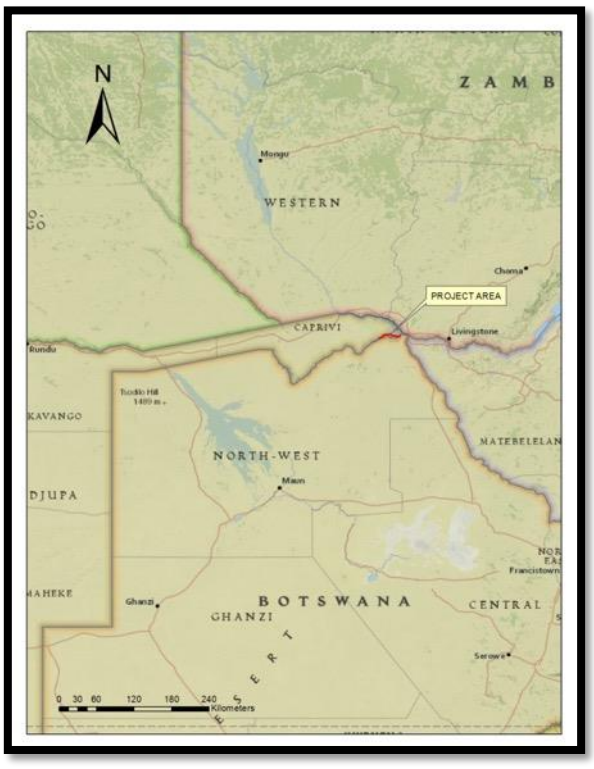
The following methodology was followed for the environmental investigation process as to compile the environmental assessment report:

Data Collection and Verification

- ***Site visit and stakeholder consultation.*** 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.
    - During the stakeholder consultation questions were posed to the meeting surrounding any environmental aspect they consider to be sensitive with regards to the project. These comments (if any) are then taken into consideration during the impact identification and evaluation process.
- ***Literature review.*** Existing literature will be obtained relevant to the previous EIA document for Section A of TR1/3 and other applicable literature.
- ***Obtaining information from team members*****.** Various inputs were received from team members involved in the project. This includes the technical, design and social team. Liaising with these teams enhances the understanding of the project and therefore focuses the environmental assessment to make it site and project specific.

4. PROJECT DESCRIPTION

4.1 OVERVIEW



The project is located in the Zambezi Region in North-Eastern Namibia, on the eastern side of Trunk Road TR 8/7 between Katima Mulilo and Ngoma.

The road traverse in a west – east direction over the flood plains found south east of Katima Mulilo with an extent of approximately 35 km.

The importance of the project is to link towns of Katima Mulilo to the settlements of Ikumwe and Ihaha with other settlements to the far east such as Mbalasinte and Kasika and ultimately Impalila Island which is mostly accessible only to travel via Botswana.

This proposed road will give access to Namibians without passports to travel to the island without requiring immigration permissions and also make the route much shorter.

The new proposed road is phase two of the newly

constructed DR3524 and continues through Mbalasinte to Kasika. The following image shows the proposed alignment:

As would be expected access to this area is troublesome during the rainy season and this proposed road will improve access to the settlements and also increase service delivery to the communities of the now isolated settlements. The proposed road will be very beneficial to the remote settlement such as Mbalasinte.

4.2 ROAD CONSTRUCTION DESCRIPTION

Road construction actions depend on the preferred option identified in the preliminary design phase of this road. Layer works are required for such a project with the wearing course as the final layer.

The following briefly describes the various layers:

Sub Base:

- It is layer of granular material provided above the selected layer generally natural gravel. This material is obtained from borrow pits alongside the planned route.

Base course:

- It is the layer immediately under the surface treatment or wearing course.

- As base course lies close under the pavement surface it is subjected to severe loading. The material in a base course must be of high quality and its construction must be done to strict design standards.
- This material is obtained from borrow-pits but may have to be screened, crushed and screened, modified by addition of lime material or stabilized. The material may also have to be obtained from stone quarries opened by the contractor or from commercial sources.

Bitumen layer:

This layer is the top layer of the pavement which is in direct contact with the wheel of the vehicle. For this project the final layer is a bitumen layer of approximately 20mm.

4.3 BORROW PITS

Suitable materials are needed for the construction of the selected layer, subbase, shoulder, gravel wearing course and base course. Fill material is also required to ensure a vertical alignment appropriate for the chosen design speed.

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 complies with 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 fill 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). The material for the gravel wearing course has to be hauled a long distance (approximately 70km); suitable material is not available in close proximity to the project.

4.4 CONSTRUCTION WATER REQUIREMENTS

There are perennial water sources in the project area and boreholes will probably not be required for this project. Contractors must obtain the consent of relevant landowners prior to utilizing a water source and Clause B1219 of the Project Specifications contains requirements and standards related to the quality of water used for construction purposes. A water extraction license is required according to the Water Resources Management Act N0.11 of 2013.

4.5 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.

Domestic and camp construction wastes generated at the contractor camps should be managed responsibly and according to the Environmental and Social Management Plan (ESMP) requirements.

Sewage management is also 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 the contamination of soils and water. The number of workers should be determined and the sewage facilities planned accordingly.

4.6 ASSUMPTIONS AND LIMITATIONS

It is assumed that the information provided by the Roads Authority and the information in the Inception 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. Communication between the various team members was assured trough regular meetings.

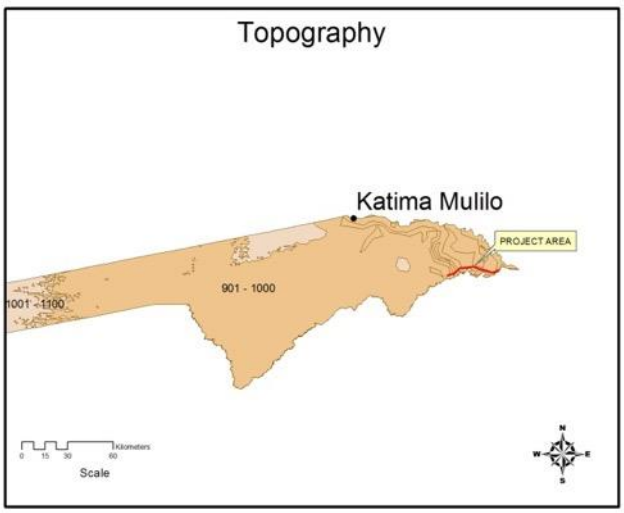
5. ENVIRONMENTAL BASELINE DATA

The Environmental Baseline Data gives a background of the Socio-Economic and Bio-Physical characteristics of the area where the intended project will be implemented. This data will also serve as a benchmark for the environmental conditions before the commencement of the proposed project.

It is important to note that this data also serves as the background on which the environmental impacts will be determined. Certain aspects (water, soil, etc) might be classified as sensitive and therefore will determine the significance of the impact associated with the project.

5.1 Bio-Physical Environment

5.1.1 Topography[1]



Topographically, the Zambezi is particularly flat, without a single feature recognisable as a hill. From the highest areas in the extreme west (about 1,100 m above sea level), elevations gradually drop to approximately 930 m near Impalila Island in the east. (Mendelsohn and Roberts, 1997).

