SAFE ROADS TO PROSPERITY

THE CONSTRUCTION OF DR 4103 OKATANA-AMUTANGA-OMULATHITU-ONANIME, IN THE OKATANA CONSTITUENCY (8.2km)

ENVIRONMENTAL SCOPING REPORT

Date: May 2024

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BY Network Planning and Consultation Division
Roads Authority

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Table of Contents

Project Name:	**THE CONSTRUCTION OF CONSTRUCTION OF DR 4103 (OKATANA-AMUTANGA-OMULATHITU-ONANIME -AMUTANGA)**
The Client:	**ROADS AUTHORITY**
Prepared by:	**In-house Roads Authority Engineers BY Network Planning and Consultation Division Roads Authority**
Release date:	
Contractors:	**OTESA CIVIL ENGINEERING**
Revised:	

EXECUTIVE SUMMARY

The Roads Authority (RA) is dedicated to environmental sustainability in all aspects of its operations, and as such, it has created an Environmental Manual (Environmental Manual, 1st Edition, October 2014) to educate Practitioners on the legal and contractual framework that specifies how roads must be planned and constructed and provides instructions on how to comply with the RA's environmental criteria. As a result, the RA is entirely devoted to environmental preservation and, in carrying out its mandate, complements the national legislative framework, including the Environmental Impact Assessment Act (NEMA).

The goal of this environmental assessment procedure is to ascertain the potential effects of the project on the socioeconomic and biophysical environments of the Oshana Region. The project entails the Construction of DR 4103 (Okatana-Amutanga-Omulathitu-Onanime), in the Okatana Constituency of Oshana Region.

Most road projects aim to enhance the social and economic well-being of both the affected communities and the country as a whole. Increased access to markets, employment opportunities, educational institutions, and healthcare facilities, as well as a reduction in the cost of transportation both passengers and freight, can all be achieved through road capacity expansion and pavement upgrades.

A team was dispatched by the Network Planning Division of the Roads Authority to investigate the availability of construction materials in the project area. The group focused on the borrow pits that were existing near DR4103 and had been utilized for earlier construction projects like MR120 and DR3609.

The RA team visited the site, evaluated the environment, and compiled an environmental assessment report outlining the effects that the planned project would have on the socio-economic and bio-physical environment.

The objective of this project is to is to construct a gravel road to provide access to vital services including markets, schools, hospitals, and social benefit withdrawal locations.

1. INTRODUCTION

This section aims to give a brief overview of the construction of DR 4103, specify the objectives of the scoping report, and outline the legislative framework that would govern the project's execution.

1.1 Background

The Roads Authority was tasked by the Ministry of Works and Transport to design, supervise and administer the construction of DR4103 from Okatana-Amutanga-Omulathitu-Onanime. The design related activities were assigned to Division: Network Planning (Head Office) for implementation.

1.2 Purpose of Scoping Report

The Scoping Report document serves as the first deliverable in terms of the Environmental Impact Assessment process. It aims to fulfil the requirements of the Namibia Environmental Management Act No7 of 2007 and the Environmental Regulations of 2012 and contains the following steps:

- Registration of the project with the Ministry of Environment and Tourism (MET)
- Notification and consultation of interested and affected parties.
- Identification and consideration of issues and opportunities
- Consideration of mitigatory plan options
- Considerations of management plan options

1.3. Policy, Legal, and Administration Framework

This segment deals with the regulatory requirements that apply to this project.

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 2014;

The Environmental Management Act is the primary legislative guardian of the environment and therefore focuses on the management of environmental resources and accordingly, identifies activities that require authorization before commencement. The road construction would trigger several activities listed in Table 1, requiring an Environmental Clearance Certificate.

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;
27.(2)(a)	land use and transformation
27.(2)(c)	resource removal, including natural living resources

The Directorate of Environmental Affairs (DEA) at the Ministry of Environment and Tourism currently oversees and directs environmental impact assessments. To improve the EIA process in Namibia, guidelines for various projects have been compiled.

In Namibia, several sector regulations are essential to scoping and EIAs. The applicable sector law is outlined in the following table.

Table 2: The applicable sector laws

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	• Permits should be obtained from the Department of Forestry for the removal of protected trees.

	of a surveyed erf or a local authority area without a license. • Vegetation which is on a sandy dune or drifting sand or a gully unless the cutting, destruction, or removal is done to stabilize the sand or gully.	
National Heritage Act 27 of 2004	Heritage resources to be conserved in development.	All archaeological sites are to be identified and protected.
Nature Conservation Ordinance 4 of 1975	Requires a permit for picking (the definition of "picking" includes damage or destruction) 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 Ordinance	Protection of 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.	Removals of vegetation cover are to be avoided and minimized at all costs. Soil pollution is to be avoided.

	The Minister may direct owners or land occupiers in respect of inter alia water courses. No Regulations exist to this effect.	
Water Resources Management Act 11 of 2013	Section 44 states that no person may abstract or use water, except following 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	Obligation not to pollute surface water bodies. The following permits are required in terms of the Water Act: 1. water abstraction license that will form part of the contract obligations.

	permit issued under Section 70 of the Act. Where “effluent” means any liquid discharge as a result of domestic, commercial, industrial, or agricultural activities.	
Public Health Act 36 of 1919	Provides for the prevention of pollution of public water supplies.	A general obligation for the Contractor is not to pollute the water bodies in the area.
Government Notice No 121 of 1969 as amended as well as Government Notice No. 156 of 1 Aug 1997	These are general health regulations applicable to this project.	The Contractor will enforce the conditions required to ensure the health and safety of the workers.

