

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)  
SCOPING REPORT**

CONSTRUCTION TO GRAVEL STANDARD DR3417 IN MUKWE CONSTITUENCY,  
KAVANGO EAST REGION (NAMIBIA)



**PREPARED BY:**

TRINITY ENVIRONMENTAL SOLUTIONS  
Email: [trinityenvir@iway.na](mailto:trinityenvir@iway.na)



**PROJECT PROPONENT:**



SAFE ROADS TO PROSPERITY

ROADS AUTHORITY

Private Bag 12030, Windhoek, Tel: +264-61-2847026, Fax: +264-61-2847013

**December 2023**

<b>Project Name</b>	Construction to Gravel Standard DR3417 – Andara to Shamaturu
<b>Document Type</b>	Environmental and Social Impact Assessment (ESIA): Environmental Scoping Report (ESR)
<b>Lead Consultant and Author</b>	Trinity Environmental Solutions CC: Mr. N. D. Muroua E-Mail: <a href="mailto:trinityenvir@iway.na">trinityenvir@iway.na</a> Tel: +264811707737
<b>Client</b>	Roads Authority of Namibia Enquiries: Chief Executive Officer Private Bag 12030 Windhoek Namibia Tel: +264-61-2847026 Fax: +264-61-2847013 LutombiC@ra.org.na
<b>Date of Release</b>	18 December 2023
<b>Signed and approved</b>	

# TABLE OF CONTENTS

<b>SECTION</b>	<b>PAGE</b>
<b>CHAPTER 1: INTRODUCTION</b>	<b>6</b>
1.1 Executive Summary and Overview	6
1.2 Project Proponents	8
1.3 Purpose of the EIA	10
1.4 Scope of the EIA Study	11
1.5 Stakeholder Consultations	12
<b>CHAPTER 2: DESCRIPTION OF PROPOSED PROJECT</b>	<b>18</b>
2.1 Location	18
2.2 Project Rationale	19
2.3 Project Description and Alternatives	20
2.4 No Go Alternative	22
<b>CHAPTER 3: LEGAL, REGULATION AND POLICY FRAMEWORK</b>	<b>23</b>
<b>CHAPTER 4: DESCRIPTION OF EXISTING ENVIRONMENT</b>	<b>26</b>
4.1 Physical Environment	27
4.2 Biological Environment	31
4.3. Socio-Economic Environment	33
<b>CHAPTER 5: POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS</b>	<b>35</b>
5.1 General Considerations	35
5.2 Prediction of Impacts	35
5.3 General Impacts	36
5.4 Impact Criterion and Classification	36
5.5 Potential Impacts	37
<b>CHAPTER 6: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN</b>	<b>46</b>
<b>CHAPTER 7: RECOMMENDATIONS AND CONCLUSION</b>	<b>46</b>
<b>BIBLIOGRAPHY</b>	<b>47</b>

## **LIST OF FIGURES**

Figure 1: DR3417 Locality	7
Figure 2: DR3417 Route from Andara via Mangamba to Shamaturu	7
Figure 3: Public Meeting held at Andara	13
Figure 4: Public Meeting held at Shamaturu	14
Figure 5: DR3417 GPS Coordinates	19
Figure 6: Typical cross section of a gravel standard road	21
Figure 7: Kavango East Region	26
Figure 8: Namibian Map and Kavango East Region	27
Figure 9: Flood water collecting in omurambas and pans	29
Figure 10: Soils, Geology and Hydrogeology	30
Figure 11: Vegetation types of the Kavango East Region	32
Figure 12: Typical vegetation cover along DR3417	32

## **LIST OF TABLES**

Table 1: Relevant legislations and policy guidelines	23
Table 2: Criterion and classification of impacts	37
Table 3: Evaluation of impacts during pre-construction phase	43
Table 4: Evaluation of impacts during construction phase	44
Table 5: Evaluation of impacts during operational phase	45

## **APPENDICES**

APPENDIX A: Typical Cross Section of a Gravel Standard Road

APPENDIX B: Culvert Structures and Locations along DR3417

APPENDIX C: Environmental and Social Management Plan (ESMP)

APPENDIX D: Background Information Document (BID)

APPENDIX E: Borrow Pits Location

APPENDIX F: Public Meeting Agenda

APPENDIX G: Newspaper Advert

APPENDIX H: Public Meeting Minutes

APPENDIX I: Registered Interested and Affected Parties

APPENDIX J: Comments and Response Trail

APPENDIX K: Attendance Register

APPENDIX L: CV D.N. Muroua

APPENDIX M: Company Profile

## **ACRONYMS**

BID	Background Information Document
DEAF	Department of Environmental Affairs and Forestry
DR	District Road
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
NEMA	Namibia Environmental Management Act
RA	Roads Authority

## **DEFINITION OF TERMS**

The "**Consultant**" – means the team responsible for conducting the ESIA and the preparation of the ESMP for the proposed project or development.

The "**Proponent**" – this refers to the legal entity responsible for the overall implementation and management of the proposed project or development, e.g., RA.

The "**Stakeholders**" – include local communities, international community and institutions (state and non-state actors) who are directly or indirectly affected and/or with interest in the proposed project or development.

The "**Environment**" – include the socio-economic and biophysical aspects.

## CHAPTER 1: INTRODUCTION

### 1.1 Executive Summary and Overview

The protection of the environment is an idea that has been increasingly being receiving attention as understanding of the consequences of human action on the planet has been growing. Although the concept is enshrined in the Namibian constitution, development of the necessary legislation and regulation needed to catch-up. Non-governmental Organisations played and pivotal role in elevating environmental issues be addressed for locally and internationally funded projects, even before the local legislation was in place. This was certainly instrumental in raising environmental awareness amongst practitioners in the fields of road design and construction.

This development inspired the Roads Authority (RA) in committing to environmental sustainability and thus produced its own manual (Environmental manual, 1st Edition October 2014) that seeks to inform practitioners as to the legal and contractual framework within which roads must be designed and built and to give guidance regarding the requirements of the (RA) in respect of environmental issues. Therefore, the RA is fully committed to environmental protection, and complement national legislative framework, while fulfilling its mandate. Which is; "The Roads Authority aspires to manage a sustainable road sector which is ahead of national and regional socio-economic needs in pursuit of Namibia's Vision 2030." The proposed construction of the 15 km long DR3417 to gravel standards is just one of the many initiatives for 2023/2026 projects implementation.

**The DR3417 is a proclaimed road from Andara to Shamaturu.** The road is situated in the rural areas which are underdeveloped. In terms of the Governments policy to provide rural access roads into regions previously neglected and thereby opening up underdeveloped land for further development and use, the Roads Authority on behalf of the Ministry of Works and Transport has decided to proceed with the design, tender documentation and construction to gravel standards of DR3417 from Andara to Shamaturu. See Figure 1 and Figure 2.