The Zambezi Region as a whole is underlain by thick deposits of Kalahari sands, most of which are wind-blown, with little of the underlying geology being exposed, except along certain sections of the river courses and on Impalila Island. The extensive Kalahari sands and the rivers with their associated floodplains, channels and deposits are the two major features which shape the landscape. Within the Project Area, only two of the six major land types (open water, flood plains, riverine woodlands, Mopani woodlands, Kalahari woodlands and Impalila woodlands) defining the Zambezi Region can be identified, namely:

- Flood plains:

These are areas associated with the various rivers in the Eastern Zambezi, and consist mainly of grasslands and old river channels which become flooded during the rainy season.

- Mopani woodlands:

The Mopani woodlands lay in an area of old river drainage lines which are covered by wind-blown sand deposits (after Mendelsohn and Roberts, 1997).

[1] Drainage Report – Lund Consulting Engineers CC

Mopani woodlands are found along the western part of DR3524 near the B8 Katima Mulilo – Ngoma tar road. The majority of the Project Area however, being that area to the east of Nakabolelwa, is located entirely in the flood plains of the Zambezi and Chobe River.

5.1.2 Geology and Soils[2]

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 (after Mendelsohn et. al., 2009).

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 (after Mendelsohn et. al., 2009).

Very few mineral deposits have been identified in the sedimentary layers of the Kalahari Group (after Mendelsohn et. al., 2009).

The existence of an extensive palaeolake system adjacent to the Okavango River, with links to the Zambezi River via the Chobe River at elevations of 940 – 945 m and 936 m, was shown following geomorphological research conducted in Botswana in the 1980s. This palaeolake "Lake Caprivi", covering some 2,000 km_2, at 936 m, ponds in the Zambezi-Chobe area behind the Mambova Falls in the Zambezi River (located upstream of Kazangula), arcing in a generally southerly direction from Katima Mulilo to the Chobe River (after VKE, 1998).

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 (Mendelsohn and Roberts, 1997).

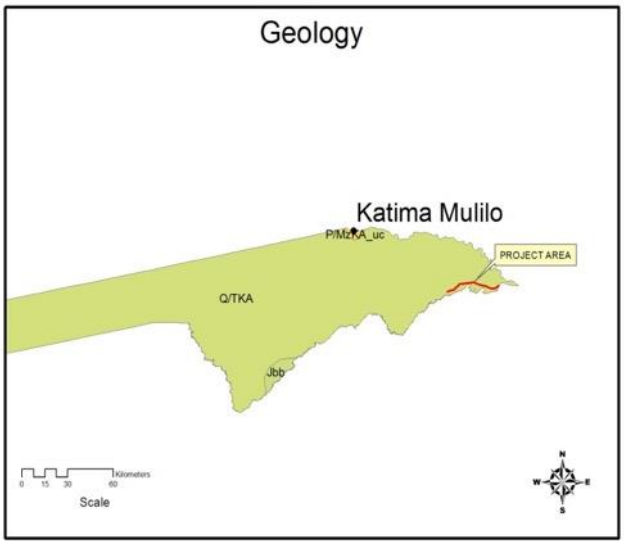
The soils at the heaviest end of the spectrum have high clay content and are found in areas which are flooded regularly, i.e. the hydromorphic and organic clay soils. Water does not penetrate these soils, or drain away easily, because the clay is so dense. Areas flooded most frequently hold water for 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 of the spectrum, are pure sands. These soils do not hold moisture for long, so plants with shallow roots grow only after good rains have fallen. Large trees found in these soils overcome this

[2] Drainage Report – Lund Consulting Engineers CC

problem by having deep roots which extend into the moist soils below. Between the heavy clayey soils and the pure sands, a range of intermediate soils (loams, clay-loams, sandy clays etc.) are found, which consist of varying proportions of sand, clay and organic material (Drainage Report – Lund Consulting Engineers CC).

On the Geological Map of Namibia the proposed route is situated on the Kalahari Group (Q/TkA on the Geological Map, 1980). The Kalahari Group comprises roughly the eastern third of Namibia and stretches from Ovamboland/ Okavango/ Caprivi Strip in the north via Bushman/ Hereroland and Gobabis district in the central region to the eastern parts of the Mariental/ Keetmanshoop/ Karasburg districts in the south.

In the northern sector, in Ovamboland and Okavango, the Kalahari Group varies in thickness from 225 to 500 m as reported by Brink (1985). Deep borehole investigations by the Namibian Directorate of Geological Survey indicate a succession which can be divided into a basal Beiseb Formation consisting of 15 to 30 m of reddish gritty or conglomeratic sandstone, more than 120 m of poorly consolidated reddish brown calcareous sandstone of the Olukonda Formation and the uppermost Andoni Formation consisting of greyish green sand or clayey sand with sandy facies towards the margins of the basin.



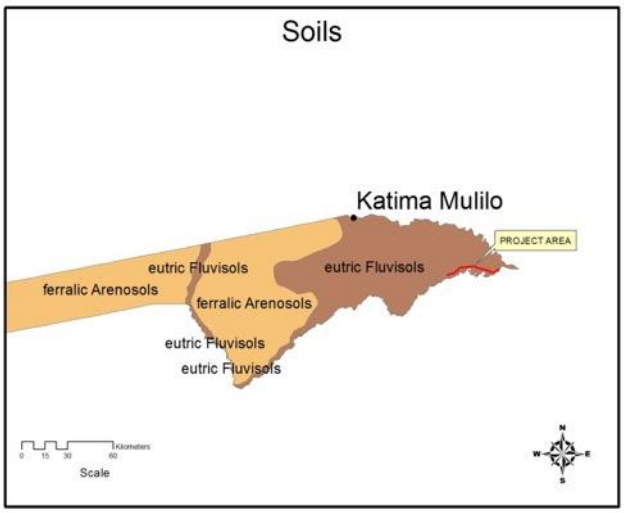
The overlying sands of the Kalahari Group are currently stabilised except at the edges of rivers and omurambas where they are still mobile and a source of fresh sediments. These sands are mainly stabilised by vegetation, which in the north-eastern parts of Namibia is often thick bush or even semi-tropical forest.

The sedimentological characteristics of the Kalahari sands have been investigated inter alia by Baillieul. Baillieul has differentiated between four different types of sand, three which can be encountered in Namibia:

1. This type will be mainly encountered in the northern sector of the Namibian Kalahari. It is pure quartz sand with a red iron skin around its particles. This sand is found in the fossil dunes of the north Kalahari.

2. The next type is defined to the central sector of the Namibian Kalahari. It consists of sands of two distinct origins. One is an aeolian component of quartz grains of distant origin and the other one is a finer felspathic type derived from the underlying sandstone formation.

3. The third one is more or less restricted to the southern sector of the Namibian Kalahari. This is also pure quartz sand similar to the second type without the felspathic component.



The soils in the Eastern Zambezi Region have a moderate or medium potential for crop cultivation (Mendelsohn and Roberts, 1997 and Mendelsohn et. al., 2009). Soils in this area are classified as Eutric Fluvisols. The first part of this classification refers to the properties of the soil; the eutric description denoting fertile soils with high base saturation. The second part of this classification refers to the conditions or processes which led to the soil's formation; the fluvisols being deposited by rivers. These soils are found in the Eastern Zambezi flood plains and along the margins and valleys of the larger river courses in eastern Namibia, for example along the Okavango, and Kwando Rivers as well. In the Eastern Zambezi, these soils are regularly flooded by the Zambezi River (after Mendelsohn et. al., 2009). The area traversed by DR3524 is underlain by clay-loam soils, which underlie approximately 35% of the Zambezi Region (Mendelsohn and Roberts, 1997). Patches of organic clay can be expected around areas of permanent water.