2. EIA APPROACH

This section provides the reader with an overview of the proposed EIA approach. An engagement with the public and stakeholders forms an integral part of the EIA process. Additionally, a description of the public participation meeting undertaken will be provided.

2.1 EIA approach to the project.

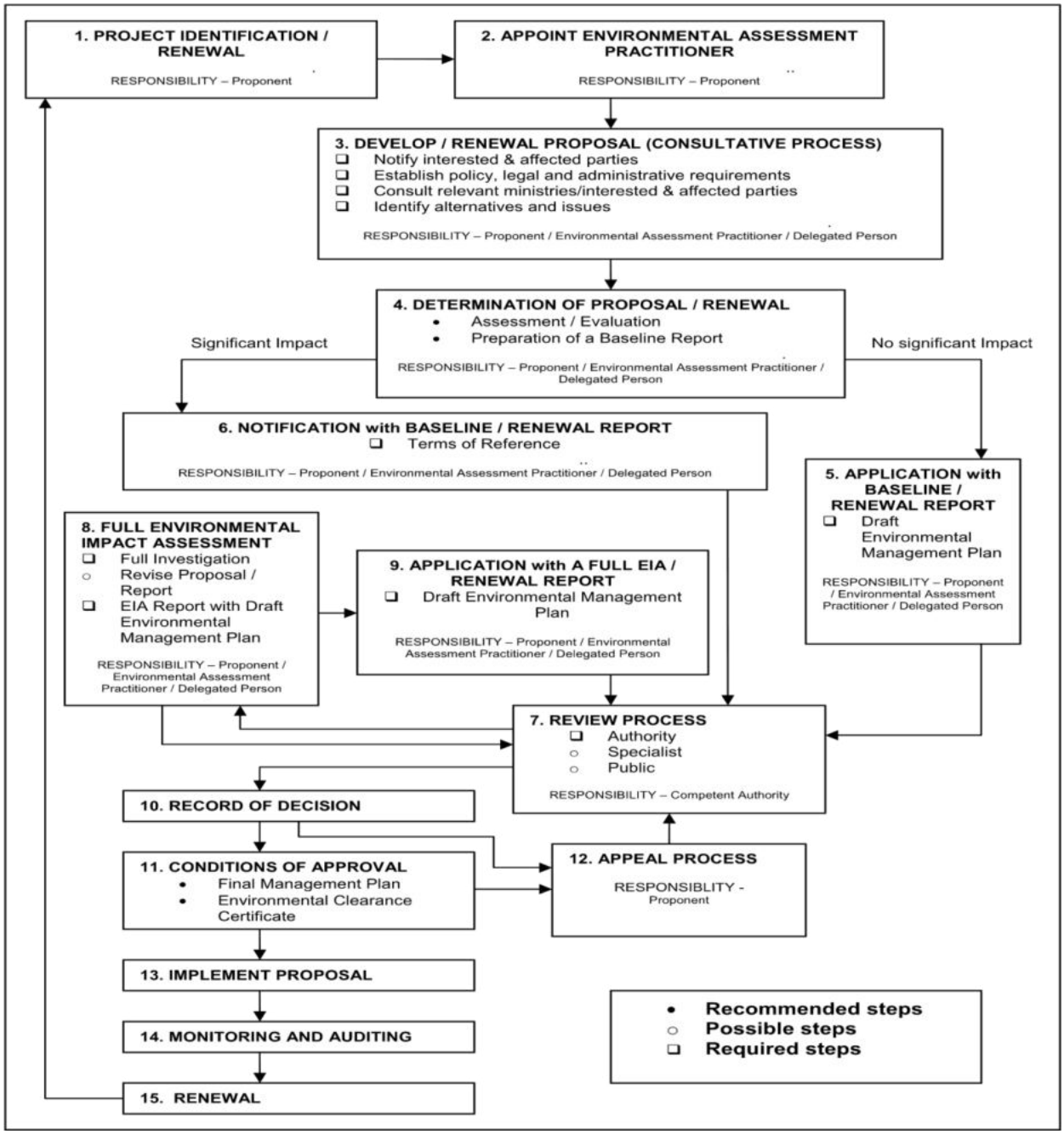

Figure 1: EIA Process

2.2 The Public Participation Process

Consultation with the public forms an integral component of this investigation and involves I&APs such as directly affected landowners and neighbours, national-, regional-, and local authorities, environmental groups, civic associations, and communities.

The interested and affected parties identify their issues, and concerns about the proposed activity which they feel should be addressed in the EIA process. The PPP has therefore been structured to provide the I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to raise any issues of concern during the EIA Process.

The Public Participation Process is undertaken by following the principles and requirements of the Namibian Environmental Management Act No 7 of 2007 and associated regulations.