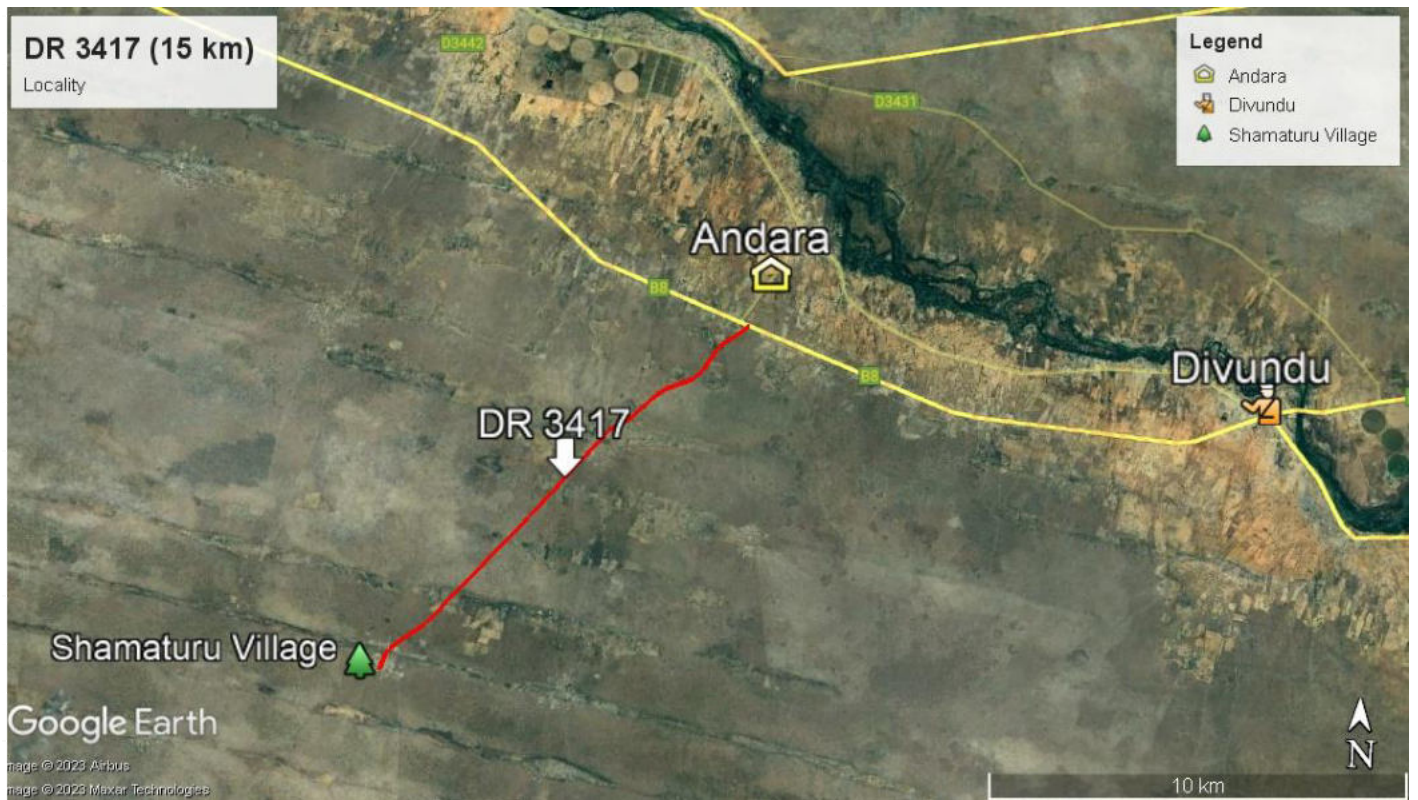


Figure 1: DR3417 Locality (Google Earth, 2023)

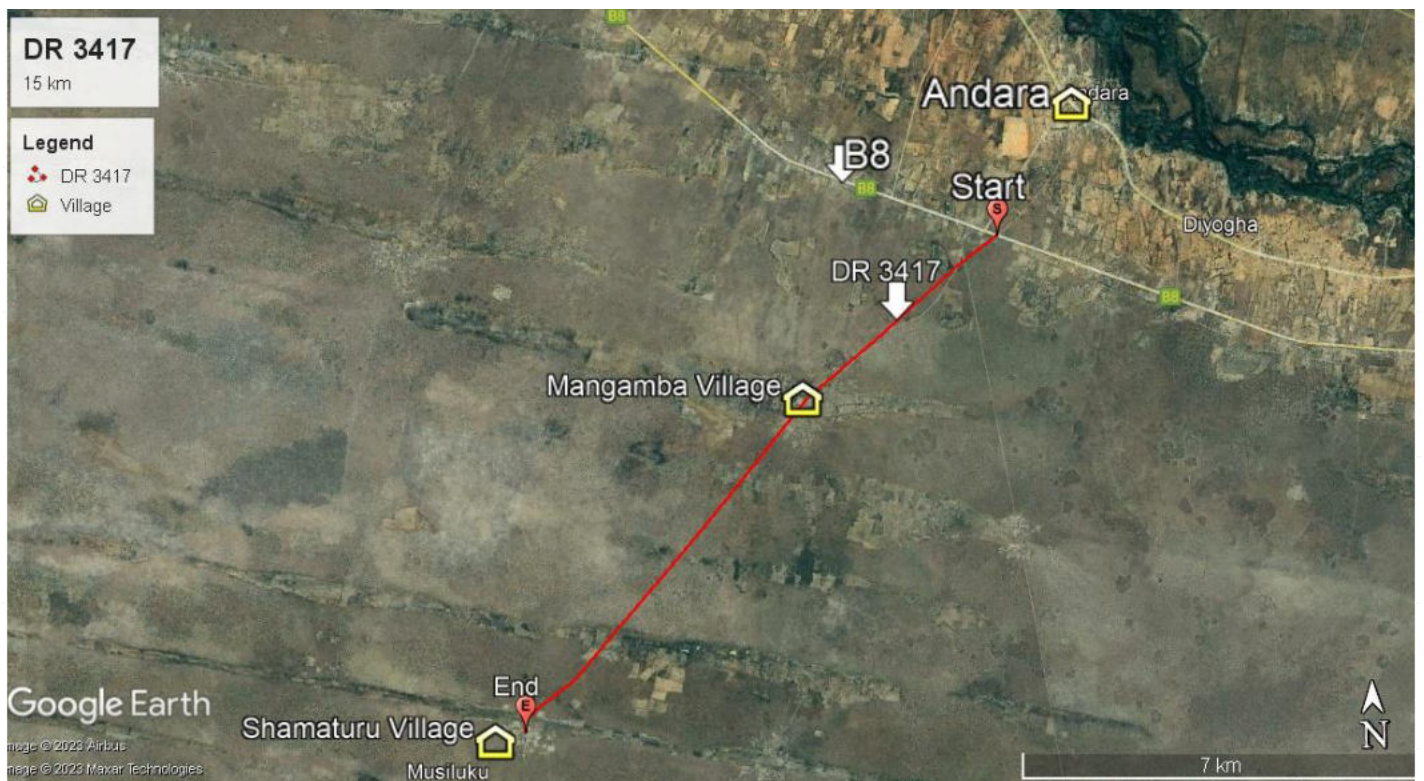


Figure 2: DR3417 Route from Andara via Mangamba to Shamaturu (Google Earth, 2023)



Presently these farming communities especially those between Mangamba and Shamaturu have very poor access to the markets in Divundu, Rundu and other parts of the regions. The construction of this road would provide improved access to the markets to these towns. With a gravel road, linking the above existing settlements to the markets it can be expected that more people will settle along the road thereby increasing the agricultural output.

The proposed works will affect an already proclaimed 15km existing earth track with limited realignment needed. At least 3000 people leaving along the development will experience long-term benefits, and also the many hundreds who will be travelling between the urban centers and rural farming areas. Especially considering that over 70% of the residents in the affected area are unemployed.

Trinity Environmental Solutions (TES) was appointed by MMCE on-behalf of the Proponent (Roads Authority) to conduct an independent Environmental Impact Assessment (EIA) for the proposed development. In terms of Namibia's Environmental Management Act (No. 7 of 2007, Section 27(2)), Government Notice No. 29 Listed Activities, Section 6) and Government Notice No. 30 (EIA Regulations), the above proposed activity constitutes a number of listed activities which require Environmental Clearance prior to commencement of the project.

## **1.2 Project Proponent**

In accordance with the Roads Authority Act (Act 17 of 199) the Roads Authority was given the mandate to develop and preserve the national road network with a view of attaining a safe and efficient roads sub-sector. The purpose is to support the national, social and economic development agenda. Road transport is the dominant mode of transport for goods and people, and the condition of roads affect all sectors of the economy and every inhabitant of this vast country. Constructing new roads for providing access and for enabling trade and other economic activities, upgrading existing roads to higher standards to reduce transport costs, travel times and accidents and improve the competitiveness of Namibia's economy are activities that all require large financial resources.

Over the past years, the RA has implemented important road development programmes as part of the Harambee Prosperity Plan. Progress on most of these projects has been affected by timely flow of funding to these projects which delayed completion.

The RA must maintain all sections of some 43,000 km of the road network to the required standards with the view to preserving the asset and in so doing minimising the cost of road transport to the economy. The financial resources allocated to the RA for achieving this objective have been below requirements in the past years. But this now has improved, and hence engaging various roads projects including the construction of DR3662 to Gravel Standards. This planned development will be co-finance by the KfW Development Bank of the German Federal Government.

**The Roads Authority**

Chief Executive Officer

Private Bag 12030

Windhoek

Namibia

Tel: +264-61-2847026

Fax: +264-61-2847013

LutombiC@ra.org.na

### **1.3 Purpose of the EIA**

This EIA study serves to determine, analyse and present the environmental impacts (positive and negative) of the proposed developmental project and associated infrastructure. The EIA will also formulate remedial measures to minimise and mitigate the negative impacts and plan in such a way that enables a rational decision to be made regarding the implementation and management of the proposed project.

This EIA will further contribute to the reduction or mitigation of adverse impacts by generating a number of project alternatives for the proposed development. In general, the purpose of this EIA is to anticipate and prevent, minimise and/or manage, potentially significant negative impacts of development that may:

- Cost too much money to rectify in the future;
- Pose risk to lives, livelihood or health of current and future generations;
- Result in irreplaceable loss of resources and reduced options for future well-being; and,
- Help to seek opportunities to optimise potential benefits of development.

As a responsible Conservation organisation, the Proponent is committed to enhancing positive biophysical and social environmental impacts of the project while mitigating negative impacts of the project. During the scoping exercise, the Proponent has emphasized that it attaches great importance to environmental sustainability and human well-being. The Proponent also recognizes the strong correlation between environmental sustainability and human well-being through good health that depends on healthy ecosystems, clean water and air. All of the above is further appreciated by the decades of direct experience in sustainable roads construction, upgrading and maintenance.