5.1.3 Vegetation

The Zambezi Region falls within the Tree and Shrub Savannah Biome, with the extreme eastern areas bordering the Subtropical Woodland Biome. The Eastern Zambezi Region falls within the Broadleaved sub-classification of the Tree and Shrub Savannah Biome. The proposed road exclusively travels through the flood plains situated in the south eastern parts of the Zambezi pan handle.

Pictures taken of the grass plain found in the flood area east of the proposed road.

In the case of the former, this consists of the Mopane-*Aristida* woodland, whilst in the case of the latter, the area includes Zambezi woodland, Zambezi transitional grassland, Zambezi floodplain grassland, Zambezi floodplain channels and channels with open water (Mendelsohn and Roberts, 1997). The dominant landscape structure for most of the route of DR3524 is Zambezi Floodplains (very flat topography), whilst the dominant vegetation is floodplains grassland with isolated clusters of trees (after Mendelsohn et. al., 2009)[3].

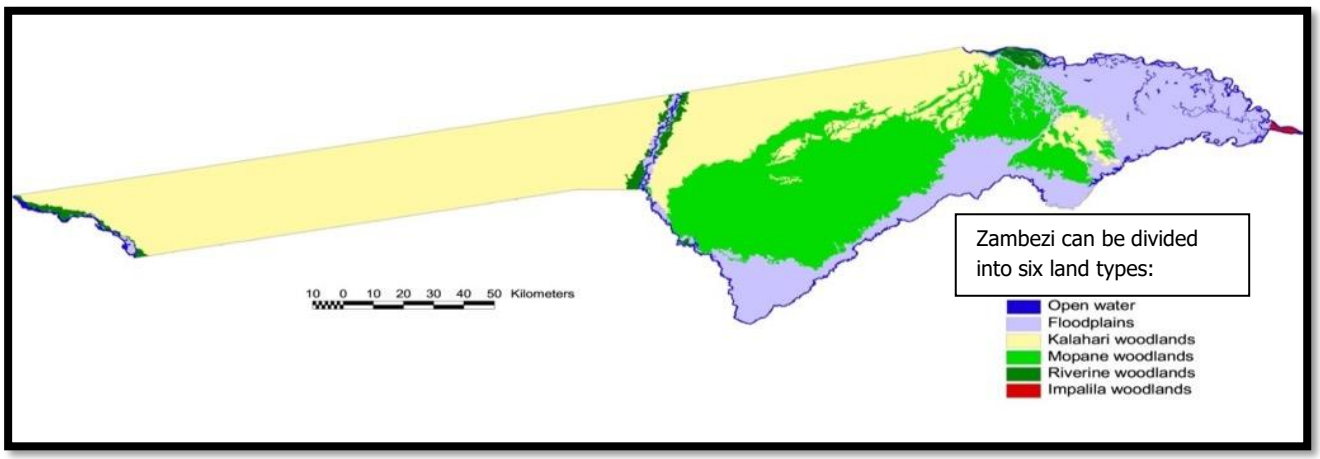


Figure 2: Land types of the Zambezi Region - IRDNC

Notice should be taken to identify these protected trees especially in the 30m wide road reserve associated with the DR3524. The following trees species are found on the flat flood areas:

[3] Drainage Report – Lund Consulting Engineers CC

Scientific Name	Common Name	Protective Status
Combretum apiculatum	Kudu-bush	None
Acacia hebeclada	Chobe Candle Pod	None
Acacia nigrescens	Knob Thorn	Threatened
Terminalia sericea	Silver Cluster Leaf	None
Combretum collinum	Variable Combretum	None
Acacia erioloba	Camel Thorn	Forestry Legislation
Combretum zeyheri	Mukenge	None
Sclerocarya birrea	Ushivi	Forestry Legislation
Kigelia africana	Kigelia africana	Exploited
Colophospermum mopane	Mopane	Forestry Legislation

Table 2: Dominant flora on the plain areas

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 (after 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 (after Mendelsohn and Roberts, 1997).

With the exception of the Kalembeza Rice Farm, crops are not cultivated in the Eastern Zambezi on area on a large scale, and the floodplains are used primarily as seasonal grazing for livestock.

5.1.4 Surface-Hydrology

A specialist surface hydrology investigation was conducted by Lund Consulting Engineers CC for the construction of DR3508 and forms part and parcel of this environmental investigation. The motivation for this specialist investigation was due to the fact that the eastern part of DR3508 will be constructed in the flood plains. For the purpose of the environmental report the following extract are inserted relevant to the flood plain in which the DR3524 will be constructed.

The area between Katima Mulilo, Sifuha and Impalila Island the whole eastern part towards Zambia and Botswana forms part of the Zambezi Floodplain, where flooding occurs regularly. This area is extremely flat – so much so that the topographical maps do not show contours of this area. Although this area receives relatively high rainfall in the Namibian context, the topography is such that catchment areas in the conventional sense do not predominate, although (isolated) localised drainage lines do feature.

In terms of road design, conventional hydrological analyses are based on the identification of catchment areas where stream flow lines cross a road. Once catchment areas have been identified, the necessary catchment area characteristics are determined, from which the runoff can be calculated for a defined return period. Drainage structures are then provided in the road embankment (culverts, bridges etc.), sized according to the calculated runoff.

Figure 3: Zambezi flood plain around DR3524

Figure 3 above shows how the Zambezi River changes as it flows eastwards, from near Katima Mulilo, where the river has a defined channel, to near Schuckmannsburg, where the river crosses a wide flood plain area, to Kazungula further to the east, where the river again features a more well-defined channel. **Figure 4** shows that with numerous meandering channels to the south of the main river, the area between Katima Mulilo and Kazungula is clearly a flood plain. The Zambezi River along the stretch between Katima Mulilo and Kazungula is located along the northern portion of the paleolake "Lake Caprivi". The flooding of this area is a well-documented phenomenon and is primarily a result of high water levels in the Zambezi River, more than it is as a result of runoff from conventional catchment areas.

Figure 4: Detailed hydrology of the area

The following figure 5 indicates the flood plain derived from a study conducted by VKE during 1998.