I&AP has been invited to attend the public meeting at the following venue:

1. Amutanga Parish Hall
   Date: 27/12/2021

2.3 Summary of the PPP

Table 3: Summary of the Public Participation Process PPP

Task	Details	Date
I&APs notification (Relevant Authorities and I&APs)		
I&APs identification	An I&AP database is developed for the project by establishing the jurisdiction of the organization in respect of the project as well as those living or working in proximity to the project site. The database of the I&AP includes the local town council officials, pertinent national and regional government officials, other	

	organizations including parastatals in the area, as well as the attendants to the respective meetings.	
Background Information Document	A background Information Document will be compiled and distributed to the I&APs during public meetings.	
Site notices	Site notices will be sent out to the local authorities to share with the communities. The site notices will be placed at strategic places in the respective towns of Oshakati and Ongwediwa to inform the general public about the Road construction.	
Addressing comments received	All comments received will be collated into the Comments and Response report.	

3. PROJECT DESCRIPTION

The purpose of this section is to provide a technical description of the activities associated with the road construction.

3.1 Overview

Road DR 4103 is situated in the Oshana Region in northern Namibia (Refer to the locality plan in Figure 2). Road DR 4103 starts at Okatana on MR120: Oshakati-Endola-Onhuno. It follows a north-westerly direction up to Epyeshona and Amutanga respectively. In length, DR4103 is about 8.2 kilometres. as shown in Figure 2 below.

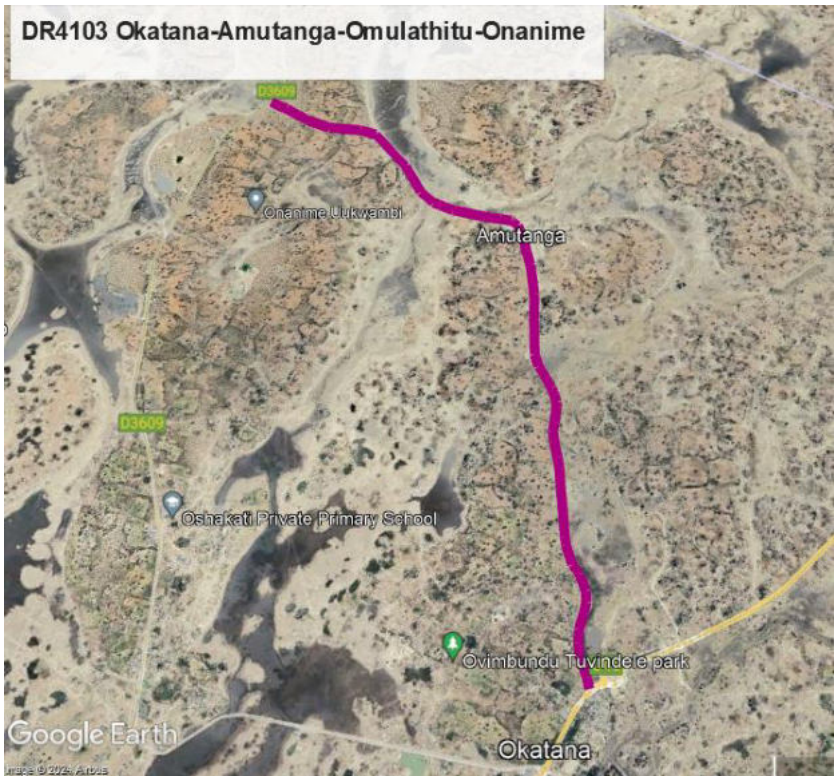

Figure 2: Locality Map of DR4103 from Okatana-Amutanga-Omulathitu-Onanime

3.2 Surrounding Points of Interest

Eight neighboring villages, Amutanga, Onanime, Onambambi, Omulathitu, Oshikondiilongo, Likelo, Epyenene, and Epyeshona, make up the rural community known as Amutanga community. There are just around 10,000 people living in the hamlet. Vital services including markets, schools, hospitals, and social benefit withdrawal locations form part of surrounding points of interest.

3.3 Technical Approach

The proposal is to upgrade the gravel road to bitumen standards. The road will be equipped with proper bridge and culvert structures to accommodate runoff during heavy water flow events. The road has been re-aligned to improve the horizontal curve radii.

3.4 Traffic on the Road Network

There is no historic data available, however the traffic volumes listed in Table 4 for the proposed road DR 4103 is the estimated Annual Daily Traffic (ADT) obtained from the Roads Master Plan (May 2007).

Table 4: Traffic Volumes

		ADT (2007)	
ROAD No.	**ORIGIN - DESTINATION**	**TOTAL**	**% HEAVY**
DR 4103	Okatana-Onanime	139	Not Available

Source: Oshana, Oshana, Omusati, Ohangwena and Kavango Roads Master Plan Revision (May 2007).

Projected traffic volumes are used to assess the appropriateness of the typical cross-sections for the road and to comment on the proposed geometric design standards.

Projected traffic volumes shown in Table 5 were calculated for the approximate date when the road is expected to be opened to public traffic. These projected traffic volumes are based on the traffic volumes shown in Table 1, the proposed traffic growth rate of 4% per annum and a traffic diverted / generation rate of 50%.