Therefore, this Environmental Impact Assessment Report has been prepared with a view to comply with RA's Environmental Manual, the Namibia's Environmental Assessment Policy of 1995, the Environmental Management Act No. 7 of 2007 (Section 27 (2a&c)), Government Notice No. 29 of 2012 (Listed Activities, No. 3.1 & 10.1b) and the Government Notice No. 30 of 2012 (EIA Regulations).

## **1.4 Scope of the EIA Study**

Trinity Environmental Solutions (TES) undertook to carry out the EIA study by following a well-defined framework. Owing to the importance of Interested and Affected Parties (I&APs) involvement in environmental studies. The EIA team ensured that I&APs consultations were central to every step of this EIA process.

The scope of the EIA study comprised of public meetings, I&APs consultations and detailed site-specific investigations. Details of each process component are elaborated below.

### Scoping Exercise

The scoping exercise aimed at identifying and screening all relevant issues related to the development project as well as identifying at the earliest possible time whether any adverse effects existed that could render the proposed project environmentally unacceptable. Specifically, scoping assisted in:

- Focusing the impact assessment on a manageable number of important questions on which decision making is expected to focus;
- Ensuring that only key issues and reasonable alternatives are examined;
- Informing the interested and affected parties and other key stakeholders about the project and to obtain their inputs, issues and concerns; and,
- Identifying fatal flaws in the proposed project planning.

### Existing Environmental Conditions

To establish prevailing environmental conditions for the project area, environmental and socio-economic data including surrounding areas was collected, compiled and analysed. Findings of the analysis are presented in the following Sections. Biological, zoological, botanical and socio-economic studies carried out in the past for the area provided secondary data for the report.

### Descriptions of Project Activities

Project inputs, activities and outputs during project preparation, construction and operational life stages were reviewed and are described in this section. This section also includes description of project alternatives.

### Analysis of Potential Environmental Impacts

An assessment of environmental effects and benefits of the proposed project regarding biophysical and socio-economic environment has been undertaken as well as an analysis of the impacts' extent, duration, intensity and significance.

### Formulation of Possible Mitigating Measures

Based on the analysis of findings, a number of measures and plans for mitigating the identified possible adverse environmental impacts of the project are proposed. Further, the report proposes measures and plans for enhancing positive environmental impacts of the project. And wherever possible, the costs and benefits of these environmental measures are quantified.

### Elaboration of an Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) for implementing the proposed mitigating measures during the project preparation, construction and operation phases of the project was developed. The ESMP further indicates management responsibilities and time frames. See **Appendix C**.

## **1.5 Stakeholder Consultations**

TES's approach to environmental assessment studies is aimed at ensuring that wide stakeholder participation and involvement is achieved. Recognising this, and as part of the transparent consultative process aimed at taking public views into account in determining the scope of the EIA, a public consultative process started in the area early as June 2023. Public meetings were held on 24 November 2023 in Andara, Mangamba and in Shamaturu. The meetings were announced locally by the Constituency Councilors

of Mukwe and local Traditional Leaders. Newspapers advertisements were also placed in the Namibian and New Era.

The total number of participants in all the meetings were over 150 (Figure 3 and Figure 4) representing the local community of which the youth was the majority, Traditional Authority leaders, Constituency Councilors, Namibian Police, Government Departments, Private Sector, etc. Telephonic conversation took place and Background Information was shared with the various stakeholders and I&APs via email.



Figure 3: Public Meeting held at Andara Village (24 November 2023)





Figure 4: Public Meeting held at Shamaturu Village (24 November 2023)

***Please Note:*** Only *Ipinge Ndelimona* [ndeliimonachox@gmail.com](mailto:ndeliimonachox@gmail.com) from *EIA Tracking and Monitoring in Namibia (EIA Tracker)* registered as an Interested and Affected Party.

Key Interested and Affected Parties consulted include:

- Kavango East Region Council
- Mukwe Constituency Office
- Hambukushu Traditional Authority

### **1.5.1 Methodology**

The Interested and Affected Parties (I&APs) consultative process involved meetings, open discussions and interviews with relevant government institutions and representatives from the local community. Through this interaction the EIA team tried to establish how Interested and Affected Parties understood the dynamics of the environment in which the proposed project is located and any possible underlying causes that could lead to changes over time as a result of implementing the project.

Where the EIA team felt it necessary to go more in-depth on a particular matter, Interested and Affected Parties within the project area or surrounding area with either experience or expert knowledge of the study area were identified and interviewed to validate the data already obtained, as well as to get their advice on any additional sources of information that was not readily available. This was useful in interpreting any underlying factors of the trends already observed.

The outcome of these Interested and Affected Parties consultations and interviews further provided relevant background information to this report and helped identify potential environmental issues of concerns within the project area.

### **1.5.2 Stakeholder Consultation Outcome**

The meetings and informal interviews conducted did not raise any objections against the proposed development. Key component of the proposed development is that it is a brown fields activity that will affect an existing earth track with a similar use - which a road way. Some of the local communities didn't fully comprehend why we still needed such an extensive to consultation about the proposed development, since the need for a reliable road is one of the area's priority needs.

List of matters arising from the public meetings:

- Andara Area
  - Proper mechanisms are needed to determine eligibility of employment as local community member.
  - Access road requested to Dingandu Village.
  - Grave site of a child/baby at S 18.090726, E 21.418382.
- Mangamba Village Area
  - Local employment opportunities concern.
  - Water scarcity for road construction.
- Shamaturu Village area
  - Local employment opportunities concern.
  - Access road request to Shividi Village.

- To assure that the Shamaturu Clinic is connected to DR3417, a culvert system is needed to cover at least 250m wide seasonal flood area/depression in Shamaturu Village.

During the various formal consultations from October 2023 to December 2023 with members of the local community, Political Leadership, Traditional Leadership, MEFT and the Namibian Police, no objections were raised against the construction of the DR3417. The proposed project is seen as a priority, a must development desperately needed to facilitate access to services and efficient transport, and creating much needed jobs to over 70% unemployed youth.

### **1.5.3 EIA Study Team**

TES is a firm of environmental consultants that has been active in Namibia since its establishment in 2012. TES staff have extensive experience in a variety of projects related to EIAs, socio-economic, water resources management, sustainable land management and on climate change mitigation.

Previous and Current Projects inter alia include:

- EIAs and EMPs for the upgrading of DR3427 to Gravel Standard.
- EIAs and EMPs for the upgrading of DR3403 to Bitumen standards.
- EIA and EMP for Osona Township development near Okahandja.
- EIA and EMP for the development of Ruacana Quarry.
- EIA and EMP the construction of an Industrial and Business Estate in Lubumbashi area, Democratic Republic of Congo.
- EIAs and EMPs for the upgrading of two gravel roads, DR3608 and MR67 to bitumen standards, approximately 185km in total length.
- EIA and EMP for new wastewater treatment ponds for Engela, Groot Aub, Andara, Onesi, Ogongo towns and villages.
- Supervision of the Environmental Monitoring and Auditing for the MR122 road upgrading from gravel road to bitumen standards.

Don Muroua, Environment Management Specialist: Mr. Muroua has compiled this Scoping Report and the EMP. He has also carried out the overall environmental assessment and public participation activities. Mr. Muroua is a qualified environmental manager and a founding member of the Environmental Assessment Practitioners of Namibia (EAPAN). He is familiar with conducting EIA studies, preparing EIA reports and EMPs, conducting specialist studies which include socio-economic assessments and ecological studies. Mr. Muroua is also a Professional Member of the Southern African Institute of Ecologists and Environmental Scientists (SAIEES).

Apart from Namibia, Mr. Muroua' experience extends across numerous countries including the Democratic Republic of Congo, South Africa, Malawi, Swaziland and Kenya.



## CHAPTER 2: DESCRIPTION OF PROPOSED PROJECT

### 2.1 Location

The Environmental Clearance Certificate is applied for the construction of DR3417 to gravel standards of the earth track which is approximately 15km in length stretching from Andara, via Mangamba to Shamaturu, in the Kavango East Region. DR3417 is a proclaimed road and community is fully aware of the status.

The approximate starting point in Andara is S  $-18.083780^{\circ}$  E  $21.426966^{\circ}$ , ending in Shamaturu Clinic at approximately S  $-18.160690^{\circ}$  E  $21.346452^{\circ}$ , Figure 5.

An alternative route is also being assess to accommodate a Grave Site and safe entry into the B8/Trans Kalahary Highway.