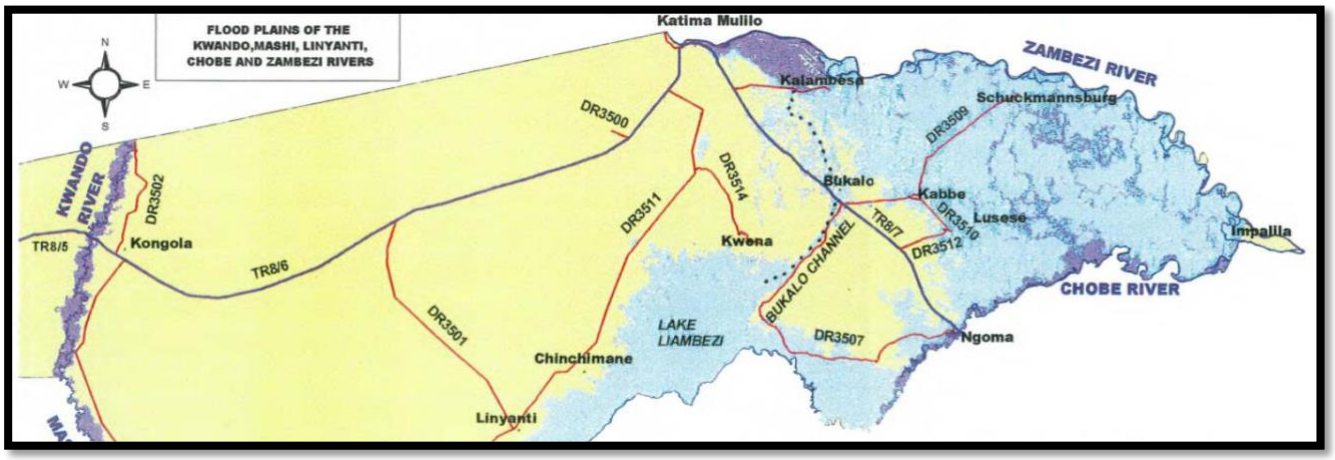


Figure 5: Flood area in the Zambezi Region

Regular flooding took place the past few years and details are available in the specialist report. It is important to note these flooding and the effect it has on the design of the road.

The proposed road (DR3524) is situated on the southern part of the pan-handle and is in totality situated in the floodplain area.

5.1.5 Regional Climate[4]

Whilst Namibia is typically characterised as a very arid country, and is the most arid country in Southern Africa, with the driest climate in Africa south of the Sahara (IWRMPJVN, 2010a), the Zambezi

[4] Drainage Report – Lund Consulting Engineers CC

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 (Mendelsohn et. al., 2009). Almost all of the Zambezi Region's rain falls during the summer months, generally between September and April, with rainfall peaks generally occurring in January and February. There is also a general decline in rainfall from north to south, with rainfall generally more variable in the southern parts and more predictable in the eastern areas.

The coefficient of variation in rainfall for this area, of only about 30 to 40%, is the second lowest in the country (after Mendelsohn et. al., 2009), which nevertheless means that rainfall is variable both spatially and time-wise from year to year.

Temperatures vary between 3 degrees Celsius during winter months of June and July and peaks at 35 degrees Celsius during the summer months of October. The maximum temperature drops to about 30 degrees during the rainy season (November to February).

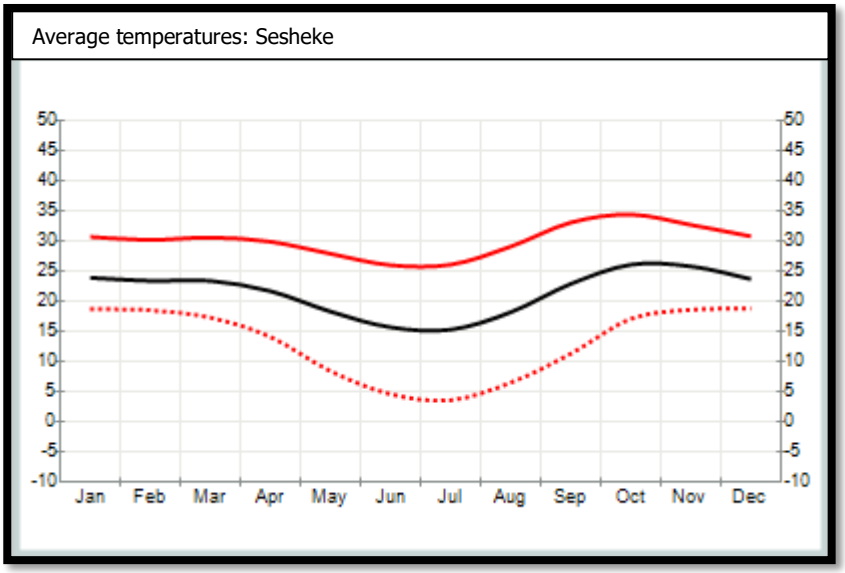


Figure 6: Average temperatures at Sesheke - 5 km from Katima Mulilo[5]

The following picture indicates the average days with precipitation. This is important for the planning phase for construction of the road.

[5] http://www.yr.no

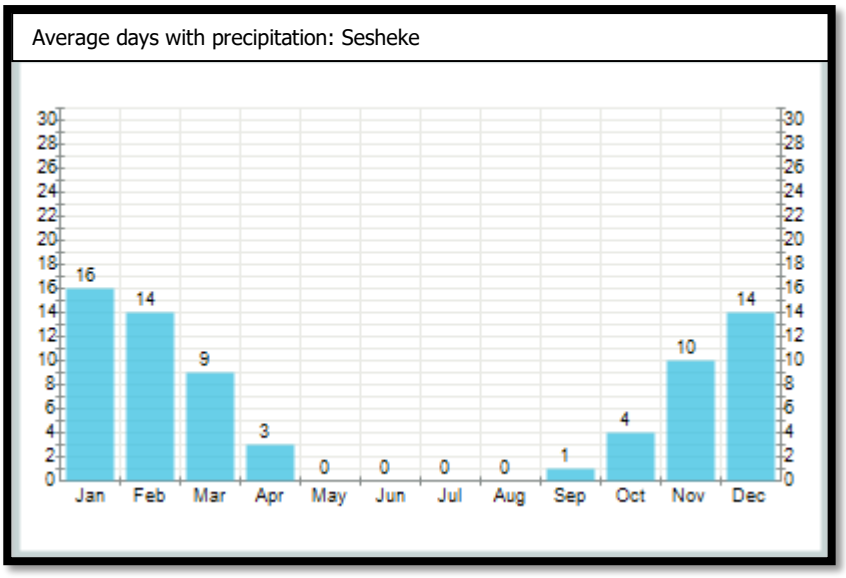


Figure 7: Average days with precipitation at Sesheke – 5km from Katima Mulilo[6]

5.1.6 Archaeological and Cultural Aspects

The heritage of Namibia is protected in terms of the National Heritage Act of 2004. This legislation obliges a developer to identify any heritage sites before project implementation. In Namibia, the heritage aspects are normally covered in the EA of the project.

The only significance with regards to archaeological material can be socio-orientated with regards to graveyards, sacred or ritual tress and places. During the site visit none of the above where identified or indicated during the Public Participation meetings.

5.2 Socio-Economic Conditions

Zambezi region is in the extreme north-east part of Namibia with a surface area covering 14,663 km2 and comprising of 8 constituencies. The distribution of people across Namibia is very unevenly, with the biggest population concentration occurring in the northern parts. It is estimated that the **Zambezi** Region has a population of 142 373 out of a total population of just over 3 million people in Namibia. This is a 57.2% increase in population from the 2023 census data. This is one of the highest percentage changes for all Regions in Namibia.

