



ENVIRONMENTAL SCOPING REPORT (ESR)



**FOR THE UPGRADE TO BITUMEN STANDARD OF M0074
(74.5 KM: GROOTFONTEIN TO ROOIDAG).**



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Location	M0074 Grootfontein – Rooidag, Otjozondjupa Region	
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Executive Summary

Roads are the veins of economic development and facilitate the movement of goods and services (logistics). Meaning, a comprehensive Road network is one of the key building blocks for socio-economic development in the country. However, road construction requires significant quantities of Sand and Water. Henceforth, sand mining and water abstraction are inevitable (cannot be avoided).

Socio-economic development is very important for our livelihood and provides services, income and employment opportunities, and hence activities such as sand mining water abstraction are vital and necessary for development.

However, the development thereof requires careful consideration of the potential environmental degradation associated with sand mining water abstraction may pose environmental and safety risks to people and animals. In-addition, the use of heavy vehicles may cause nuisance and health hazards (such as noise and dust and potential environmental pollution from the storage and use of fuels and oils. Socially, roads construction attracts people for employment opportunities, which are often recipe for various social ills such pollution, spread of diseases and theft.

Potential impacts linked to the sand mining in the proposed site have been identified, and mitigation measures were identified and have been recommended for adoption by the project proponent to manage the sand mining activities. It is imperative that any further sand mining activities should conform to the Environmental Management Act of 2007 and EIA regulations of 2012. Upon approval of the Environmental Clearance Certificate, the proponent (Roads Authority) should commit and abide to the recommended mitigation and rehabilitation measures as prescribed herein.

ACRONYMS

BID	Background Information Document
DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Plan
ESR	Environmental Scoping Report
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
PPE	Personal Protective Equipment
RA	Roads Authority
SM	Site Manager
TEC	Tortoise Environmental Consultancy

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1. INTRODUCTION

1.1. Terms of Reference

This document is prepared as part of the Environmental Impact Assessment (EIA) and scoping exercise, aimed at obtaining an Environmental Clearance Certificate (ECC) for the proposed upgrading of the M0074 Grootfontein – Rooidag gravel road to Bitumen standards (**low volume seal**)..

1.2. What is an EIA?

An Environmental Impact Assessment (EIA) is a tool to manage negative environmental impacts that may arise from the proposed development and is aimed at guiding the proposed activities to be more environmentally friendly and to comply with the provisions of the Environmental Management Act (Act No.7 of 2007).

The aim of the EIA is to reduce negative impacts (effects) and maximize positive impacts, through the adoption of best environmental practices and application of the precautionary principle

1.3. Demand for Sand

A comprehensive Road network is one of the key building blocks for socio-economic development in the country. However, road construction requires significant quantities of Sand and Water.

The project entails the proposed upgrading of the M0074 Grootfontein – Rooidag gravel road to Bitumen standards (**low volume seal**).

Site Location: GPS coordinates:
Latitude -30.523932 and Longitude 52.349458 (figure 2.1).

1.4. EIA Process

An EIA is a systematic process of identifying, predicting, evaluating and mitigating the potential environmental and social effects that may arise from the activities of a proposed project.

1.4.1 Identification and Mitigation of Impacts

The backbone of the EIA report entails identification of impacts (whether real or perceived) and recommendations on suitable mitigation measures to ensure compliance with the principles of environmental management and highlight risks and measures to ensure an environmentally friendly development.

1.4.2 Purpose of the EIA Scoping Exercise

The purpose of this EIA scoping exercise is to:

- a) Provide description of the proposed activity;
- b) Describe the affected environment (proposed area),
- a) Identify potential environmental impacts / aspects of concern;
- b) Describe the methodology followed to assess the potential impacts;
- c) Mitigate negative impacts that may arise from the proposed project

1.4.3 Rehabilitation

The EIA should not only focus on mitigating the impacts of the activity during the active operations but also should go further and recommend rehabilitation measures at project closure (when activities cease). Rehabilitation measures should not be parked waiting for project closure but should be implemented from the beginning and incrementally throughout the project lifespan.

1.4.4 Scope and Purpose of this Report

The purpose of this report is to present the findings of the EIA for the proposed sand mining activities, as part of the application of the Environmental Clearance Certificate (ECC).

The environmental assessment has been undertaken in accordance with the requirements of the Environmental Management Act, 2007 and the EIA Regulations.

1.4.5 Application for ECC

Upon completion, the EIA Scoping Report and Environmental Management Plan (EMP), will be submitted to the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism (MET), for review and decision, in accordance with Section 8 of the EIA Regulations.