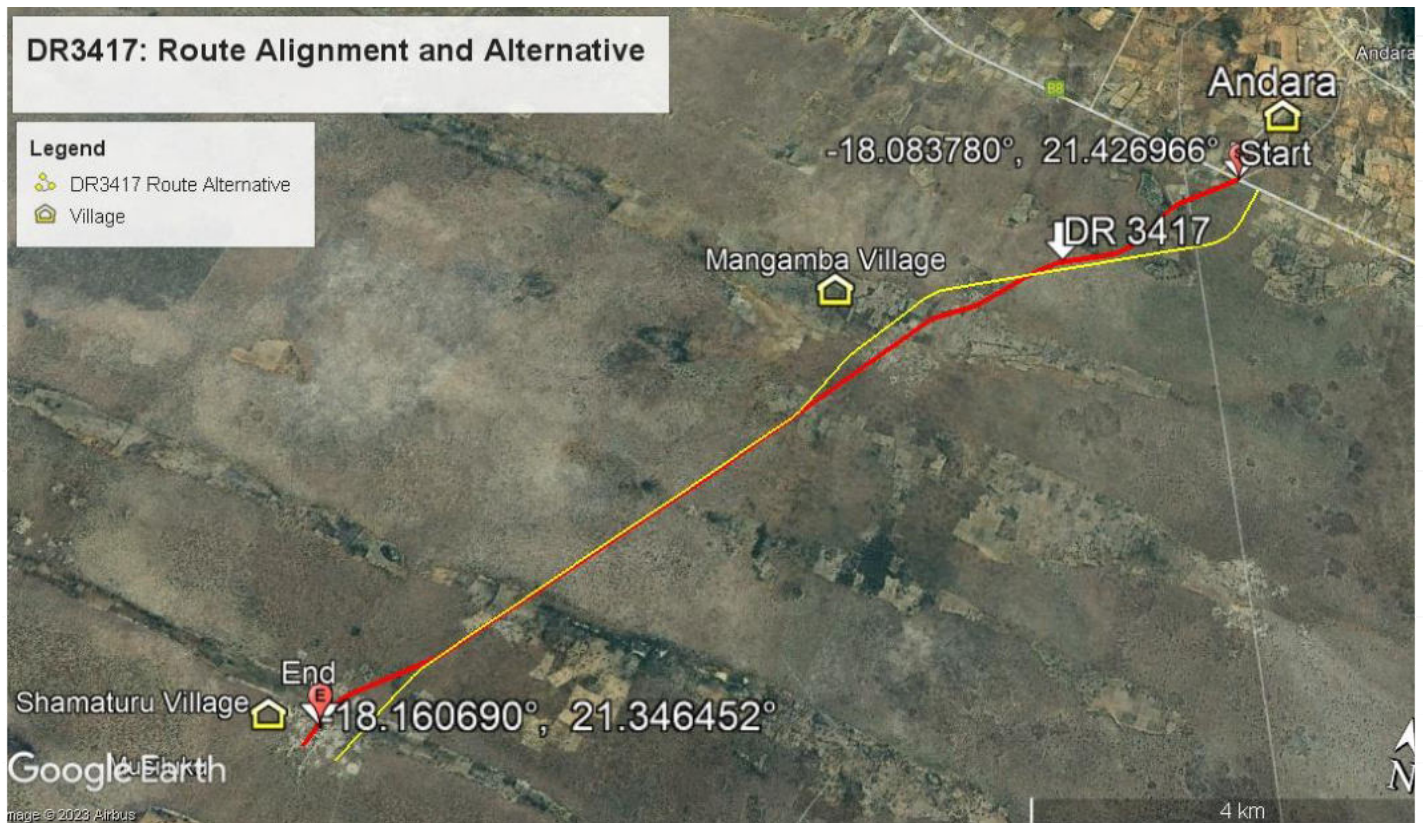


Figure 5: DR3417 PGS Coordinates (Google Earth, 2023)

## **2.2 Project Rationale**

The Roads Authority aspires to manage a sustainable road sector which is ahead of national and regional socio-economic needs in pursuit of Namibia's Vision 2030." The proposed upgrading from an earth track to gravel road standards of the DR3417 is just one of the many initiatives for 2023/2026.

The project is aimed to construct a gravel standard road of District Road 3417 from Andara, via Mangamba to Shamaturu. Presently these farming communities have very poor access to the markets in Andara, Divundu, Rundu and other markets especially in Zambezi Region. Currently the communities travel on earth tracks passing through sections of loose sandy soils and sections through water ponds during the rainy season. The existing track width varies between 3 m to 5 m.

The construction of this road will provide improved access to the markets to these communities. With a gravel road, linking the above existing settlements to the markets, it can be expected that more people will not migrate to urban centers thereby increasing the agricultural output, and the general rural economy of the surrounding area.

The construction of this road will contribute to poverty alleviation as outlined in NDP5 and Harambee Prosperity Plan (HPP). The construction will provide jobs to the surrounding communities with the labour-based construction of the road and after construction, it will encourage offices, Ministries and service providers (NamPower, NamPol, NamWater and others) to easily access these communities and provide them with the necessary services.



## 2.3 Project Description and Alternatives

### 2.3.1 Project Description

Application for the Environmental Clearance from the Directorate of Environmental Affairs and Forestry (DEAF) is being made for the upgrading of the 15km DR3417 earth track to gravel standards.

The constructions work envisaged will be as follows:

- The layer works for the entire 15km from Andara via Mangamba to Shamaturu.
- To mitigate flooding, at least 14 box culverts will be installed over depressions and pans at five (5) different points as per Appendices B.
- The widening of the existing earth track to gravel standards.
- Prospecting of suitable road materials in four (4) borrow pits.

In total, four (4) potential borrow pits were identified, investigated and tested, of which all were deemed to have suitable material to be used for this project (i.e. use as selected subgrade and wearing course materials). The borrow pits were identified at stake-values of 1.0km, 4.4km, 6.5km and at 10.1km. In total, twenty-nine (29) test pits were sampled during the detailed investigation.

Borrow pits GPS coordinates are as follows:

- Borrow Pit (PB) 1: S -18.087946°, E 21.417585° (new)
- Borrow Pit 2: S -18.107668°, E 21.394360° (new)
- Borrow Pit 3: S -18.121029°, E 21.383615° (new)
- Borrow Pit 4: S -18.147584°, E 21.362639° (new)

***\* Borrow Pit 1 and Borrow Pit 3 will be prioritized for use due to its limited impact on the households.***

Graders, roller compactors, front loaders, excavators, survey equipment, water dozers, tipper trucks and fog spray trucks, are some of the equipment to be used during the 12 months construction period starting next year.

It is anticipated that the existing alignment will be used as far as possible with minor adjustments to comply with the Roads Authority's standards. Properly constructed accesses will be provided to adjacent settlements, villages, schools and at any other locations where it is evident that traffic accesses or leaves the road to be constructed. The positions of the intersections and accesses have to be determined through stakeholder consultations.

### **2.3.2 Design and Layout**

The design and construction will be performed in accordance with various RA's Manuals such Section 4 (Detailed Design Stage) of the RA Procedures Manual. Any proposed deviation from the requirements of the RA Manuals must be brought to the attention of the Roads Authority.

The appropriate manuals to be consulted i.e.

- RA Materials Manual (1st Edition, October 2014).
- Technical Recommendations for Highways (TRH20).
- Code of Practice for Pavement Design (Southern Africa Transport and Communications Commission (SATCC), 1998).

The road will have a 30m wide reserve that will include the following, Figure 6:

- Road reserve 30m total. Vegetation clearing required for at least 15m total area and fences will be moved. No building will be affected, especially since most buildings are at least 50 away from the edge of the proposed road.
- Road way, about 7.5m wide. Area to be used as carriage way for goods and public. Vegetation clearance not really needed since this road-way already exist and most vegetation already cleared.
- Road Shoulders and Side Slope, 6m wide. Vegetation clearing will be required to improve visibility of road users and pedestrians.

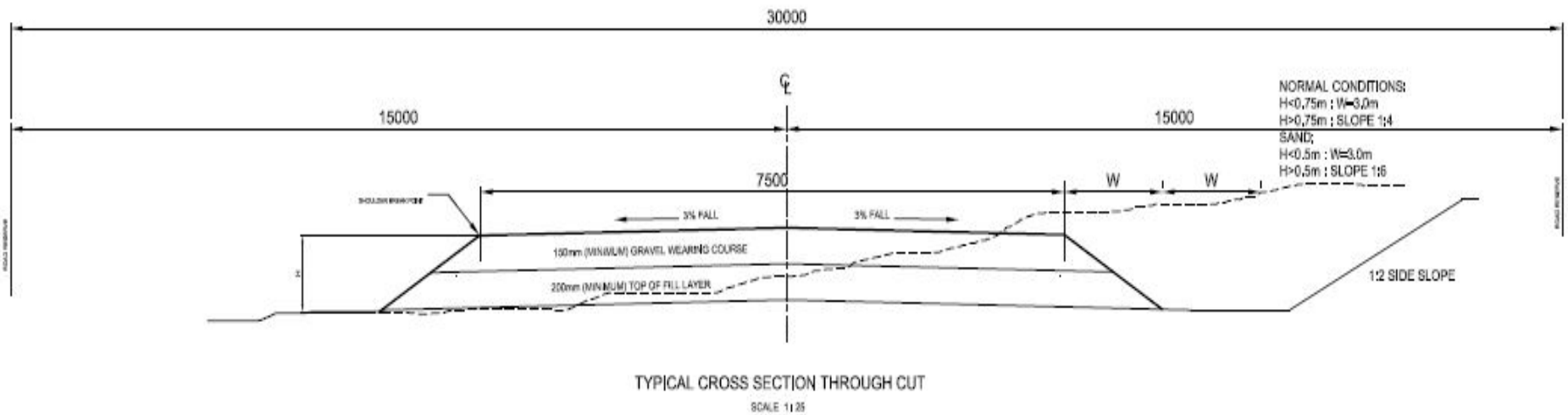


Figure 6: Typical cross section of a gravel standard road

See also **Appendix A**.