[6] http://www.yr.no

Region	2011 Population	2011 Population share	2023 Population	2023 Population share	2011–2023 Percentage change
Namibia	2 113 077	100.0	3 022 401	100.0	43.0
//Kharas	77 421	3.7	109 893	3.6	41.9
Erongo	150 809	7.1	240 206	7.9	59.3
Hardap	79 507	3.8	106 680	3.5	34.2
Kavango East	136 823	6.5	218 421	7.2	59.6
Kavango West	86 529	4.1	123 266	4.1	42.5
Khomas	342 141	16.2	494 605	16.4	44.6
Kunene	86 856	4.1	120 762	4.0	39.0
Ohangwena	245 446	11.6	337 729	11.2	37.6
Omaheke	71 233	3.4	102 881	3.4	44.4
Omusati	243 166	11.5	316 671	10.5	30.2
Oshana	176 674	8.4	230 801	7.6	30.6
Oshikoto	181 973	8.6	257 302	8.5	41.4
Otjozondjupa	143 903	6.8	220 811	7.3	53.4
Zambezi	90 596	4.3	142 373	4.7	57.2

Table 3: Population Demographics - Namibia

Zambezi region houses just less than 4.8% of the total population of Namibia (Population and Housing Census, 2023). It is estimated that 45.5% of the population in this region live in urban areas and the other 54.5% are rural. The total number of employed persons in establishments for Zambezi region stood at 10,481employees. In terms of nationality, Namibian employees amounted to 10,215 compared to 266 non-Namibian employees. The regional proportion of non-Namibian employees to the total employment was 2.5 percent. At constituency level, the highest share of 5.0 percent was recorded in Linyanti constituency. The road traverse mostly in the Kabbe South Constituency which hosts only 6.2% of the population in the Zambesi Region. According to the Census data the employment number of people in this Constituency is 716 people from 10,215 of the Zambesi Region (only 7%) and are dominated by the wholesale / retail trade, accommodation and food services, public administration, defense and educational sectors.

According to the 2022 Census there are 15 450 Primary School enrolments for this Region which totals to 88.9% of the Zambezi Region population aged between 7 – 13 years.

The provision of health services in the Zambezi Region is very important. This reduces infant mortality rates, increase life expectancies, and help control diseases such as HIV/Aids, tuberculosis, cholera and other occurring diseases. Access to hospitals and clinics plays a vital role insuring proper healthcare. Good roads are key to facilitating access to health services.

Access to schools, clinics and other important social and economic nodes are some of the major objectives for the construction of these roads. It is therefore important to look at the social structures present in these specific regions.

6. 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. The communities at the various settlements alongside the route are well aware of the proposed construction of the road and the Engineers communicated the proposed project to the relevant leaders and politicians. The construction 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 proposed construction of the road was advertised twice in two different newspapers as to comply with the Environmental Management act No.7 of 2007 and the applicable Environmental Regulations. The advertisements were placed in the Market Watch sections of the Republikein, The SUN and Algemeine Zeitang on the following dates:

- 5th August 2024
- 12th August 2024

There were **only two I&AP registrations received** on the placement of the notices in the various newspapers:

Name	Company	Contact	Comments
Leon van der Merwe	Montserrat Investments CC	lavdmerwe58@gmail.com	Register
Ndelimona Iipinge	EIA Tracking and Monitoring in Namibia (EIA Tracker)	info@eia-tracker.org.na	Register

Three Stakeholder and Public Meetings were held on the 23rd March 2024 at the Nakabolelwa Constituency office at 9:00, then at Mbalastine Khuta at 12:00 and finally at the Kasika Khuta 14:00. Various Councilors, Traditional leaders and members of the community attended those meetings.

Various aspects of the road design were discussed during the meeting which includes the proposed route, drainage challenges due to the floods, access to various important social nodes (schools and clinics), land compensation issues, delays with regards to the proposed route and the benefits of the road.

The Community in general agreed to the proposed route alignment. Everybody present at the meeting accepted the road and indicated that they look forward to the road as it will improve their livelihood.

Please find attached the minutes and attendance of the meetings: **APPENDIX A**

PROOF OF PLACEMENTS OF NOTICES:

Save the number
085 785 6231
Send Finance or scan the QR code

Economic Indicators

Exchange Rates

Currency	Spot	Currency	Spot
USD/NAD	18.196	NAD/AUD	0.084
EUR/NAD	19.668	NAD/NZD	0.092
GBP/NAD	23.127	NAD/BWP	0.738
NAD/CHF	0.047	NAD/JPY	8.106

Forward Cover

Currency	1M	3M	6M	12M
USD/ZAR	18.605	18.55	18.901	18.461
EURO/ZAR	19.998	19.903	20.39	20.204
GBP/ZAR	23.608	23.261	23.883	23.482
ZAR/JPY	8.68	8.249	7.862	7.764

*Effective rate (withholding tax still to be applied)

DATE: 05/08/2024 - 13:15 PM

COMPANY NEWS IN BRIEF

INTEL SHARES SLUMP 26% AS TURNAROUND STRUGGLE DEEPENS

Intel shares sank 26% on Friday in their worst day since 1974 after the chip manufacturer suspended its dividend and slashed its workforce to fund a costly turnaround after losing its once-dominant global position.

The company lost more than $30 billion in market value after it gave a disappointing forecast and said it would cut 15% of its workforce, deepening worries about its ability to catch up with Taiwan's TSMC and other chipmakers.

The stock ended the day at $21.48, its lowest since 2013.

"Intel's issues are now approaching the existential in our view," Bernstein analyst Stacy Rasgon said.

Rasgon said Intel could add $40 billion in cash to its balance sheet by the end of 2025 through the moves, as well as subsidies and partner contributions.

While Intel's manufacturing setbacks are specific to the Santa Clara, California-based company, other chipmakers also sank for a second straight day.

-REUTERS

TECH-HEAVY NASDAQ IN CORRECTION AS EQUITY SELLOFF DEEPENS

Worries over tech earnings and a slowing U.S. economy slammed the Nasdaq Composite index on Friday as it extended recent declines to fall 10% below its record high, confirming it was in correction territory.

The tech-heavy index fell 2.4% on Friday after a softer-than-expected jobs report spurred worries over whether the Federal Reserve will need to deliver hefty interest rate cuts at its next meeting to prevent the U.S. economy from falling into recession.

Disappointing earnings from Amazon and Intel also have spooked investors.

The Nasdaq has dropped 10% from its record close of 18,647.45 points on July 10. An index or stock is widely considered to be in a correction when it closes 10% or more below its previous record closing high.

"This is an old-fashioned correction going on," said Tom Plumb, chief executive and portfolio manager at Plumb Funds. "We passed the economic torch from the perception of growth to the perception of needing government intervention with lower interest rates to stabilize the economy."

-REUTERS

AMAZON SHARES DROP ON SLOWING ONLINE SALES GROWTH

Shares of Amazon.com fell more than 12% on Friday after the company reported slowing online sales growth in the second quarter and said consumers were seeking out cheaper options for purchases.

The commentary from the online shopping behemoth is in line with recent value-conscious consumer behavior, ahead of retail giant Walmart's quarterly results later this month.

Amazon CEO Andy Jassy said on a post-earnings call that customers were trading down on price when they could.

The company's shares were trading at about $165, with the stock among the biggest drags on the Nasdaq. Amazon was set to lose about $188 billion in market value, if losses hold.

"Consumer spending trends facing retail peers appear to have finally caught up with Amazon's P&L," MoffettNathanson analyst Michael Morton said.

Amazon's online stores sales rose 5% in the second quarter to $55.4 billion, compared with growth of 7% in the first quarter.

-REUTERS

SINGER AKON'S MULTIBILLION-DOLLAR FUTURISTIC CITY IN AFRICA GETS FINAL NOTICE

A single arched concrete block juts out of a field in Senegal where R&B singer Akon first laid the foundation stone for his $6 billion metropolis four years ago.

The West African nation granted the artist 136 acres of land on its Atlantic Coast in 2020 to build his Akon City — envisioned as a real-life Wakanda, the fictional country from Marvel Studios' Black Panther films.