Table 5: Projected Traffic Volumes

			PROJECTED TRAFFIC VOLUMES (v.p.d.)	
ROAD No.	**ORIGIN - DESTINATION**	**PROJECTION DATE**	**Excluding Diverted / Generated**	**Including 50% Diverted /**
DR 4103	Okatana-Onanime	January 2012	165	250

3.5 Typical Road Cross Section Design

3.5.1 General

The Terms of Reference for this project states that DR 4103 should be constructed as a 6.4m wide road, but the Oshana, Oshana, Omusati, Ohangwena and Kavango Roads Master Plan Revision (May 2007) proposed that DR 4103 should be constructed as a 7.5m wide gravel road.

3.5.2 Road Width

The roadway widths must be sufficient to accommodate the average design vehicles passing each other whilst providing horizontal clearance between vehicles and also clearance to the edge of the road (shoulder breakpoint).

TRH17 (1988) recommend an absolute minimum clear space of 0,3 metres on either side of a vehicle with a clear space of 0,6 metres between vehicles where speeds and/or traffic volumes are expected to be low.

However, considering that these gravel roads have no shoulders that could serve as a recovery area, the preferred outside clearance should be at least 0,5 metre between the outside of a vehicle and the shoulder break point. The preferred horizontal clearance between passing vehicles is 1,2 metre.

With the above mentioned in mind, cross-sectional widths were assessed for different design vehicle combinations comprising of light and heavy vehicles.

3.5.3 Road Reserve Width:

The Oshana, Oshana, Omusati, Ohangwena and Kavango Roads Master Plan Revision (May 2007) recommended a clearing width of 30m wide for the proposed road.

A minimum road reserve width of 30 metres is therefore proposed for the road to be constructed as part of this project to minimise the effect on properties, as requested in the Terms of Reference for this project.

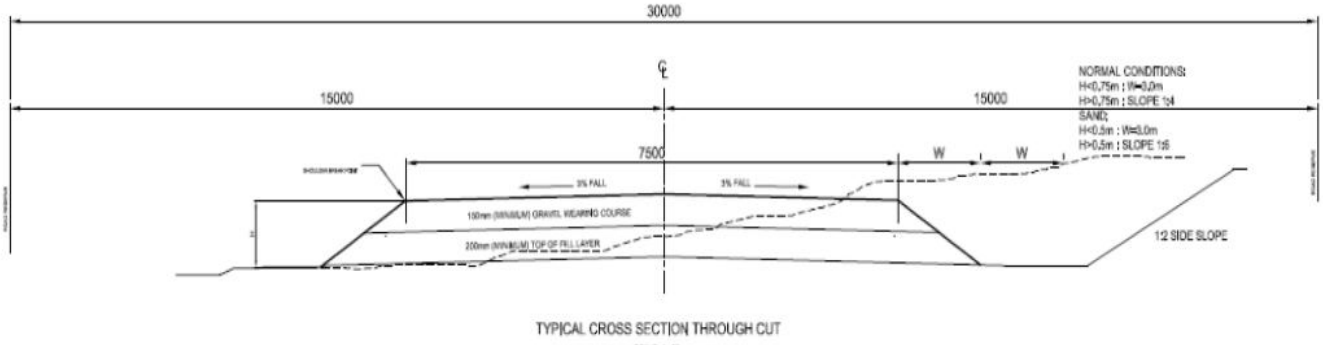

Figure 3: Typical cross section of a gravel standard road

3.6 Surface Water Drainage Design

Minor drainage culverts shall be designed in terms of the Drainage Manual for run-offs with a 1:5 return period.

Concrete drifts have in the past on other regions of Namibia not been acceptable to the local population and should only be used where construction costs justify such an option.

3.8 Importance of the Project

Road DR 4103 is situated in the Oshana Region in northern Namibia (Refer to the locality plan in Figure 2). Road DR 4103 starts at Okatana on MR120: Oshakati-Endola-Onhuno. It follows a north-westerly direction up to Epyeshona and Amutanga respectively. In length, DR4103 is about 8.2 km. Eight neighboring villages, Amutanga, Onanime, Onambambi, Omulathitu, Oshikondiilongo, Likelo, Epyenene, and Epyeshona, make up the rural community known as Amutanga community. There are just around 15,000 people living in the hamlet.

3.9 Motivation for the project

Due to the nearby Cuvelai flood plains, the Amutanga centre is known as a "Island" during the rainy seasons. The community's livelihoods, companies, education, and other essential services are all negatively impacted by the massive economic damages caused by these floods. Essential services like education, social services, and health care at Okatana and Oshakati are completely cut off from the population.

Access to vital services including markets, schools, hospitals, and social benefit withdrawal locations would be made possible via the road. Additionally, it would promote economic growth by providing a market link for a proposed community-based chicken farm.

The following would result from the road's entire construction:

- Enhancement of the inhabitants' general standard of living in the impacted regions.
- Promoting economic growth by giving nearby enterprises, like the chicken farm offered by the Amutanga Charity Organization, simple access to markets.
- Resolving enduring community concerns and completing the access road development that was earlier given top priority.

4. 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.

4.1 Bio-Physical Environment

Topography

Geology

The Oshana Region is part of the Kalahari Basin, which was formed 130 million – 180 million years ago. The project is situated in an area covered with sediments of the Kalahari Group that consists of fine to coarse sands with varying clay and silt content.