1.4.6 Environmental Assessment Practitioner

Tortoise Environmental Consultants (TEC) has been appointed to carry out the requisite Environmental Impact Assessment (EIA) and develop an Environmental Management Plan (EMP).

1.5. Alternatives Considered

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

The road already exists and hence No alternatives were considered.

1.6. Environment vs Economic Development

Namibia's economy is highly dependent on a healthy environment and striking a balance in meeting demands for economic development (e.g sand mining) and maintaining biological diversity can be a challenge. Therefore, the environment and development sectors should work together and identify synergies in order to ensure that natural resources are harvested in a sustainable manner.

Development takes place on land (in the environment) and hence the quest for economic development requires a trade-off with certain parts of the environment in-order for the development to be realized. Meaning, for development to take place, some part of the environment will be affected. However, such impacts should be mitigated through the EMP.

The aim of environmental assessments is to guide the sustainable utilization of natural resources and to mitigate negative impacts that would otherwise compromise the environmental integrity and future ecosystem benefits.

2. PROJECT INFORMATION

2.1 Project Location and Route Description

The Otjozondjupa Region is one of Namibia's fourteen regions and is known for outstanding landmarks such as the Waterberg Plateau Park. The region's capital and largest town is Otjiwarongo.

The road section, M0074 to rooidag, starts at the junction with T0802 which is situated 58.92 km out of Grootfontein through Maroela boom, to Rooidag, through Tsumkwe and ends at Dobe border (Namibia-Botswana international border). Please refer to *Figure 2.1* below:

2.2 Sand / Gravel Mining

A geotechnical investigation for preliminary construction materials prospection such as gravel for SSG & Subbase layers for road pavements was conducted. The total number of seventeen (17) borrow pit were sampled, and the samples were taken for both existing & new borrow pits.

Subsequent tests were conducted on the samples for the determination of the California Bearing Ratio (CBR), the grain distribution by means sieve analysis and the atterberg limits.

Even though the investigation took place during rainy conditions, no water table was encountered in all existing borrow pit.



Figure 2.1: Borrow pit investigation

Table 2:1: List of existing & new borrow pit along MR 74

Number of B/Pit	B/Pit Farm Name	Road Number	Offset MR 74	Km & Coordinates
1 Ext B/P	Nutsos Nuord	MR 74	LHS	9.1 S19.14.795 E018.35.367
2. New B/P	“	MR 74	RHS	10.2 S19.14.930 E018.35.890
3. New B/P	“	MR 74	RHS	13.2 S19.14.846 E018.37.665
4. Ext B/P	Osmoor 264	MR 74	RHS	14.9 S19.14.783 E018.38.669
5. Ext B/P	“	MR 74	LHS	18.5 S19.14.358 E018.40.773
6. New B/P	Abed Ruhe	MR 74	RHS	24.1 S19.14.967 E018.44.307
7. New B/P	“	MR 74	RHS	25.2 S19.14.989 E018.44.686
8. Ext B/P	“	MR 74	LHS	28.3 S19.14.266 E018.45.722
9. Ext B/P	Muhonge	MR 74	LHS	30.4 S19.14.558 E018.47.428
10. New B/P		MR 74	RHS	34.2 S19.14.873 E018.48.882
11.Ext B/P		MR 74	LHS	38.4 S19.15.155 E018.51.239
12.Ext B/P	Mayville # 920	MR 74	RHS	47.0 S19.15.711 E018.56.878

Table 2:2: List of existing & new borrow pit along MR 74

Number of B/Pit	B/Pit Farm Name	Road Number	Offset MR 74	Km & Coordinates
13.New “ BP		MR 74	RHS	49.1 S19.15.622 E018.57.452
14. New B/P		MR 74	LHS	58.2 S19.16.263 E018.02.923
15. New B/P		MR 74	LHS	64.6 S19.16.390 E019.05.532
16. New B/P		MR 74	LHS	68.4 S19.16.549 E019.08.045
17. New B/P	Rooidag 1001	MR 74	LHS	72.5 S19.16.649 E019.10.259