Akon got the notice after missing several payments to Sapco, two people familiar with the matter said. A spokesperson for Akon declined to comment. A member of his staff said he wasn't aware of any notice when reached by phone. Sapco declined to answer further questions.

In addition to the luxury apartments and seaside resort, Akon, 51, also envisioned hospitals, a police station and a university equipped with cutting-edge technology. Akon City was to be solar-powered and environmentally friendly, the artist said in 2020. Residents and visitors would use Akoin cryptocurrency launched that year.

-BLOOMBERG

APPLE, AMAZON RESULTS ARE CRUCIAL FOR NASDAQ 100'S NEXT LEG

Earnings from Apple Inc and Amazon.com Inc will be critical to give direction to the Nasdaq 100 after a volatile period marked by some of the benchmark's worst — and best — days this year.

The pair are the last megacaps to release results until Nvidia Corp at the end of August, and will set the tone for tech investors for the coming month. The reports, due after the close, will be scrutinized for how artificial intelligence is driving growth for Amazon's cloud-computing unit and how the new technology is expected to boost demand for the next iPhone. They'll also give investors some insight into the health of consumer spending.

Apple is under pressure to give more information about expected demand for its next iPhone models, which will include AI. The shares have rallied more than 10% since the firm unveiled long-awaited new AI features in June, and more than 25% since last quarter's estimate-beating results, even after the recent rotation out of the tech sector. Amazon shares are up about 20% this year. Amazon and Apple shares each slipped more than 2% in mid-day trading Thursday.

-BLOOMBERG

NOTICE OF AN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Enviro Management Consultants Namibia is appointed by the Roads Authority to conduct an Environmental Impact Assessment and develop an Environmental Management Plan as required by the Environmental Management Act No 7 (2007) and the associated Environmental Regulations for the following road construction project.

This environmental assessment process aims at the construction of a Low Volume Seal Road- DR3524 from Nakabolelwa via Mbalasinte to Kasika (Zambezi Region) with a total length of approximately 34 km. This road is phase two of DR3524 which is a gravel road already constructed up to Nakabolelwa.

Take note that all Interested and Affected Parties (I&AP's) are hereby invited to register in terms of the environmental assessment process and to give input, comments or opinions regarding the intended road construction.

Closing date for registration is the 31st August 2024.

Please forward your inputs to the following:

Enviro Management Consultants Namibia
Contact: Rian du Toit
Fax: 088 626968
Email: enviromc@iway.na

ENVIRO

Economic Indicators

Exchange Rates *Forward Cover*

Currency	Spot	Currency	Spot	Currency	1M	3M	6M	12M
USD/NAD	18.323	NAD/AUD	0.082	USD/ZAR	18.155	18.466	19.134	18.986
EUR/NAD	19.991	NAD/NZD	0.09	EURO/ZAR	19.633	19.91	20.515	20.842
GBP/NAD	23.331	NAD/BWP	0.733	GBP/ZAR	23.215	23.129	24.036	24.151
NAD/CHF	0.047	NAD/JPY	7.963	ZAR/JPY	8.886	8.415	7.82	7.57

*Effective rate (withholding tax still to be applied)

DATE: 12/08/2024 - 12:15 AM

COMPANY NEWS IN BRIEF

LIHLE MBELE APPOINTED ASCENDIS HEALTH FINANCE HEAD

Ascendis Health said late on Tuesday that it has appointed Lihle Mbele, its current group head of finance, as interim CFO with effect from the end of July. The group had recently been subject of a buyout offer from a consortium headed by CEO Carl Neethling, but that called this off after a protracted process at the Takeover Regulator Panel. Neethling, who had been acting CFO, said that given the consortium had allowed the long-stop date for the transaction of 20 July to lapse, that the group would therefore remain listed. - FIN24

JSE REGISTERS R493 MILLION PROFIT

The JSE Ltd., the entity that operates Africa's largest stock exchange, reported flat interim net profit amid various challenges, including a sluggish domestic economy and political and geopolitical issue. The bourse operator reported a net profit after tax of almost R493 million for the six months ending in June, unchanged from the previous half-year period. The group, which had paid out a dividend representing 82.4% of earnings in 2023, reaffirmed its guidance for 2024 of a payout of between 67% and 100%. Operating income was up 4.2% to R1.5 billion as the JSE's efforts to diversify revenue streams amid ongoing delistings bore fruit. The JSE has been pushing a strategy of earnings diversification, including through its Information Services business - which includes promotion, licensing and sale of data and statistics - and JSE Investor Services (JIS), which provides, among other things, share registry services. Most business segments reported growth in revenue for the period, with JIS revenue up 28.9%, commodity derivatives revenue up 24.7%, and revenue from bonds and interest rate trading rising 7.8% year-on-year. Though overall capital markets revenue was more or less flat at R529 million, equity trading income fell 12% to R212 million for the period as capital flows continued to shift offshore, with more domestic investors seeking out foreign assets. The JSE lost about 1.7% on Wednesday but has still risen 13% in the past year.

COMMODITY CRISIS HIS IMPALA PLATINUM

Impala Platinum warned on Wednesday that a downturn in commodity prices is expected to help prompt an up to 90% fall in headline profits for its year to end-June, when it also saw a significant deterioration in fatality metric after a major incident last year, and huge impairments. Implats' headline earnings for the period are expected to decrease by between 85% and 90% to between R1.9 billion and R2.8 billion to end June, the mining group said in a statement. It also expects to report a basic loss of up to R17.8 billion, from earnings of R4.9 billion previously, amid hefty writedowns, notably R16.5 billion for Impala Rustenburg, which reflects a weaker commodity price outlook. *Received US dollar sales per 6E ounce fell 34%, with sharply lower average palladium and rhodium pricing,* and has embarked on job cuts, saying it incurred R488 million related to restructuring in its 2024 year. Implats, valued at about R76 billion on the JSE, had completed its acquisition of Royal Bafokeng Platinum in May 2023, with this helping in a 12.6% rise in group production to about 3.65 million ounces in its year to end June. Like-for-like production fell 1%. But it also implemented a black economic empowerment transaction, which cost it R1.9 billion, while it also had to account for R19.8 billion in impairments, including R1.6 billion for Impala Canada. Implats gained about 2% on Wednesday but has still fallen more than a quarter on a one-year basis. - FIN24

GLENCORE TO KEEP COAL ASSETS

Diversified mining giant Glencore announced on Tuesday that it has decided keeping its coal assets within the group is the best way to add value to shareholders. But the diversified mining giant also reported it has swung into a hefty interim loss, in part due to a hefty R11 billion writedown of its SA coal mines in order to reflect lower thermal prices, as well as the local logistics crunch. "Glencore's board, considering both risk and opportunity scenarios, endorsed the retention, rather than demerger, of the coal and carbon steel materials business, as currently providing the optimal pathway for demonstrable and realizable value creation for Glencore shareholders," Glencore CEO Gary Nagle said in a statement. The decision to retain the coal assets was announced alongside Glencore's results for the six months ended in June. The group swung into a $233 million (about R4.28 billion) loss, compared with a $4.56 billion profit in the comparative half. Glencore added 2.6% on Wednesday but has still fallen about 13% in the past year. - FIN24

MAERSK TO REGISTER 45% PROFIT FALL

Danish shipping giant Maersk posted Wednesday a 45% fall in net profit in the second quarter, as supply chain disruptions due to the Red Sea crisis led to higher operating costs. Months of attacks by Yemen's Iran-backed Houthis have prompted some shipping companies to detour around southern Africa to avoid the Red Sea route - which normally carries about 12% of global trade. The Yemeni rebels have been launching drones and missiles at shipping in the Red Sea since last November, saying they are acting in solidarity with Palestinians during the Gaza war. In the April to June period, Maersk posted a net profit of $798 million, while sales dipped to $12.77 billion, both slightly lower than analysts' forecasts. - AFP

SOME PHOTOS TAKEN DURING THE PUBLIC PARTICIPATION PROCESS

7. ENVIRONMENTAL IMPACT ASSESSMENT

The following activities are generically associated with the construction of a road. These activities are kept in mind during the environmental impact assessment process. Due to the fact that there will not be a contractor's camp constructed for this project, makes the activity list shorter than for other road construction projects.