Calcrete, a pedogenic material, occurs within the sediments of the Kalahari Group and is covered with a sandy overburden often in excess of 2 metres.

Topography and Vegetation

The area traversed by the road is fairly flat with a sandy overburden. The elevation along the route varies between 1085 m and 1100 m above mean sea level.

The common land type is classified as Kalahari Woodlands comprising of tree and shrub combinations. Approximately 65% of the area traversed by the route has been cultivated and is used to grow mahangu.

The flat terrain, sandy soils, and ephemeral watercourse flow resulted in an inadequately formed drainage system that took the shape of a massive river delta made up of several interconnected ephemeral pans and broad, shallow water courses (oshanas). Cross flow between oshanas happens occasionally, but flow is normally in the direction of the oshanas. It has been noted that there is annual and inter-annual variability in the drainage systems' flow volumes, primary pathways, and directions. Furthermore, an impermeable layer of calcrete lies beneath the soil cover of the oshanas and the nearby lowlands. This soil cover is often shallow.

Regional Climate

The Oshana Region has the following three distinct seasons:

- Cool-dry from April to August
- Hot-dry from September to November
- Hot-wet from December to March

Rainfall occurs mainly in the form of summer thunder showers. The average annual rainfall for the project area varies between 500 mm and 550 mm. The average temperature in Oshana is 25.4°C, which is somewhat higher than the national average for Namibia. in spite of 84 wet days (23 percent of the year). There are two distinct seasons: October through April is the wettest month, and May through September is the driest. July is the coldest month (11.4°C) while October is the hottest (36.2°C). December is the wettest month with an average of 144.7mm, while June loses out on moisture with an average of 0mm. With an average humidity of 35.03%, the warm air is a little bit muggy. In a nutshell, Oshana experiences mild, dry weather interspersed with periodic downpours.

5. ENVIRONMENT IMPACTS

5.1 Overview

The Scoping Report will look at the Construction and Operational Phases of the project alternatives to determine any significance. The environmental impact process will focus on the case whereby the existing gravel track will be upgraded with some layer works and horizontal/vertical alignment. This will include the use of heavy machines to obtain, haul, and process materials for layer works.

The following activities are generally associated with the construction of a road. These activities are kept in mind during the environmental impact assessment process.

- ❖ Camp site establishment
  - ✓ Demarcation of the camp site

- ✓ Protection of vegetation and natural features o 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
- ✓ Hazardous substances

5.2 Borrow pits

In total seventeen (17) borrows pits were identified, of which only eight (8) are to be investigated and tested. 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 6 months construction period.

In addition to the 8.2 km section of road, it is the intent (should funding be availed in the near future) to construct the following access roads to adjoin to DR4103 from Okatana-Amutanga-Omulathitu-Onanime. These accesses will connect places of social importance as largely the horizontal alignment traverses the boundaries between the ephermal pans and the established homesteads.

- Access Road 1: 1.81km
- Access Road 2: 1.67km
- Access Road 3: 0.49km
- Access Road 4: 0.70km

Table 6: List of Borrow Pits identified

Borrow PitNo.	Village	Latitude	Longitude	Existing/Proposed
1	Ondjondjo	17°41'58.69"S	15°42'52.45"E	Existing
2	Ondjondjo)	17°41'21.63"S	15°42'54.8"E	Proposed
3	Onambambi	17°42'58.21"S	15°39'59.03"E	Proposed
4	Onambambi	17°43'3.25"S	15°39'57.89"E	Existing
5	Onanime	17°40'38.99"S	15°38'20.58"E	Existing
6	Amutanga	17°41'52.42"S	15°40'15.85"E	Proposed
7	Amutanga	17°42'9.3"S	15°41'32.19"E	Existing
8	likelo	17°41'12.16"S	15°41'33.95"E	Existing
9	Ohailulu B	17°40'43.67"S	15°42'59.46"E	Existing

10	Omusheshe	17°43'23.52"S	15°45'12.83" E	Existing
11	Omusheshe	17°43'43.87"S	15°45'3.11"E	Existing
12	Omulathitu	17°42'6.47" S	15°40'45.49" E	Proposed
13	Onambambi	17°42'43.06" S	15°40'46.897 " E	Proposed
14	Onanime	17°43'48.44" S	15°39'10.74" E	Existing
15	Onashiku	17°46'27.62" S	15°37'25.53" E	Existing
16	Ohailulu	17°41'1.83" S	15°43'13.33" E	Existing
17	Amutanga	17°42'38.02" S	15°41'48.995 " E	Proposed