Table 2:3: Summary of CBRs and Indicator test results for Borrow pits

Samp leNO:	KM	Depth	Material Description	Sieve Analysis Percent Passing Sieve Size										Oversize Index	Grading Coefficient	Shrinkage Product	Grading Modulus	Mdd (kg/m3)	O.M.C (%)	CBR@%Mod AASHTO					Atterburgs				Type of material
				63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.0	0.425	0.075							100	98	95	93	90	LL	PL	PI	LS	
RL/377	28	400-1000	Soft Calc+Clay Soil	100	96	89	87	84	74	53	43	33	26	10.5	23.1	6.6	2.23	1814	13.8	61	52	36	24	13	35.5	22.8	12.7	4.4	G6
RL/378	28	400-1050	Soft Calc+Clay Soil	100	89	81	76	74	71	58	36	22	20	19.0	23.0	2.6	2.40	1763	18.4	40	31	19	13	8	50.0	39.7	10.3	1.7	G8
RL/384	30	200-100	White Calc + Clay soil	100	93	88	78	76	66	55	47	33	19	11.9	17.0	2.1	2.14	1935	8.4	70	55	38	27	15	27.7	21.2	6.5	1.4	G6
RL/389	34	1400-2400	White Calc+brown soil	100	82	73	71	70	63	55	46	23	28	26.5	14.0	3.1	2.31	1996	9.0	72	55	32	21	11	23.8	18.4	5.4	2.1	G6
RL/396	38	1000-2100	Hard Calc+Redish sand	100	89	73	71	70	61	48	35	24	28	27.3	17.2	4.5	2.41	2124	7.4	121	85	52	40	28	22.6	14.1	8.5	3.0	G5
RL/412	49	600-1200	white Calc Gravel soil	100	91	87	81	75	69	58	45	38	19	13.4	21.0	3.6	2.14	1898	11.3	93	71	46	35	23	29.4	19.0	10.4	2.4	G5
RL/413	49	1000-1900	white Calc Gravel soil	100	91	85	80	74	69	58	44	38	19	15.2	20.5	3.4	2.16	2027	10.1	138	130	89	67	43	25.0	17.7	7.3	2.2	G5
RL/407	65	700-1400	Hard Calc+Redish sand	100	94	85	77	74	67	58	47	33	26	15.0	17.4	4.1	2.18	1894	12.6	106	84	61	49	35	30.8	24.6	6.2	2.7	G5
RL/428	68	800-1600	White Calc gravel	100	100	99	87	82	73	50	39	31	19	1.3	24.2	4.5	2.29	2126	8.7	116	100	80	66	51	26	18.2	7.9	3.0	G5
RL/429	68	500-1000	White Calc gravel	100	92	82	79	77	73	64	49	37	21	18.0	18.9	4.2	2.1	1811	14.5	83	72	51	39	26	23	14.0	9.2	2.8	G5
RL/423	73	1600-2500	Gravel +Brown sand	100	94	85	82	78	66	53	42	28	20	14.5	21.0	3.1	2.28	1926	9.2	159	116	74	67	50	19.9	11.3	8.6	2.1	G5
RL/424	73	1600-2800	Gravel +Brown sand	100	95	56	81	77	64	58	45	33	21	14.2	21.0	3.2	2.19	2000	9.0	70	58	46	41	33	20.7	13.2	7.5	2.1	G5
RL/425	73	1600-2700	Gravel +Brown sand	100	100	97	94	90	77	66	53	38	19	3.1	26.6	2.1	2.06	1871	9.8	118	94	67	57	45	19	10.8	7.9	1.4	G5

The borrow pits at Km 28, 30 and 34 they have good materials for SSG. While the Borrow pit from Km 38, 49, 65, 68 and 73 they have Subbase Materials.

2.3 Base Course, Surfacing & Concrete Aggregate Sources

During investigation, there's no Base course materials identified on site. There is a potential commercial source of G3/G4 and concrete aggregate stone from Rundu based commercial supplier namely Crushco Trading. They are currently supplying coarse and fine surfacing aggregates, base course G3 & G4 materials and concrete stone different projects around the two Kavango Regions. Although there is no test done yet for ACV & 10% FAC.

Crushco Trading is a Rundu based business entity that is specialized in brick making, fine aggregate, concrete stone, Coarse aggregate supply to clients for surfacing, slurry, G3,G4 layers, concrete etc. Their quarry is situated at Kangongo some 160 km east of Rundu.

2.4 Water Source/s for Road Construction

The main source of water available is the underground water. Most boreholes belongs to the farmers (private) owners others belong to NamWater.

Although there are numerous water sources as indicated, it could not be established whether these sources will yield enough water to supply the road construction.

It is therefore, the contractor should conduct water prospection to identify the sufficiency of the water sources.

According to the locals interviewed, there's only one pipe crossing the road at km 35.