- **Camp site establishment**
  - Demarcation of the camp site
  - Protection of vegetation and natural features
  - Protection of fauna
  - Protection of cultural historical aspects
  - Topsoil conservation
  - De-bushing and de-stumping
  - Structures construction: bulk water, sewage, electricity and accommodation
  - Parking and other required demarcated areas

- **Site infrastructure**
  - Batching plants
  - Crusher plants
  - Sand washing plants
  - Nurseries
  - Construction of service, haul and access roads
  - 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

- **Earthworks**
  - Prospecting boreholes and test pits
  - Excavations and trenches
  - Cut and fill
  - Shaping and trimming
  - Construction of pavement layers

- **Stockpiles, storage and handling**
  - Topsoil
  - Spoil
  - Vehicles and equipment
  - Fuel

7.1 Environmental Impact Assessment Process Methodology

One of the objectives of this study is to identify and quantify the potential positive and negative impacts which the proposed road will have on the receiving biophysical and socio-economic environment

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 4.

Finally, use Checklist of Criteria for Evaluating the Significance of Impacts to help complete Column 5. 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 the locality (topography, land use, changes in water bodies, etc)?

No.	Questions to be considered in the 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 borrow pit 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 return 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. It is very unlikely that any buildings will be cleared.	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 informal alignment.	Low significance.
1.4	Pre-construction investigators eg boreholes, soil testing?	Yes	Materials testing are required to obtain construction materials which will affect the topography and vegetation cover.	The areas of disturbance are very small. Holes are dug to excavate samples and closed after sampling. Low significance.
1.5	Construction works?	Yes	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	The existing informal alignment will be used therefore there are no significant impacts anticipated.
1.6	Demolition works?	No		
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	A temporary construction camp will probably be constructed 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.
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 informal road.
1.9	Underground works including mining or tunneling?	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	The storage of machines, gravel, crushed stone, sand, cement, bitumen 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?	Yes	Sewage effluent from the camp sites need to be treated or disposed.	This might have a significant negative impact on Health / Safety as well as soils and water if not managed effectively.
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 traffic increase due to movement of construction vehicles.	Low significance due to low vehicle volumes.
1.19	New road, rail, air, water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	Yes	A new road alignment will be determined and constructed based on the informal roads that exist.	The significance will be low due to the width and current informal 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?	No		
1.22	Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	New culverts will be constructed.	Should proper planning and consultation with local communities be applied, negative impacts on the hydrology of the flood planes and tributaries should be limited therefore reducing the significance. Construction of new culverts will have a positive impact.
1.23	Stream crossings?	Yes	The road crosses the flood planes.	The significance is medium positive due to more effective water balance culverts.

1.24	Abstraction or transfers of water from ground or surface waters?	No		
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	Yes the new road will have an impact on the surface drainage.	The significance will be low negative due to the newly constructed drainage structures
1.26	Transport of personnel or materials for construction, operation or commissioning?	Yes	Movement of people and materials will impact on the air quality and road safety.	Low significance due to few receptors alongside the route. Medium negative on road safety due to increased vehicle movement at the towns.
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 is either temporarily or permanently?	?	It is uncertain what the impact might have on the migration of people in the region.	The significance is estimated to be low, but possible.
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
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 and layer works. Soils will be affected and might therefore impact negatively on the agricultural land.	The significance is low. The existing informal alignment will be followed with some small adjustments.

2.2	Water?	Yes	Water is used for domestic and construction purposes.	The available water will be used for construction. The significance will be low due to the sufficient volumes available.

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 medium 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	The proposed route will impact positively on the vulnerable groups due to improved mobility network and increased safety.	Positive medium 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.	Medium significance should it not be properly 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.	The quantity of these gasses will not impact significant 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	Construction vehicles, power plants and the crusher plant will generate gaseous emissions.	The impacts might be low significant and can mitigated.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Dust from material 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)?	Yes	Burning of waste will negatively affect the air quality.	The significance will be low negative.
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 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 will produce noise.	Low significance due to low receptor density.
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 on the ground water into sewers, surface water, 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.	With no mitigation the significance might be medium.
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 controls systems?	No		
8.3	From any other causes?	Yes	The health and safety of road users might be affected by construction vehicles.	Might be significant if proper road traffic management is not conducted during the construction phase.

8.4	Could the project be affected by natural disasters causing environmental damage (eg floods, earthquakes, landslip, *etc)?*	No		

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?	No		
9.2	By resettlement of people or demolition of homes or communities or community facilities eg schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	?	In-migration of people might be a possibility.	The significance is unsure.
9.4	By placing increased demands on local facilities or services eg housing, education, health?	No		
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	The local and larger community will benefit from the construction phase.	The significance might be positive medium due job creation and increased mobility.
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?	Yes	New road will be constructed which will benefit the communities. Lower vehicle operating costs will contribute to the National economy.	The significance will be positive but the extent uncertain.

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?	Yes	Stimulating the tourism industry.	This might be a significant positive impact on the Zambezi Region
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?

- There are no areas protected by law in the vicinity of the proposed site.
- No areas were identified that could be regarded as sensitive with reference to bio-diversity or historic importance.
- There is a low possibility of features of high historic or cultural importance.
- Surface drainage patterns will be addressed through proper engineering design.

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

This road is not used extensively; therefore the location is not highly visible to many people, except for the few settlements residents in the area.

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

No, the road will be constructed on the existing informal alignment.

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

There will be a quite 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. The area will probably remain agricultural / flood plain.

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

No.

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

No.

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 some flora species (trees) that are protected by Forestry Legislation.

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?

No.

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?

No. The area is very flat with limited floods, erosion or impacts on the climatic conditions.

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

No, the proposed project will be constructed on the existing informal alignment.

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. Noise levels will decrease during the operation phase of the project.

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 geological materials 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 social economic welfare of 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?