5.3 Scoping Checklist

Table 7: Scoping Checklist

PART 1 OF THE SCOPING CHECKLIST: QUESTIONS ON PROJECT CHARACTERISTICS				
1. Will construction, operation, or decommissioning of the Project involve actions that 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 the intensity of land use?	Yes	The borrow pit operations will temporarily alter the land use, land cover, and, for the borrow pits - the topography of the area.	Low significance because of possible mitigation measures that can be implemented. Rehabilitation of borrow pits normally returns the land use to its original state.
1.2	Clearance of existing land, vegetation, and buildings?	Yes	Clearing of vegetation for construction operations influences the vegetation, soils, and topography. It is very unlikely that any buildings will be cleared.	Clearing 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 road will be built mostly on the existing alignment.	Low significance.
1.4	Pre-construction investigators e.g boreholes, soil testing?	Yes	Materials testing is required to obtain construction materials that 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 alignment will be used therefore there are no significant impacts anticipated.
1.6	Demolition works?	No	There are no existing culverts.	Very low significance
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, they 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 primarily for road construction.	It is anticipated that the impact will not be significant due to the flat topography of the existing 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 needs to be treated or disposed of.	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	The new road, rail, or sea traffic during construction or operation?	Yes	Construction of a bypass and traffic increase due to the movement of construction vehicles.	Medium significance due to the popular tourist route.
1.19	The new road, rail, air, water borne, or other transport infrastructure including new or altered routes and stations, ports, airports, etc.	No	The current alignment will be followed.	The significance will be low due to the width and current alignment to be used.
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	Yes	There will be temporary bypasses constructed.	The significance is likely to be low due to the temporary nature of the activities.
1.21	New or diverted transmission lines or pipelines?	Yes	There will be transmission lines and pipelines relocated	High Significance
1.22	Impoundment, damming, culverts, realignment, or other changes to the hydrology of watercourses or aquifers?	Yes	New culverts will be constructed	Significance is high. Construction of new culverts and widening of culverts will have a positive impact.
1.23	Stream crossings?	Yes	Some streams will be crossed.	The significance is medium positive due to more effective water balance culverts capacity.
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	Water will be extracted for the construction phase of the project.	Water from boreholes will be used and the significance will be medium due to the scarcity of available water.
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The existing road impacts the drainage patterns.	The significance will be medium positive due to the improved capacity

				of the drainage structures
1.26	Transport of personnel or materials for construction, operation, or commissioning?	Yes	Surface characteristics.	No significance.
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	The influx of people to an area is either temporarily or permanently?	No		
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 the 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 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 medium due to the low volumes available.
3. Will the Project involve the 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 the 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 the 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 concerning the living conditions of the adjacent people and the environment. This is concerning 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 networks 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 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, 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 into the 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 the 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 significantly 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 be mitigated.
5.5	Dust or odors from handling 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 the incineration of waste?	No		
5.7	Emissions from burning of waste in the open air (eg slash material, construction debris)?	Yes	The 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 the operation of equipment e.g. engines, ventilation plant, crushers?	Yes	The mining of borrowed pits and production equipment produces noise and vibrations	No. The ambient receptors are minimal. 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 groundwater 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 hydrocarbons 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	The 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 into the air, onto the land, or into the 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 e.g. failure of pollution control 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 (e.g. floods, earthquakes, landslips, etc.)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, and 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 e.g. schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or the 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 e.g. 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 a positive medium due to job creation and increased mobility.
9.6	Any other causes?	No		
10. Are there any other factors that 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 a significant impact on the environment e.g. more housing, new roads, new supporting industries or utilities, etc.?	Yes	The 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 the development of supporting facilities, ancillary development, or development stimulated by the project which could have an impact on the environment e.g.: • 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 the 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 concerning 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.

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

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

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

There will be 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/residential.

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

The project area is surrounded b schools, villages, dwellings and agricultural land.

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. The area has been subject to agricultural and semi-urban activities.

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

The area is susceptible to high floods and erosion.

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

No, the proposed project will be constructed on the existing 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 and 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, and 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, reduce or repair or compensate for the effect?

5.4 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 a low, medium, and high.

Table 8: Environmental impacts that were identified during the assessment procedure

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 - the 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 influences the vegetation, soils, and topography.	Negative	High
Creation of new land uses.	The existing land use will change from agricultural to the road (land use).	Negative	Low
Pre-construction Investigators egg boreholes, soil testing?	Materials testing is required to obtain construction materials that will affect the topography and vegetation cover.	Negative	High

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 and bridges.	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 primarily for 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 campsites needs to be treated or disposed of.	Negative	Medium
The new road, rail, or sea traffic during construction or operation?	Limited traffic increases due to the 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. Improving the culverts on the road Will be positive.	Positive	Medium
Abstraction or transfers of	Water Will be extracted for the	Negative	Medium

water from ground or surface waters?	construction phase of the project.		
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
The influx of people to an area either temporarily or permanently	The migration of people might impact 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 the biodiversity 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 the 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 e.g. by changing living conditions?	The proposed route will impact positively on the vulnerable groups due to improved mobility networks. Safety of the road user will also greatly improve between Okatana and Amutanga	Positive	Medium
Spoil, overburden, or mine wastes?	Spoils will be generated during construction affecting the aesthetic appeal of the area.	Negative	Low
Pollution on site (domestic and	Pollution of the natural environment (soil and water).	Negative	Medium

construction waste).			
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 the 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
Will the project cause noise and vibration from blasting?	Blasting might be conducted which will impact existing water sources, houses, and other receptors in the area.	Negative	Low
Emissions from burning of waste in the open air	The burning of waste will negatively affect the air quality.	Negative	Low

(eg slash material, construction debris)?			
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 a significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	The new road will be constructed which will benefit the communities by improving access to schools, clinics, and churches.	Positive	Medium
	The new road will be constructed which will benefit the communities. Lower vehicle operating costs will contribute to the National economy.	Positive	Medium