Table 2:4: List of boreholes along MR 74

Farm Name	Kilometre	offset	Coordinate	Remark
Nutsos Nuord	4.2	RHS	S19.14.886 E018.32.483	
OSMOOR 264	14.2	RHS		
Abed Ruhe	23.5	LHS	S19.14.725 E018.43.552	
Farmer Asociat hall	30.2	RHS	S19.14.665 E018.47.433	
Police Station	31.5	RHS	S19.14.788 E018.47.760	This Borehole has Salt water
"	"	RHS	S19.14.757 E018.47.802	
	36.0	RHs	S19.15.087 E018.50.623	
Kaihiva Farm	39.3	RHS	S19.15.433 F018.52.479	
Farm 10	56.4	LHS	S19.16.063 E19.02.312	
Rooidag gate	75.2	RHS	S19.17.117 E019.12.211	

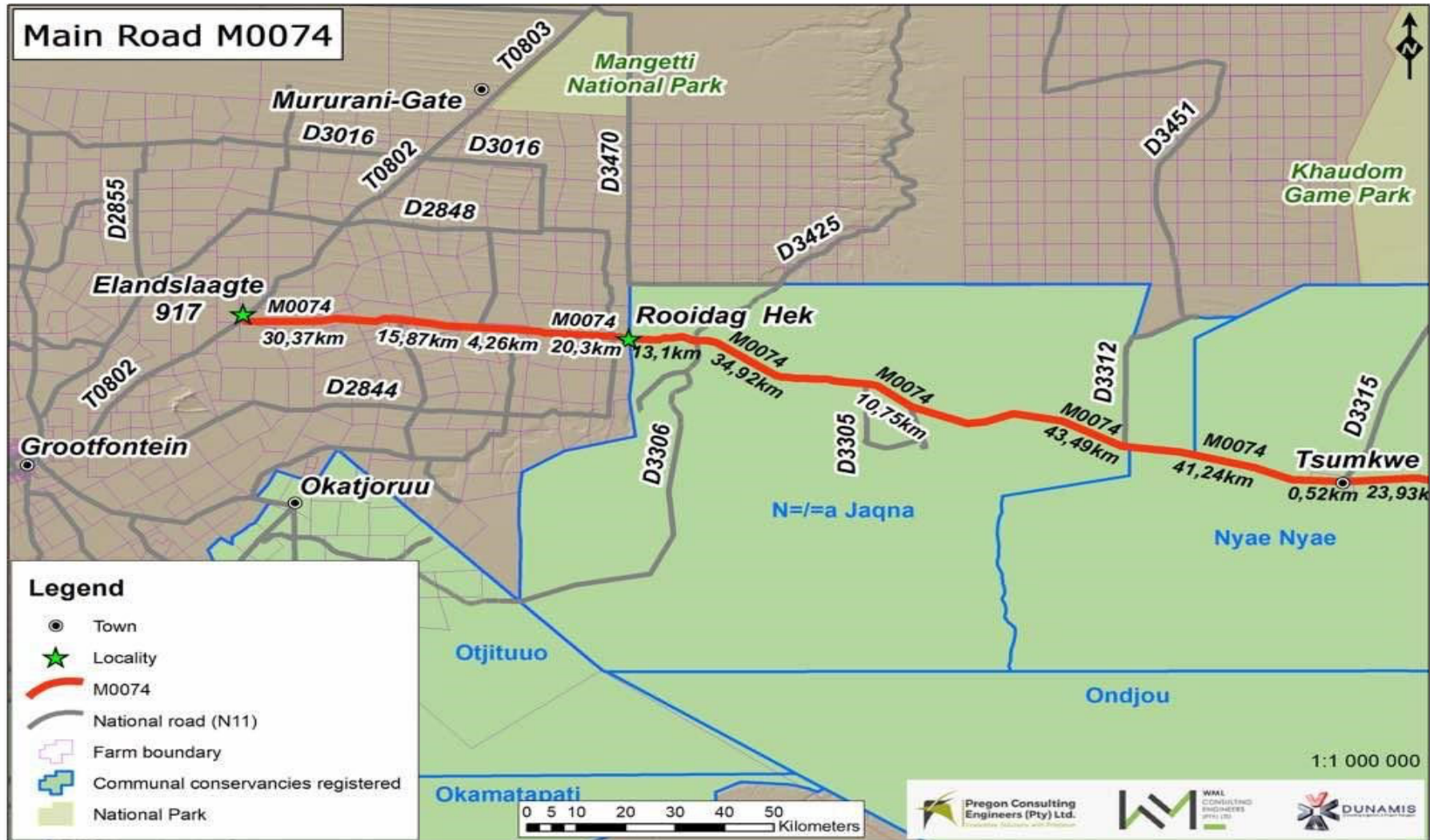


Figure 2.2: M0074 locality map

2.5 Climatic Conditions and Rainfall

The Region is characterized by semi-arid climate, with an annual rainfall ranging from 300-600mm increasing from the south-west to the north-east. Although there is a high degree of variability and the area is subject to periodic droughts, making the area marginal for rain-fed crop production.