### 2.3.3 Project Alignment Alternatives

As shown in Figure 5 above, alternative especially at the start the road is being made. This will allow for the Grave Site found near the existing alignment, but to also made entry into the B8/Trans Kalahari Highway safely.

### 2.4 No-Go Alternative

**No-Go Alternative:** If this option is selected, the development will not proceed. In essence, the no-go alternative would ultimately imply that the status quo would be retained as it is presently, with obvious advantages and disadvantages. The benefits of continuing with this proposed construction of the DR 3417 to gravel standards significantly outweigh the loss of less than 50ha of grazing lands. The Department of Environmental Affairs and Forestry (DEAF) of the MEFT stresses that the no-go alternative should only be considered in cases where the proposed development will have a significant negative impact that cannot be effectively or satisfactorily mitigated against.

The limited negative impacts from this proposed development can be effectively and satisfactorily mitigated.

### CHAPTER 3: LEGAL, REGULATION AND POLICY FRAMEWORK

The Table 1 below summarises the legislation and policy guidelines that are relevant to the proposed project and is not exhaustive.

Table 1: Relevant legislations and policy guidelines

Title of legislation, policy or guideline	Implications for proposed project (Please read all Acts with their Regulations)
<b>The Namibian Constitution of 1990</b>	The Constitution clearly indicates that the State shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.
<b>Water Resources Management Act No. 11 of 2013</b>	This Act protects all water resources in Namibia. The Act also laid down conditions to ensure that proper wastewater treatment is provided, including requirement for wastewater discharge permit from the Directorate of Water Affairs.
<b>Environmental Assessment Policy of Namibia (1995)</b>	The Policy seeks to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.
<b>Environmental Management Act No. 7 of 2007</b>	The Act provides a list of projects requiring an Environmental Assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities which may have significant effects on the environment.
<b>Roads Authority Manuals</b>	<p>These are various manuals all contractors are or must be aware of when dealing with road construction works in Namibia. These manuals are on, but not limited to:</p> <ul style="list-style-type: none"> <li>• Procedures Manual (1st Edition, October 2014)</li> <li>• Materials Manual (1st Edition, October 2014)</li> <li>• Structures Manual (1st Edition, October 2014)</li> <li>• Drainage Manual (1st Edition, October 2014)</li> <li>• Survey Manual (1st Edition, October 2014)</li> <li>• Geometrics Manual (1st Edition, October 2014)</li> <li>• Environmental Manual (1st Edition, October 2014)</li> <li>• Construction Manual (1st Edition, October 2014)</li> <li>• Economic Evaluation Manual (1st Edition, October 2014)</li> <li>• Standard Drawings Manual (1st Edition, October 2014)</li> </ul>
<b>Labour Act No. 11 of 2007)</b>	Consolidate and amend the labour law; to establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections; to regulate basic terms and conditions of employment; to ensure the health, safety and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers' organisations; to regulate collective labour relations; to provide for the systematic prevention and resolution of labour disputes; to establish the Labour Advisory Council, the Labour Court, the Wages Commission and the labour inspectorate; to provide for the appointment of

	the Labour Commissioner and the Deputy Labour Commissioner; and to provide for incidental matters.
<b>Nature Conservation Ordinance Number 4 of 1975 (as amended)</b>	Guide the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.
<b>Public Health Act, No. 36 of 1919 and Amendments and Regulations</b>	This Act makes provision for the prevention and control of infectious diseases, venereal diseases and epidemics. It also regulates sanitation, food and public water supplies.
<b>MEFT Policy Document - Community-Based Tourism Development (June 1995)</b>	<p>This document contains the approved Ministry policy for providing support to, and encouraging the development of, community-run tourism activities and enterprises on communal land.</p> <p>This policy document provides a framework for ensuring that local communities have access to opportunities in tourism development and are able to share in the benefits of tourism activities that take place on their land.</p> <p>Support for the involvement of rural communities in tourism enterprises is important:</p> <ul style="list-style-type: none"> <li>a) to implement the government policy of giving communities access to development opportunities and</li> <li>b) because where tourism is linked to wildlife and wild landscapes, the benefits to local communities can provide important incentives for conservation of these resources.</li> </ul>
<b>Act No.5, 1996 Nature Conservation Amendment ACT, 1996</b>	<p>These amendments to the Nature Conservation Ordinance of 1975, provide for an economically based system of sustainable management and utilisation of game in communal areas.</p> <p>This amend allows for the formation of Conservancies in communal areas.</p>
<b>Hazardous Substances Ordinance No. 14 of 1974</b>	<p>The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.</p> <p>Hydrocarbons handled during the construction phase may be hazardous thus careful handling and management is vital to prevent spills, explosions, ill-health or death.</p>
<b>Pollution Control and Waste Management Bill of 1999</b>	The Bill promotes sustainable development and the establishment of the Pollution Control and Waste Management Unit; to prevent and regulate the discharge of pollutants to the air, water and land; to make provision for the establishment of an appropriate framework for integrated pollution prevention and control; to regulate noise, dust and odour pollution; to establish a system of waste planning and management; and to enable Namibia to comply with its obligations under international law in this regard.
<b>Draft Wetlands Policy of 2004</b>	This policy strives to complement existing policy instruments regarding sustainable development and sound natural resource management in Namibia. Its implementation provides a platform for the conservation and wise use of wetlands, thus promoting inter- generational equity regarding wetland resource utilisation. Furthermore, it facilitates the Nation's efforts to meet its commitments as a signatory to the International Convention on Wetlands (Ramsar) and other Multinational Environmental Agreements (MEA's).
<b>National Waste Management Policy, 2010</b>	This policy is focusing specifically on Waste Management and use of various technologies waste treatment and disposal to minimize health risks. It is also geared to have a unified waste management system country wide. This policy provides the necessary guidance on the processes related to waste management in the MOHSS, wider Namibia health and social welfare sectors, and other relevant stakeholders. It is taking into consideration the process of integrated waste management from generation to final disposal. This practice also focus on medical, household, mining, agricultural, and construction waste.



**Forest Act No. 12 of 2001 and its amendments**

The purpose of this Act guides the use and management of forestry and related resources. The aims of the forest management as per the Act, is to achieve manage of forest “for which forest resources are managed and developed, including the planting of trees where necessary, to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is compatible with the forest's primary role as the protector and enhancer of the natural environment.”

**National Heritage Act No. 27 of 2004**

The Act provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.

**Communal Land Reform Act 5 of 2002**

This Act provides for the allocation of rights in respect of communal land; to establish Communal Land Boards; to provide for the powers of Chiefs and Traditional Authorities and boards in relation to communal land. The alignment of the development, use of water and siting of borrow pits, should consider provisions of this Act in terms of rights of communal people.

**The Regional Councils Act No. 22 of 1992**

This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in Section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.”  
RC are import I&APs

**Roads Ordinance No 17 of 1972**

The Ordinance consolidates the laws relating to roads.

- a) Section 3.1 deals with width of proclaimed roads and road reserve boundaries.
- b) Section 27.1 is concerned with the control of traffic on urban trunk and main roads.
- c) Section 36.1 regulates rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads.
- d) Section 37.1 deals with infringements and obstructions on and interference with proclaimed roads.

## CHAPTER 4: DESCRIPTION OF EXISTING ENVIRONMENT

The project area is largely the same as the current proclaimed earth track DR3417 as shown in Figure 1 and Figure 2, located in Mukwe Constituency, Kavango East Region.

The Kavango East Region stretches from just west of Rundu up to the eastern boundary of the former Kavango Region. The Region covers an area of 23983.2 km<sup>2</sup> and constitutes about 2.9% of Namibia's extent. The region is bordered by the Kavango River and Angola to the north, the Zambezi Region and Botswana to the east, the Kavango West Region to the west and the Otjozondjupa Region to the south. There are 6 Constituencies in the Kavango East Region: Rundu Urban, Rundu Rural, Mashare, Ndonga Linena, Ndiyona and Mukwe. Rundu is the capital of the Region., see Figure 7 and Figure 8.