Will the project lead to the development	Access improvement to facilities in the region will benefit the local and regional communities.	Positive	Medium

6. DESCRIPTION OF EXISTING ENVIRONMENT

The project area is largely the same as the current proclaimed earth track DR4103 as shown in Figure 1 and Figure 2 above, located in Okatana Constituency in the Oshana Region. Oshana Region is situated in the northern part of the Republic of Namibia. It is one of the fourteen regions of Namibia, its capital is Oshakati. The towns of Oshakati, Ongwediva and Ondangwa, all situated with this region, form an urban cluster with the second largest population concentration in Namibia after the capital Windhoek. As of 2023, Oshana had a population of 230,801. It shares borders with the following regions Ohangwena on north, Oshikoto on the east, Kunene on the south and Omusati on the west.

There are many unspoiled beautiful sceneries, while different species of trees and animals continue to attract tourists and visitors to the Region. The Region consists of twelve (11) Constituencies, namely Okaku, Okatana, Okatyali, Ompundja, Ondangwa Rural, Ondangwa Urban,Ongwediva, Oshakati East, Oshakati West, Uukwiyu and Uuvudhiya and five (3)Local Authorities namely Oshakati, Ondangwa and Ongwediva. Oshakati Town is the Administrative Seat and Capital of the Region.

Figure 4: Typical landscape of Oshana Region

6.1 Physical Environment

6.1.1 Climate and Temperature

Oshana Region is in a semi-arid, characterized by high temperatures ranging between 25-37 degrees Celsius. The average rainfall per year is about 350-500 mm mainly experienced between November to April. The Region and project site falls under the very flat hydro-geological Cuvelai Basin dipping from some 1150 m above sea level (asl) in the north east to 1080 m asl in Etosha Pan. The rainfall decreases from 600 mm in the north east to 300 mm in the west.

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.

6.1.2 Soils, Geology and hydrogeology

The DR4103 areas are part of the greater Kalahari Basin, 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.

North-central Namibia lies in the Owambo basin, comprising a topographic depression filled with sediments. Along the rim of the basin in the north, west and south there are older rock formations near or at the surface, manifesting as hills and low ridges of rock outcrops.
The flat landscape and low permeability of the Cambisols (Figure 5 and Figure 6) soil produce

a lot of surface runoff and water collections in the form pans/oshanas. Water collects and flows in many of the shallow omurambas (Etaka, main river), or the pans in shallow depressions, these events can be short-lived of seasonal.