7.2 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
	Areas zoned as undetermined or agricultural will change to transport (land use).	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 to road (land use).	Negative	Low
Pre-construction investigators egg boreholes, soil testing?	Materials testing are required to obtain construction materials which will affect the topography and vegetation cover.	Negative	Low
Construction activities.	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	Negative	Low
Demolition works?	The possible removal of old culverts.	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
Facilities for treatment or disposal of solid wastes or liquid effluents?	Sewage effluent from the camp sites need to be treated or disposed.	Negative	Medium
New road, rail or sea traffic during construction or operation?	Limited traffic increase due to movement of construction vehicles.	Negative	Medium

Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	There will be temporary bypasses constructed.	Negative	Low
Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers.	Water balancing is an important aspect to be evaluated. The addition of 170 surface water structures (culverts / widening of bridges) will improve the surface water balancing.	Positive	Medium
Stream crossings?	Various streams will be crossed but with the addition of the new culverts the proposed project will improve the surface water flow characteristics.	Positive	Medium
Abstraction or transfers of water from ground or surface waters?	Water will be extracted for the construction phase of the project.	Negative	Medium
Changes in water bodies or the land surface affecting drainage or run-off?	Drainage will improve due to the increased structures (culverts) and widening of the bridges.	Positive	Medium
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 influx.	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 agricultural land will be affected due to the construction of the road.	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 the vulnerable groups due to improved mobility network. Access to rural services and markets improve.	Positive	Medium
Spoil, overburden or mine wastes?	Spoils will be generated during construction affecting the aesthetics appeal of the area.	Negative	Low

Pollution on site (domestic and construction waste).	Pollution of the natural environment (soil and water).	Negative	Medium
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	Low
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 noise, dust and gaseous emissions.	Negative	Low
Emissions from burning of waste in open air (eg slash material, construction debris)?	Burning of waste will negatively affect the air quality.	Negative	Low
By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	The local community will benefit from the construction phase through additional 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 road will be constructed which will benefit the communities by improving access to schools, clinics and churches.	Positive	Medium
	New road will be constructed which will benefit the communities. Lower vehicle operating costs will contribute to the tourism potential of the Zambezi Region due to better access to Impalila Island and the towns alongside the route.	Positive	Medium
Will the project lead to development	Access improvement to facilities in the region will benefit the local and regional communities.	Positive	Medium

8. ANALYSIS OF ALTERNATIVES

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

8.1 Horizontal alignment of the roads:

It was decided for this project that the existing horizontal informal 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, flood plains, rivers, etc);
- Maximum access to schools, clinics, economic nodes and other institutions;
- Minimal impact on socio-economic activities (agricultural fields, graves, etc);
- Avoidance of structures (houses, power lines, etc).

8.2 Construction Method

The construction method of the road is a combination of labour-based and equipment based construction. While all earthworks and layer works will be carried out by equipment based operations, the concrete works on culverts and drainage structures will be carried out by labour based techniques.

8.3 Construction Materials

The obtainment of suitable construction material is also a process to identify certain areas (borrow pits) known for good construction materials and to further investigate the known sites. This was the first and best alternative. The reason be that these known borrow pits have been impacted on previously and therefore do not pose any unknown environmental risks.

8.4 The "No-Go" Option

If this option is executed the status quo of the environment will prevail. Access to the eastern parts of the pan handle in the Region will stay restricted for the dry months only.

9. 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 implant the ESMP.

The ESMP detail 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.

9.1 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.

9.2 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.

9.3 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.

9.4 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.

9.5 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
9.5.1 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.
9.5.2 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, community, 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 9.3 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.
9.5.3 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. The Contractor shall also liaise with the Traffic Authorities in this regard.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		d. Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer and the Roads Authority. e. 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. f. Dust protection masks shall be provided to task workers if they complain about dust. g. 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. h. Dust at the crusher shall be suppressed by adding water sprayers at the distribution points on the various stages. i. 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. j. 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. k. 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.	

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.	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		l. The contractor shall also comply with relevant Labour Laws as stipulated by the Labour Act of Namibia. m. The contractor shall compile a Health and Safety Management Plan for this project. This plan shall be implemented and forms part of the contractors contractual obligation. n. Blasting may only be conducted by a qualified person and all laws and regulations will be enforced before and during blasting. Blasting must be done in accordance with Clause 1222 of the Standard Specification of the Roads Authority of Namibia. A blasting notice board shall be erected where blasting is to take place with the scheduled time and date when blasting will commence.	
9.5.4 CONSERVATION OF THE NATURAL AND HISTORICAL ENVIRONMENT	To minimise damage to soil, vegetation and historical resources during the construction phase. This includes soil crusting, soil erosion and unnecessary 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.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		f. No trees may be felled or live wood in the project area removed by any member of the construction team, including sub-contractors. 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 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 unless a permit has been obtained for legal hunting purposes. l. The killing of any animal (reptile, bird or mammal) is prohibited, unless for legal hunting purposes. 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 wild 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.	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
9.5.5 BORROW PIT MANAGEMENT AND REHABILITATION	To ensure proper soil management (combat soil erosion and promote biological activities). Preserve and manage natural vegetation. To ensure health and safety around the borrow pits (decommissioning phase). To stimulate ecological processes after decommissioning (to stimulate vegetation and other biological activities). To establish borrow pits which is aesthetically pleasing after decommissioning.	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 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 applicable local headmen OR residents 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.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		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).	
9.5.6 WASTE AND POLLUTION MANAGEMENT	To avoid contribution to potential surface and groundwater pollution. To avoid contribution to potential soil pollution. To ensure that sound waste management practices are adhered to during construction.	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 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	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		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. l. Accidental spills will be cleaned immediately. The contaminated soil will be suitably disposed of in a container suitable for hazardous waste.	
		m. 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 oil recycling company such as WESCO Salvage (this company collects significant quantities of oil from central locations throughout the country). n. 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. o. 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. p. 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.	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		q. Should large quantities of bitumen needs to be disposed, it can be done at a borrow pit with the following mitigation measures: (i) the borrow pits area should not be in the road reserve; (ii) The aquifer should not be near the borrow pit floor and the borrow pit must not be situated less than 100m from any stream or river; (iii) a plastic lining will be laid underneath the proposed dumping area and the spoiled bitumen needs to be covered with the same plastic lining as to prevent leaching; (iv) at least three meters of material will be placed on top of the plastic lining.	
9.5.7 REHABILITATION OF CONSTRUCTION SITE, SERVITUDES AND CLEARED AREAS (WHICH INCLUDES STOCKPILES)	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 particularly the Downy thorn apple (*Datura innoxia*) and Wild tobacco (*Nicotiana glauca*) that occur 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). e. Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase.	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will monitor.

9.6 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.

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 thing related to the Contractors operations within the designated boundaries of a "no-go" area	N$5,000
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.

9.7 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.

9.8 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.

10. CONCLUSION AND RECOMMENDATIONS

Flooding is a real constricting factor with regards to movement within the area and the new road will greatly improve accessibility to schools, clinics and economic nodes. This said proper planning is required by the Engineers to ensure effective surface water flow, minimizing the possible negative impact of depriving flood areas of seasonal water.

Removal of vegetation is always associated with the construction of roads, however proper planning can limit the negative impact on the vegetation.

It is the opinion of the environmental team that this road will have a positive impact on the communities in the south – eastern parts of Zambezi and might contribute positively to tourism growth in this area.

No further significant negative impacts were identified during the site visit or during the Scoping process. Implementation and monitoring of the Environmental Management Plan will further reduce the negative impacts associated with road construction and enhance the benefits of such a project.

10.1 References

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Other citations were done in the document with references.

APPENDIX A - PUBLIC PARTICIPATION PROCESS

MINUTES OF THE STAKEHOLDER AND PUBLIC PARTICIPATION PROCESS – 23 MARCH 2024

ATTENDANCE REGISTER FOR ALL THREE MEETINGS:

APPENDIX B

CURRICULUM VITAE OF COMPILER