Figure 7: Kavango East Region



Figure 8: Namibian Map and Kavango East Region

#### 4.1 Physical Environment

The Kavango East Region generally receives more rainfall than the rest of the country, except for Zambezi. The highest rainfall usually occurs in the summer months with the periods of highest rainfall normally in January and February. Temperatures are mild but some frost occurs close to the Kavango River. Soils are generally sandy with low nutrient levels with more fertile soils occurring along a thin strip next to the Kavango River. Agricultural potential in the region is therefore generally low except for the floodplains and soils close to the river.

Vegetation in the region is fairly homogenous Kalahari Woodland comprising broad-leaved deciduous forests that vary according to topography and soil quality. Another important plant area is the Kavango River Valley, which is important wetland system with some endemic and near endemic plant species as well as a number of critically endangered species of ground orchids. Deforestation in the woodlands as well as on the banks of the river is a challenge.

Terrestrial diversity is high with a number of core wildlife areas, national parks and the river accommodating an impressive range of fish and wildlife. The most conspicuous and important feature in the region is the perennial Kavango River which is the main source of life in the region

#### **4.1.1 Climate and Temperature**

Mukwe Constituency is characterized by high temperatures ranging between 32-36 degrees Celsius. The average rainfall per year is about 450-600 mm mainly experienced between November to April. The region and project site falls under the very flat hydro-geological homogenous Kalahari Woodland comprising broad-leaved deciduous forests. Dipping from some 1020m above sea level (asl) in the north (Kavango River) to 1075m asl in Shamaturu Village area.

The relatively high and reliable average rainfall allows for crop farming. After the rainy season, innovative irrigation systems are being utilized by locals to produce agricultural products. The ground water in the west and south of the Region is sweet and shallow i.e. 10-20 meters from surface. During droughts, pits are dug and serve as reliable sources of water. The rest of water sources in the Region is predominantly saline. (Mendelsohn, Jarvis, Roberts, & Robertson, 2002).

The amount, timing and effectiveness of rainfall varies greatly from year to year and also from place to place, making rain-fed crop production very risky. For instance, a period of about four weeks with dry, hot weather can cause failure of mahangu fields, the staple and favourite crop for most smallholder farmers.

#### 4.1.2 Soils, Geology and hydrogeology

The DR3417 areas are part of the greater Kalahari sandveld and woodland, which covers most of the northern and eastern parts of Namibia and extends across the Namibian border into Angola and Botswana. The bedrock underlying the basin filled with Kalahari Sequence deposits is poorly understood but presumably consists of basal rocks of the Damara Sequence, followed by the Karoo Sequence sediments intruded by volcanics of Karoo age as defined below.

The undulating landscape with a mix of low and high permeability of the Calcical and Arenosols (Figure 9 and Figure 10) soils produce strips of areas with surface runoff and water collections in the form pans. Water collects and flows in many of the shallow omurambas, or the pans in shallow depressions, these events can be short-lived or seasonal. There is five (5) such depression feature where culverts will be installed along the DR3417, as per Appendix B.



Figure 9: Flood water collecting in omurambas and pans

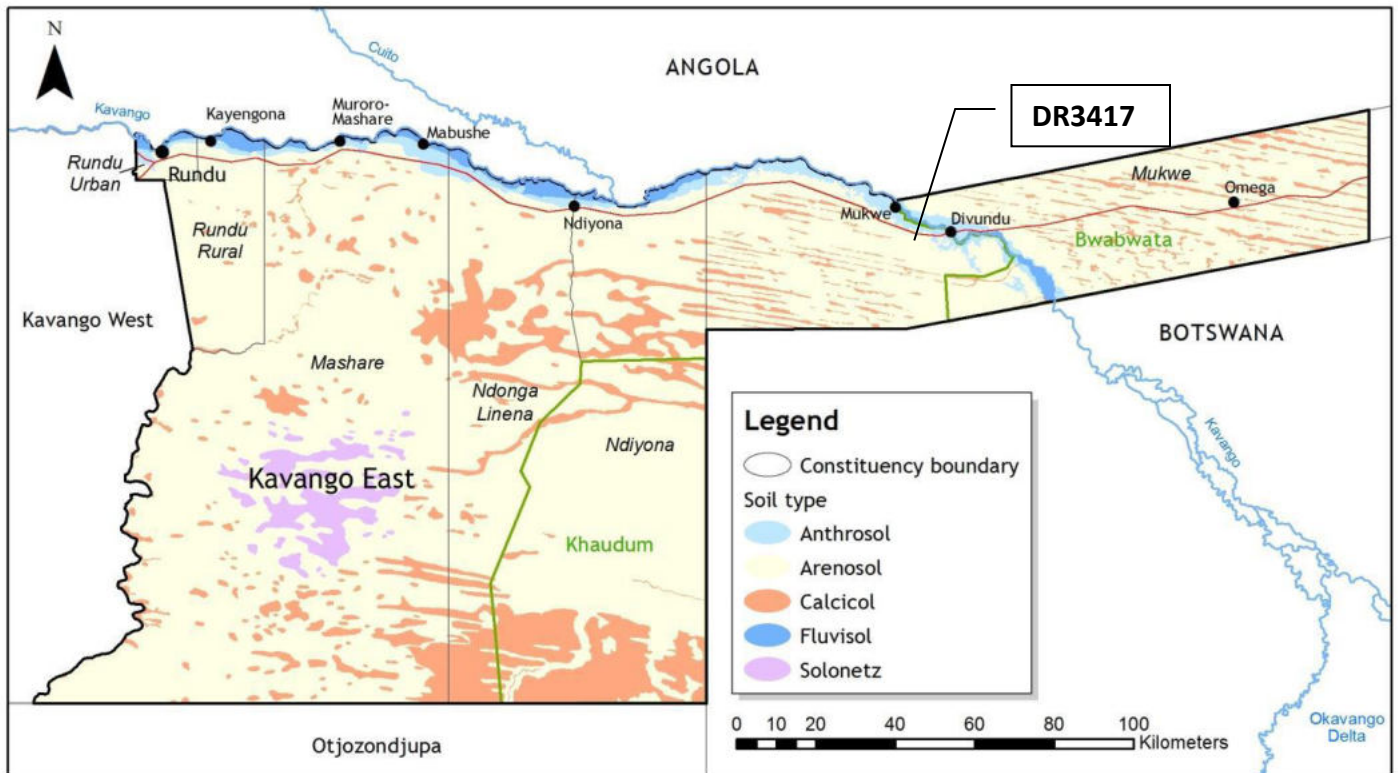


Figure 10: Soils, Geology and Hydrogeology

#### 4.1.4 Air Quality

An assessment of the baseline air quality status in the project area and surroundings was carried out in order to assess the possible impacts on the air quality due to certain project activities with the potential of releasing pollutants to the ambient air. Field surveys showed that fugitive dust from vehicles using the earth tracks are the main source of air pollution. Noise population is also emanating from vehicles using these tracks.

The observed air pollution did not remain hanging over the area for prolonged periods and as such no haze was reported to be a distinctive result of vehicles use. Apart from pollution caused by vehicles, the air quality in the area was found to be very good.



## 4.2 Biological Environment

### 4.2.1 Approach

The methodology used to describe the site's biological environment took into consideration the purpose of the study, extent of development site, and the flora and fauna species composition.

It should be noted that the >95% of the proposed activity will be constructed on an brownfield site or existing roadway, DR3417.

### 4.2.2 Flora

Due to the limitations of the climate, the vegetation in the former Kavango Region is fairly homogeneous Kalahari Woodland that is comprised of broad-leafed, deciduous woodlands that vary according to topography and the nature of the soils that support them.

The Broad-Leafed Kalahari Woodland of DR3417 is dominated by trees such as Yellow-Wood (40%), Mopane (10%), Mosuse-eared Combretum (15%), Zambezi Teak (2%) and false Mopane on the sandy areas, and Camel-Thorn and Leadwood in the Omurambas. While other various species of shrubs and grasses can be found in the shallower soils. See Figure 11 and Figure 12.

**All the above listed species plants are in abundance in the area, and not rare or threatened.**

Due to the clearing of land and hunting, much of the wildlife that used to occur along the DR3417 has now disappeared and most of the remaining wildlife is now concentrated in the Bwabwata and Khaudum National Parks.