Figure 5: Water collecting in pans/oshanas

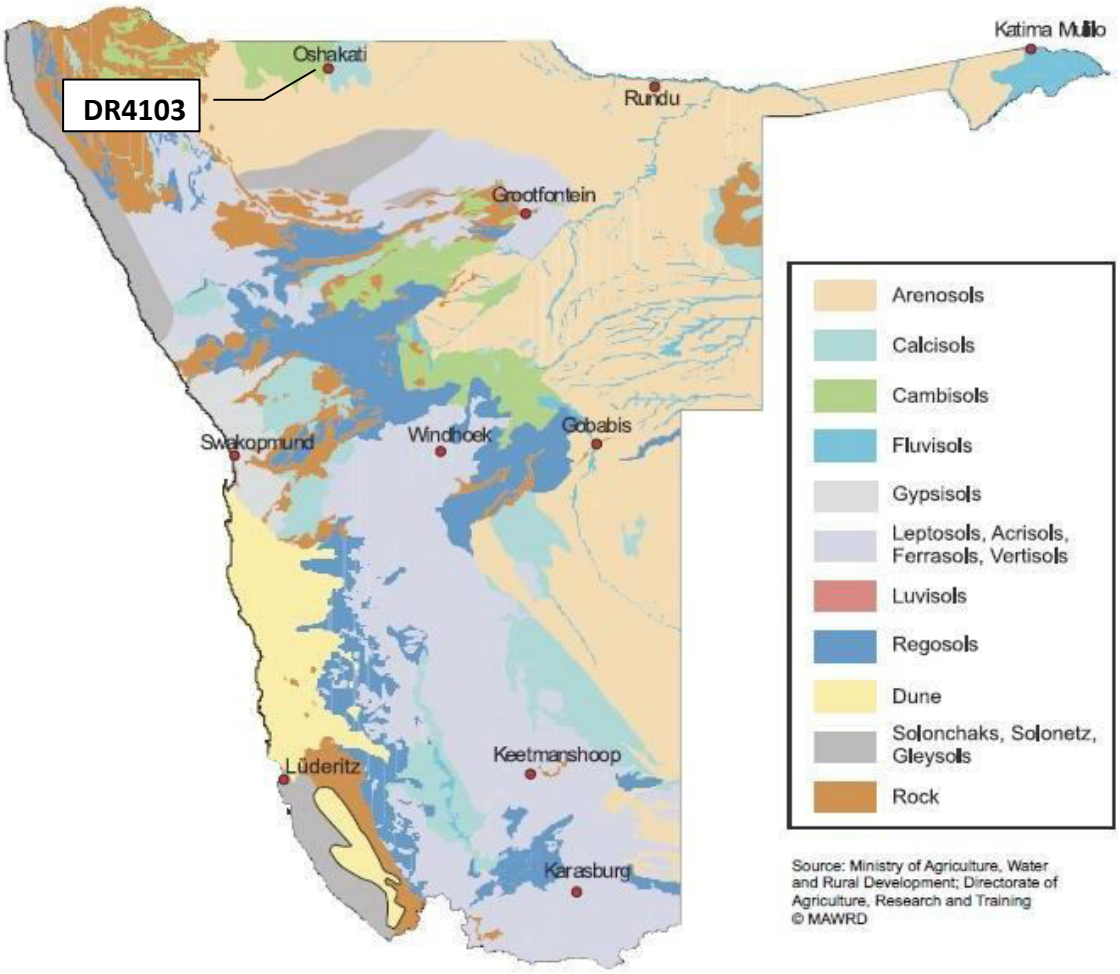

Figure 6: Soils, Geology and hydrogeology

6.1.3 Air Quality

An assessment of the baseline air quality status in the project area and surroundings was carried out 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 is 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.

6.2 Biological Environment

6.2.1 Approach

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

It should be noted that over 60% of the proposed activity will be on an existing roadway, DR4103.

6.2.2 Flora

Due to the limitations of the climate, the vegetation in the Region is homogeneous Mopane Woodland that is comprised of broad-leafed, deciduous woodlands that vary according to topography and the nature of the soils that support them. Broadly speaking, the relatively larger and deep-rooted trees, such as Mopane are most prevalent, while various species of shrubs and grasses can be found in the shallower soils. See Figure 7.

Figure 7: Main biomass is Mopane trees.

From the above three Figures, it can be clearly determined that the area have various types of development and disturbances such track roads and crops fields. Hence impact on the general vegetation will not be on significance.

6.2.3 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, like Etosha National Park. The DR4103 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 (99% of biomass).

6.3 Socio-economic Environment

6.3.1 Introduction and Demography

The current population residing in the target area between Okatana and Amutanga is less than 20,000 of over 50% 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 Oshakati and Ondangwa 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 DR4103 are subsistence farmers with very few employees. These farmers mostly produce food for their own survival with little surplus left to sell to

earn a significant income. In addition, as these farmers have no paid employees, there is no benefit of job-creation to address the high levels of unemployment in the area.

The area is rural with Okatana and Oshakati as urban centers, and with a school at Amutanga village. There are also shops in the area apart for Cuca Shops.

6.3.2 Land Tenure

The land where the project area is located is a proclaimed DR4103 gravel road and under the authority of the Roads Authority. No physical long-term construction will take outside the existing road reserve of 30m. There are about fifteen (15) sets of fences that could be affected and requested to be moved, at most 10m. The materials to be used for the construction will be sourced from the borrow pits in the sounding villages. Most of the borrow pits are existing ones, formed/used during the construction of the other projects such as MR120 (Okatana – Onhuno) and DR3609 (Oshakati – Omungwelume), therefore no new significant impact to the environment will be expected from this activity. It is expected that only less than five (5) new borrow pits will be formed under this project. See table.

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

6.3.3 Archaeological and Cultural Sites

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

6.3.4 Existing Infrastructure

The only infrastructure types along the DR4103 are fences made from wires and wood. These are mainly fences for homesteads, crop fields and camps. In total, there are about fifteen (15) fences potentially within the 30m road reserve, depending on the final road alignment.

7. POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

7.1 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.

7.2 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, borrow pits, 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.

7.3 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.

7.4 Impact Criterion and Classification

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

Table 9: Criterion and classification of impacts

Assessment EvaluationCriteria	**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 notaffected)
	M	Medium (where the affected environment is altered but natural, culturaland 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 thatnatural, cultural, social and economic functions and processes willtemporarily 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.

7.5 Potential Impacts

7.5.1 Socio-Economic Impacts

Impact: Increased Employment Opportunities

The development will create job opportunities for the local community members of the Okatana 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 potentiallypositively impact at least 800 members of the local community**. And reduce the long-term unemployment by 10%.

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 snowball 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, at least one borehole exclusively for the purpose of the construction might need to be drilled. That borehole should be place so not to negatively impact the long-term water security of the communities.

Impact: Loss on Cultural Sites

No significant impact determined.

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 DR4103. 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.

7.5.2 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 impact is expected.

Impact: Loss of Productive Land

60% of the development will take place on an existing road, DR4103. Hence, very little area will be affected, requiring loss of significant property. As a fact, the whole road will occupy only about 20ha (8200 m X 30m = 246,000m^2). The 246,000m^2 is equal to 24.6ha. Take into account that most of the 24.6ha consist already of an at least 4.5m- 6m 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 24.6ha, and additionally from borrow pits (not exceeding 5ha). Hence, we expect the project direct footprint to be less than 30ha).

Impact: Erosion of the Topsoil

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 Environmental and Social Management Plan for the Excavation and Rehabilitation of Borrow Pits on DR4103 was developed.

The following Tables below present the proposed impact analysis.

Table 10: 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 10: 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

8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMP)

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

9. 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 expectedto 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 based on the upgrading of an existing DR4103, hence very little new area is expected to be affected. Thus unlikely to generatelong-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.

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