Heavy rainfalls are most common between January and March. One of the most important natural features in the region is the system of calcrete pans often fill with rainwater in the wet season, providing seasonal access to water for people, livestock and wildlife.

3. LEGAL AND DEVELOPMENTAL FRAMEWORK

This chapter outlines the regulatory framework applicable to the proposed project. Table 2 provides an overview of applicable policies, plans and strategies and Table 3.1 provides a list of applicable national legislation.

1.6 Compliance to the EMP to the Environmental Management Act

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

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

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

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

1.7 Listed Activities

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required.

As the organ of state responsible for management and protection of its natural resources, the MET: DEA is committed to pursuing the principles of environmental management. The EMA provides a list of activities that require an EIA and the proposed sand mining is among the listed activities or activities that may not be conducted without at ECC. The purpose of listed activities for projects is to ensure that the associated impacts on the environment are carefully considered.

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

Table 3-1: Listed Activities triggered by the proposed project

Activity	Applicability
Activity 10: Infrastructure: 10.1 The Construction of (b) Public roads	Road Construction: Upgrading of the M0074 Grootfontein to Rooidag
Activity 3: Mining and Quarrying Activities 3.2 The Other forms of mining or extraction of any natural resources whether regulated by law or not 3.3 Resource extraction, manipulation, conservation and related activities	The project entails Sand Mining activities for road construction
Activity 8: Water Resource Development 8.1 The abstraction of ground or surface water for industrial or commercial purposes	The project entails Water abstraction for road construction

1.8 Additional Permits

Sand mining in river course requires permits from the Ministry of Agriculture, Water and Land Reform (MAWLR). However, this is not applicable here because the extraction of sand is not in the river course.

1.9 Extended developmental and Legal Framework

In addition to the EMA and the Environmental Assessment Policy, there exists a host of legal and policy documents and guidelines that must be considered when undertaking an EIA as indicated in table 3.2, below. The proponent has the responsibility to ensure that the sand mining operations conforms to all other National developmental plans and legal framework.

Table 3-2: Policies, Plans and Strategies

Policy / Plan	Relevance	Applicability to the Proposed Project
5th National Development Plan (NDP) and Vision 2030	Outlines the country's National Development Plans (NDPs), in line with the Harambee Prosperity Plan (HPP) and vision 2030	The proposed project is a development that forms part of the bigger picture of achieving economic progression, social transformation and environmental sustainability

Table 3.2: Other Legal Instruments / National Statutes

National Statutes	Relevance	Applicability to the Proposed Project
Environmental Assessment Policy (1995)	Promotes Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards environmental sustainability	Environmental Protection
Soil Conservation, 1969 (Act 76 of 1969) and the Soil Conservation Amendment Act (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Monitor and apply the soil conservation mechanisms
Forest Act 12 of 2001 Forest Act Regulations 2015	To provide for the protection of the environment and the control and management of forest. Relevant sections: - Approval required for the clearance of vegetation on more than 15 hectares (Section 23, subsection 1 (b)).	Forestry permits maybe required for vegetation clearing
Public Health Act (Act No. 36 of 1919)	Advocates for Public Health and safety	Personal Protective Equipment (PPE)
The Occupational Safety and Health Act No. 11 of 2007	Advocates for employee and public safety, health	In the working context "SAFETY" implies "free from danger"
Local Authority Act No. 23 of 1992 Government Notice of No.116 of 1992.	Advocates for inclusive socio-economic development	Ensure communication and necessary approvals to township developmental activities
National Heritage Act, No. 27 of 2004.	The Act provides provision of the protection and conservation of places and objects with heritage significance.	No heritage features were observed within or around the site. Procedures and mitigation measures presented in the EMP should be applied

4. IMPACT ASSESSMENT METHODOLOGY

4.1 Assessment of Impact Significance

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

The assessment of the environmental impacts of development activities should strive to be objective and impartial at all times. However, environmental assessment processes can be exposed to subjectivity inherent in attempting to measure significance.