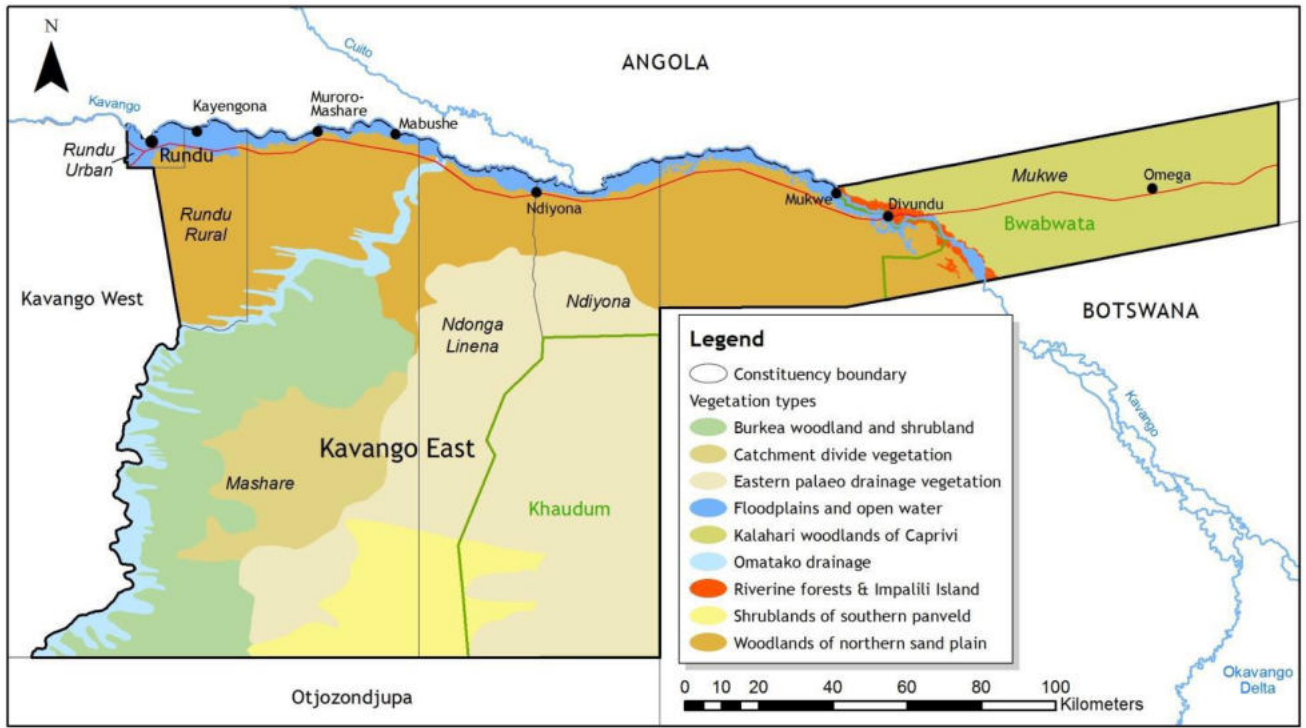


Figure 11: Vegetation types of the Kavango East Region



Figure 12: Typical vegetation cover along DR3417

### **4.2.3 Fauna**

Due to the clearing of land, hunting and human activities, much of the wildlife that used to occur along the area has now disappeared and most of the remaining wildlife is now concentrated in National Parks. The DR3417 area do not support a viable wildlife population and none of the large or rare and endangered species were observed or reported to inhabiting the area.

The most common animals of importance found in the area are livestock, mainly cattle (>90% of biomass).

## **4.3. Socio-economic Environment**

### **4.3.1 Introduction and Demography**

The current population residing in the target area between Andara, Mangamba and Shamaturu is 5000, of over 70% of the youth is unemployed (NSA, 2011 Population and Housing Census).

The tendency to migrate to urban areas due to the (often incorrect) perception of more employment opportunities can also be seen in the "urban" centers of especially Andara and Divundu that has both the highest proportion of its men and women participating in the labour force, as well as the highest proportion of its men and women unable to find employment.

The residents living along the DR3417 are subsistence farmers with very few employees. These farmers mostly produce food for their own survival with little surplus left to sell to earn an insignificant income. In addition, as most of these farmers have no paid employees, there is no benefit of job-creation to address the high levels of unemployment in the area.

There various health centers in the area such as the Andara Clinic, Andara District Hospital and Shamaturu Clinic. While education facilities include Andara Combined School, Mangamba Junior Primary School and Shamaturu Primary School. There is no Police Station in the area. Also, apart from Divundu, there are also no shops in the area apart for Cuca Shops.

#### **4.3.2 Land Tenure**

The land where the project area is located is a proclaimed DR3417 gravel road and under the authority of the Roads Authority. No physical long-term construction will take place outside the existing road reserve of 30m. There are about five (5) sets of fences that could be affected and requested to be moved, at most 10m.

There will be no significant loss of land for both crops and grazing from this proposed development. Compensation will be done according National Compensation Guidelines, should it be necessary, especially for the loss of part of a crop field.

#### **4.3.3 Archaeological and Cultural Sites**

No sites of archaeological and cultural importance were recorded or reported to be present.

#### **4.3.4 Existing Infrastructure**

The only infrastructure types along the DR3417 are fences made from wires and wood. These are mainly fences for homesteads, crop fields and camps. In total, there are about five (5) such fences potentially within the 30m road reserve, depending on the final road alignment.

## **CHAPTER 5: POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS**

### **5.1 General Considerations**

The objective of assessing the potential effects of the proposed project was essentially to permit planning of actions to avoid or reduce undesirable effects and/or to enhance secondary benefits of the project. Implementation of a project may exert a suite of effects during the construction and operation stages. It is therefore common practice to discuss the effects of the project construction and operations (including preparatory phase) before the project commences.

Therefore, this section of the report addresses the interactions of the project with the natural and socio-economic resources in and around the project site. These interactions are normally known as 'impacts'. It is worthwhile separating project effects into direct (or primary) effects resulting from direct interaction of some components of the project with one or more environmental resources, and indirect (or secondary) effects which arise from the primary effects. Note that a classification of negative effect does not necessarily imply a long-term adverse effect on the environment. It may as well indicate an irreversible change to the physical environment from original conditions. In some cases, these irreversible changes can result in favourable long-term effects.

### **5.2 Prediction of Impacts**

The Proponent is aware of the fact that the proposed project will have both negative and positive impacts. Importantly, the negative impacts are mainly related to the construction and operation activities, and limited to the site. In predicting possible impacts, the following impact zones were applied:

- a) Zones influenced by land use changes: area where the development will be carried out.
- b) Zones influenced by activities associated with the construction: road upgrading and construction impact zone, camp establishment area, access roads and local communities.

- c) Zones influenced by activities associated with the operations of the development: area that will be impacted on due to human activities arising from the upgraded road and support infrastructure.

Prediction of impacts of the proposed project was carried out with the aid of appropriate analytical techniques. However, certain ecological aspects do not lend themselves to straight forward quantification. In such instances, expert judgement by members of the multi-disciplinary EIA team was employed.

### **5.3 General Impacts**

A number of impacts (positive and negative) were identified with due consideration to issues discussed in the earlier Sections. These impacts are based on the design of the infrastructure development, project details, environmental and socio-economic baseline studies, stakeholder consultations as well as expert judgment.

### **5.4 Impact Criterion and Classification**

For purposes of this report, classification of possible impacts and criterion used are highlighted in the Table 2 below.



Table 2: Criterion and classification of impacts

Assessment Evaluation Criteria	Rating (Severity)	
Impact Type	-	Negative
	=	No Impact or Negligible Impact
	+	Positive
Extent of impact	I	Immediate (the site and immediate surroundings)
	L	Local
	R	Regional
	N	National
	IT	International
Duration of impact	ST	Short term (0-5 years)
	MT	Medium term (5-15 years)
	LT	Long term (lifetime of the development)
Intensity of impact	L	Low (where natural, cultural and social functions and processes are not affected)
	M	Medium (where the affected environment is altered but natural, cultural and social functions and processes can continue)
	H	High (where the affected environment is altered to the extent that natural, cultural and social functions and processes will temporarily or permanently cease)
Probability of impact	LP	Low probability (possibility of impact occurring is low)
	P	Probable (where there is a distinct possibility that it will occur)
	HP	Highly probable (where the impact is most likely to occur)
	D	Definite (where the impact will occur)
Significance of impact	L	Low (where natural, cultural and social and economic functions and processes are not affected). In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming
	M	Medium (where the affected environment is altered but natural, cultural, social and economic functions and processes can continue). An impact exists but is not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
	H	High (where the affected environment is altered to the extent that natural, cultural, social and economic functions and processes will temporarily or permanently cease). In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time consuming or a combination of these. In the case of beneficial impacts, the impact is of a Substantial order within the bounds of impacts that could occur.

## 5.5 Potential Impacts

### 5.5.1 Socio-Economic Impacts

#### Impact: Increased Employment Opportunities

The development will create job opportunities for the local community members of the Constituency, and Namibia in general. At preparatory, construction and operational stages, local community members will be employed and consequently livelihood support for family members will be improved (short-term and long-term) – in particular as on average, support from one job benefit five family members. ***Currently, there are limited job opportunities in the target area. This development could potentially positively impact at least 1000 members of the local community.*** And reduce the long-term unemployment by 5%.

#### Impact: Increase in Local Population

The development will not have a significant impact on the population size of the area. The proposed development will source a very small number of highly skilled personnel from outside the Constituency during the construction phases, and the rest from the local community. All semi-skilled and unskilled staff will be employed from the area and appropriate training provided. Hence, the possibility of the project to significantly increase the local population is very low. Human presence in the remote project site will though increase temporally.