The determination of the significance of an impact depends on both the context (spatial and temporal scale) and intensity of that impact.

4.2 Impact Assessment Criteria

For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** and **DURATION** will be described. These criteria would be used to ascertain the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure/s in place. The mitigation described in the Scoping Report would represent the full range of plausible and pragmatic measures.

Table 4-1: Assessment criteria for the evaluation of impacts

CRITERIA	CATEGORY	DESCRIPTION
Extent or spatial influence of impact	National	Beyond a 20km radius of the site
	Regional	Within a 20 km radius of the site
	Local	Within a 2 km radius of the centre of the site
	Site specific	On site or within the boundaries of the property
	Zero	
Magnitude of impact (at the indicated spatial scale)	High	Natural and/ or social functions and/ or processes are <i>severely</i> altered
	Medium	Natural and/ or social functions and/ or processes are <i>notably</i> altered
	Low	Natural and/ or social functions and/ or processes are <i>slightly</i> altered
	Very Low	Natural and/ or social functions and/ or processes are <i>negligibly</i> altered

	Zero	Natural and/ or social functions and/ or processes remain <i>unaltered</i>
Duration of impact	Zero	Zero time
	Short Term	Up to 18 months
	Medium Term	0-5 years (after operation)
	Long Term	5- 10 years (after operation)
	Permanent	More than 10 years (after operation)
Probability	Definite	Estimated greater than 95 % chance of the impact occurring.
	Very likely	Estimated 50 to 95% chance of the impact occurring
	Fairly likely	Estimated 5 to 50 % chance of the impact occurring.
	Unlikely	Estimated less than 5 % chance of the impact occurring.
	Zero	Definitely no chance of occurrence
Confidence	Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.
Reversibility	Irreversible	The activity will lead to an impact that is permanent.
	Reversible	The impact is reversible, within a period of 10 years.

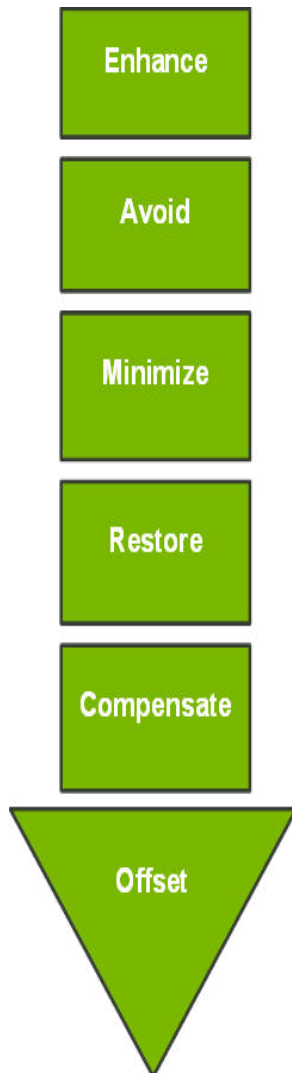
4.3 Mitigation Measures

For each impact assessed, mitigation measures should be identified to reduce and/ or avoid negative impacts. These mitigation measures are also incorporated in the Environmental Management Plan (EMP) to ensure that they are implemented throughout the lifespan of the proposed activity. The EMP forms part of the Scoping Report, and upon project approval, the implementation thereof, would become a binding requirement.

4.4 Mitigation Hierarchy

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

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



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

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

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

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

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

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

Figure 4-1. Mitigation Hierarchy

5 ENVIRONMENTAL IMPACT ASSESSMENT

This section presents the potential impacts that may arise from the proposed sand mining activities. The full mitigation measures are presented in the EMP.

5.1 Landscape Alteration

With the excavations and establishment of borrow pits, the sand mining activity has potential to alter (change) the natural view of the landscape

IMPACT DESCRIPTION:	Vegetation clearing		
Predicted for (specific activity)	Cutting and Excavations		
Dimension	Rating		
Duration	Permanent	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Site specific		
Magnitude	Low		
Probability	Fairly likely		
MITIGATION:			
<ul style="list-style-type: none"> If possible, rehabilitate the mining site by refilling the pit with overburden top soil, and revegetation 			

5.2 Access Roads

Establishment or creation of access roads to transport and from the borrow pit to the town.

IMPACT DESCRIPTION:	Access Roads		
Predicted for (specific activity)	Establishment of Road Tracks		
Dimension	Rating		
Duration	Permanent	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Site specific		
Magnitude	Low		
Probability	Very likely		
MITIGATION:			
<ul style="list-style-type: none"> Limit the number of access roads as far as possible 			

5.3 Borrow pit edges and steepness

Steep borrow pit edges presents potential danger to people and wildlife and should be smoothed to create gentle slopes.

IMPACT DESCRIPTION:	Borrow pit edges and steepness		
Predicted for (specific activity)	Excavations		
Dimension	Rating		
Duration	Long term	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Site specific		
Magnitude	Low		
Probability	Very likely		
MITIGATION:			
<ul style="list-style-type: none"> • Smoothen the borrow pit edges to ensure that the angles are not steep sloped, but rather gentle sloped at less than < 30° slope angles. • The principle idea is for the borrow pit edges to gentle so that the is no tipping point, where people or livestock can fall in. Meaning even if the is water, people and livestock can go in with minimal danger 			

5.4 Biodiversity (Fauna and Flora)

Although the sand mining site is barren (and cleared of vegetation), due consideration should be made to ensure minimal disturbance to the general landscape of the area.

IMPACT DESCRIPTION	Biodiversity (Fauna and Flora)		
Predicted for (specific activity / project phase)	Sand Mining Excavations		
Dimension	Rating		
Duration	Long term	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Site specific		
Magnitude	Low		
Probability	Unlikely		
MITIGATION:			
<ul style="list-style-type: none"> • Stock pile the topsoil overburden, to be re-used during rehabilitation after sand mining operations and to aid the re-establishment of vegetation 			

5.5 Pollution: Noise and Dust

The proponent should ensure noise from excavator machinery and transportation trucks is kept below the recommended noise levels of -85dB (A).

IMPACT DESCRIPTION	Noise and Dust		
Predicted for (specific activity / project phase)	Extraction and transportation of the sand		
Dimension	Rating		
Duration	Short term	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Local		
Magnitude	Medium		
Probability	Definite		
MITIGATION:			
<ul style="list-style-type: none"> • Where possible, use dust suppression measures to mitigate dust impacts • Provide dust masks and ear muffs to machinery operators • Where possible, install silencer on exhaust to reduce noise levels • Avoid working during times with excessive wind 			

5.6 Oil Spills (Pollution)

Soil pollution may occur as a result of oil and fuel leakages from machinery

IMPACT DESCRIPTION	Soil Pollution		
Predicted for (specific activity / project phase)	Oil Leakages from Machinery		
Dimension	Rating		
Duration	Short-term	Reversibility: Reversible	Degree to which impact can be mitigated: Medium
Extent	Local		
Magnitude	Low		
Probability	Definite		
MITIGATION:			
<ul style="list-style-type: none"> • Operators should be trained on dangers of oil pollutions & response action • There must be an oil spill response kit on site • If an oil spill occurs, collect the contaminated soil, store in drums or appropriate structures and dispose at approved waste disposal site; • Ensure all vehicles / machinery are well service, install drip trays and conduct regular leak inspection. 			

5.7 Ground Water abstraction

Ground water abstraction for road construction.

IMPACT DESCRIPTION:	Ground water abstraction		
Predicted for (specific activity / project phase)	Ground Water Absraction		
Dimension	Rating		
Duration	Short term	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Local		
Magnitude	Medium		
Probability	Highly likely		
MITIGATION:			
<ul style="list-style-type: none"> • Conduct borehole testing to determine borehole yield and optimum water abstraction rates • Allow borehole resting for recharge 			

5.8 Solid Waste Management

Littering and any other unsightly waste at the site or anywhere around the village, as a result of sand mining operations will be an eye sore.

IMPACT DESCRIPTION:	Solid Waste Management		
Predicted for (specific activity / project phase)	Mining Operations		
Dimension	Rating		
Duration	Short term	Reversibility: Reversible	Degree to which impact can be mitigated: High
Extent	Local		
Magnitude	Medium		
Probability	Highly likely		
MITIGATION:			
<ul style="list-style-type: none"> • No disposal of solid waste on site • Adopt the principle of what goes in, goes out 			

5.9 Socio-Economic Environment

Sand is an important element for township development (construction of roads housing, landscaping, etc), and it is one of the key building blocks for socio-economic development, which further contributes to employment creation, food security and improvement of community livelihood.