#### Impact: Increase in Local Economic Activities

Trading opportunities among the local people are expected to increase. Increased in people employed in the Constituency will also support local trade through increased income in the area.

This will lead to a snow-ball of positive growth for the area, for at least 2 years. Possibly, creating longer-term safety-nets for many families.

Impact: Water Supply Availability

The development is likely to put pressure on water demand in the area and could overwhelm the water resources. Therefore, new boreholes exclusively for the purpose of the construction should be drilled. These boreholes should be placed so not to negatively impact the long-term water security of the communities.

Impact: Loss on Cultural Sites

No significant impact determined.

***A new grave site of a child was identified within a large termite mound at the following GPS coordinates: S 18.090726, E 21.418382. This site is near the DR3417 alignment, but there is sufficient space to align the road away from the grave site.***

Road construction usually always avoid termite mounds too.

Impact: Increased Demand for Health Services

During construction, when most labour will be needed, all occupational health related injuries will be referred to the local health facilities for immediate attention. This will not have a significant impact on the capacity of the medical staff and facilities to meet the demand for health care, since most of the employed people will be from the area and already residing within the area. HIV and AIDS programs for the Contractors, Staff and local communities need to be developed and provided so to ensure that the participating people are not exposed to increased risk of contracting HIV and/or spreading it.

Impact: Worker Safety

During the construction phase, heavy machinery will be employed for the various works associated with the upgrade of DR3662. Absence of clear safety guidelines may lead to accidents affecting worker's safety and productivity, however, this will not be the case during the construction of this development and clear safety guidelines will be available and all workers will be briefed and trained accordingly as per industry and RAs' standards and guidelines.

Impact: Increased Traffic

Increased traffic flow in and out of the area is expected during construction and especially during operations. During operations, this increase is expected to be significant. An increase in local traffic can be expected during operational phase, however, negative impacts can be mitigated through the appropriated road signage and other speed control techniques.

Impact: Blasting noise and vibration

No blasting will take place, but limited vibrations from machinery and tools could be perceived as intrusion. This will only occur during limited construction time and at irregular times.

### **5.5.2 Environmental Impacts**

Impact: Displacement of people

No impact. There will be very limited request to move some fences and not loss of entire properties.

Impact: Machinery noise and vibration

During the construction and operational phases, noise and vibrations from the vehicles and machineries will result into noise and vibration. This impact will be insignificant. The construction workers are the most vulnerable and therefore they should wear protective gear.

Impact: Water quality

No impact.

Impact: Solid Waste Disposal

Waste will be produced at the site during the setting up of supporting infrastructure and construction phases. Piles of gravel cleared are not environmental pollutant hazard, but can reduce the area aesthetics value.

Impact: Air Pollution

The major source of the impact will be dust from vehicles ferrying materials. Due to distance from local communities, this impact can be significant. Care should be taken not to expose the local community and workers to excessive dust and exhaust fumes.

Impact: Loss of Historical and Cultural Sites:

No significant impact determined.

***A new grave site of a child was identified within a large termite mound at the following GPS coordinates: S 18.090726, E 21.418382. This site is near the DR3417 alignment, but there is sufficient space to align the road away from the grave site.***

Road construction usually always avoid termite mounds too.

Impact: Loss of Productive Land

At least 40% of the development will take place on an existing earth track, DR3417. Hence, very little area will be affected, requiring loss of significant property. ***As a fact, the whole road will impact less than 50ha (15,000m X 30m = 450,000m<sup>2</sup>). The 450,000m<sup>2</sup> is equal to 45ha.*** Take into account that some of the 45ha consist already of an at least 3m wide earth track and other infrastructure.

Impact: Loss of Wildlife Habitat, Indigenous Flora and Fauna

Wildlife their habitants will minimally impacted, due to their very low populations. There will be loss of vegetation and this is the expected trade-off for these types of developments. The direct impact is loss of vegetation on parts of the 45ha, and additionally from borrow pits (not exceeding 3ha). Hence, we expect the project direct footprint to be less than 50ha).

Impact: Erosion of the Top-Soil

The nature of the project demands the use of machinery during construction. This may lead to instability of the soil in the area and as a result may cause soil erosion. This

though will not lead to gully formation, unless site rehabilitation is not done properly after construction and no regular maintenance is carried out during the operational phase of the project.

Special attention should be given to material excavation in the borrow pits as shown in.  
***A special Section in the Environmental and Social Management Plan for the Excavation and Rehabilitation of Borrow Pits on DR3417 is inserted.***



The following Tables below present the proposed impact analysis.

Table 3: Evaluation of impacts during pre-construction phase

PRE-CONSTRUCTION PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	=						
Soil pollution	=						
Air pollution	=						
Land use potential	=						
Habitat transformation	=						
Fauna displacement	=						
Damage to Flora	=						
Traffic impacts	=						
Visual & aesthetic impacts	=						
Social	+	L	ST	M	D	L	M
Economic	+	L	ST	M	D	L	M

Table 4: Evaluation of impacts during construction phase

CONSTRUCTION PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	-	I	ST	L	LP	L	=
Soil pollution	-	I	ST	L	LP	L	=
Air pollution	-	I	ST	L	P	L	=
Land use potential	-	I	ST	L	P	L	=
Habitat transformation	-	I	LT	L	D	L	=
Fauna displacement	-	I	ST	L	LP	L	=
Damage to Flora	-	I	LT	L	D	L	=
Traffic impacts	-	I	ST	L	P	L	=
Visual & aesthetic impacts	-	I	ST	L	P	L	=
Social	+	L	ST	M	D	M	H
Economic	+	L	ST	M	D	M	H

Table 5: Evaluation of impacts during operational phase

OPERATIONS PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	-	I	ST	L	P	L	=
Soil pollution	-	I	ST	L	P	L	=
Air pollution	=						
Land use potential	+	L	LT	M	D	M	H
Habitat transformation	=						
Fauna displacement	=						
Damage to Flora	=						
Traffic impacts	+	L	LT	M	D	M	H
Visual & aesthetic impacts	+	L	LT	M	D	M	H
Social	+	L	LT	M	D	M	H
Economic	+	N	LT	M	D	M	H

## **CHAPTER 6: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP)**

From the above identification of adverse and positive impacts measures have been proposed for mitigation. In order to achieve this, an Environmental and Social Management Plan (ESMP) has been developed. See Appendix C.

## **CHAPTER 7: RECOMMENDATION AND CONCLUSION**

A project of this magnitude will bring with it both positive and negative environmental and socio-economic impacts. These can be localized to the project site or can also affect areas beyond the project's vicinity. While positive impacts from this development are expected to affect the wider local community and region, the adverse affects can be considered very localized. For this development project, the positive impacts outweigh the negative impacts to which amelioration measures have been proposed to cushion their impacts.

Therefore, we recommend that the project be considered for approval for implementation, especially since the proposed development will be based on the upgrading of an existing DR3417, hence very little new area is expected to be affected. Thus, unlikely to generate long-term significant negative impacts.

This Scoping Report has revealed that a full EIA will not be required in order to identify gaps in information or to accurately identify all project's aspects that could generate significant negative impacts.

## BIBLIOGRAPHY

- Christelis G. & Struckmeier W. 2001. Groundwater in Namibia: an explanation to the hydrogeology map. John Meinert Printing (Pty) Ltd. Windhoek, Namibia.
- Kavango East Regional Council (KERC) Website. <https://kavangoeastrc.gov.na/mukwe/>. Accessed October 2023 to December 2023
- Legal Assistance Center Website. <http://www.lac.org.na/>. Accessed October 2023 to November 2023.
- Mendelsohn, J. 2003. Atlas of Namibia: A portrait of land and its people. David Philip Publishers. Cape Town, South Africa.
- Mendelsohn, J. 2009. Land Use in Kavango: Past, Present and Future. Windhoek: Research and Information Services of Namibia).
- Ministry of Lands and Resettlements. 2015. Regional Development Profile for the Kavango Region. Rundu, Namibia
- Muller M.A.N. 2007. Grasses of Namibia. John Meinert Printing (Pty) Ltd. Windhoek, Namibia.
- NACSO Website. <http://www.nacso.org.na/index.php>. Accessed November 2023 to December 2023.
- National Planning Commission (NPC). 2015. Regional Development Profile for Kavango East. Windhoek, Namibia.
- National Planning Commission (NPC). 2012. Namibia 2011 population and housing census preliminary results. Windhoek, Namibia.
- Palgrave K.C. 1993. Trees of Southern Africa. 2<sup>nd</sup> Ed. Struik Publishers. Cape Town, South Africa.
- Southern Africa Institute for Environmental Management. 2014. Strategic Environmental Assessment of the Kavango Integrated Regional Land Use Plan. Windhoek: Ministry of Lands and Resettlement.
- US Department of State Geographer. Google Earth. Accessed September 2023 to December 2023.