IMPACT DESCRIPTION	Socio-economic		
Predicted for (specific activity / project phase)	Development and Employment Opportunities		
Dimension	Rating		
Duration	Long and Short- term	Reversibility: Irreversible	Degree to which impact can be mitigated: Medium
Extent	National & Local		
Magnitude	Medium		
Probability	Definite		
MITIGATION:			
<ul style="list-style-type: none"> • Employ local labour as far as possible • Establish on the job training and other capacity development training programs 			

6 PUBLIC PARTICIPATION PROCESSES

Public consultation is a requirement by law (EMA No 7 of 2007) to be incorporated into an EIA process, hence it is a fundamental part of the EIA. Public consultation ensures robust decision making by involving Interested and Affected Parties (I&APs). The PPP has therefore been structured to provide I&APs an opportunity to gain more information on the proposed project and for them to provide inputs through the review of documents/reports, and to flag any issue of concern during the PPP process.

6.1 Authority Consultation

Consultations were made with the Regional Council in Otjiwarongo and the Constituency Councillor's Office in Grootfontein respectively.

6.2 Public Meeting

- 1st public meeting was conducted on 28 February 2022 at the farmer's community hall, in Maroela Boem.
- 2nd public meeting was conducted on 30 May 2022 at the farmer's community hall, in Maroela Boem.

7 CULTURAL HERITAGE

7.1 Cultural Heritage – Legal Requirements

The principal instrument of legal protection for heritage resources in Namibia is the National Heritage Act (27 of 2004), Part V Section 46, which prohibits the removal, damage, alteration or excavation of heritage sites or remains (defined in Part 1, Definitions 1), whilst Section 48 sets out the procedure for application and granting of permits as may be required in the event of damage to a protected site occurring as an inevitable result of the proposed development.

Furthermore, Section 51 (3) sets out the requirements for impact assessment. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council.

In-addition to the National Heritage Act (No. 27 of 2004), international guidelines such as the World Bank OP and BP of 2006, particularly guideline no: 4.11 which refers to the “Physical Cultural Resources” (R2006-0049), and provide direction regarding project screening, baseline survey and mitigation.

Archaeological impact assessment is also a requirement of the Environmental Management Act (7 of 2007) and EIA regulations (Government Notice 30 of 2012) includes the mitigation of impacts on archaeological sites, remains or and artefacts.

7.2 Archaeological Assessment Methodology

The archaeological assessment carried out in and around the project site relies on the indicative value of surface finds for cultural and heritage artefacts.

Following standard practice both in Namibia and internationally, a chance-find procedure for cultural heritage should be recommended as a component of the Environmental Management Plan (EMP), and the necessary precautions should be taken throughout the project lifespan.

7.3 Cultural Heritage sites / artefacts within the Proposed Road upgrade area

- a) **NO** cultural heritage sites or artefacts are registered by the National Heritage council in or around the proposed sand mining site.
- b) **NO** cultural heritage sites or artefacts are known to occur in or around the sand mining site (local knowledge),

- c) **NO** cultural heritage sites or artefacts were observed within the proposed Sand mining site,

7.4 Limitations

Although, there were no surface finds for cultural and heritage artefacts, there is a possibility that there could be cultural or heritage artefacts underground (e.g., unknown war graves, fossils etc), that could be uncovered during the establishment and management of the sand mining project.

7.5 Recommendations

Based on the limitations, it is recommended that:

- i. All employees, contractors or sub-contractors working on the sand mining site should be made aware that it is a legal requirement under the National Heritage Act that if any items protected under the definition of heritage is found during the course of development should be reported to the National Heritage Council.
- ii. The management of the sand mining operation should be conducted in a vigilant and cautious manner, and
- iii. If any cultural artefacts are found during the sand mining activities, the necessary steps and due process as presented in the EMP should be followed.

8 REHABILITATION PLAN

Socio-economic development is very important for our livelihood and provides services, income and employment opportunities, and hence activities such as sand mining are vital and necessary for development. However, such developmental activities should be conducted in a thoughtful and forward-looking manner. In other words, developmental activities, such as sand mining should consider the future land use after such activity has come to an end. Therefore, to ensure that the land remains valuable for other land uses in the future, rehabilitation should be part and parcel of such developmental activity right from the beginning and throughout the project lifespan.

The aim of the rehabilitation plan is to ensure soil conservation, prevent soil erosion, reduce safety risk (safety for both animals and people) and to ensure that the borrow pit does not become an eye shore.

8.1 What is Rehabilitation?

Rehabilitation is the process of repairing and taking all necessary actions to limit the damage caused by the developmental activity, to minimise potential danger, to make the land suitable for other uses or simply to beautify the affected area (so that it does not become an eyesore). Rehabilitation can also be referred to as the measures taken to repair damaged environments (example refilling of borrow pits with the overburden, re-vegetating, removal of unwanted infrastructure / cleaning up, etc).

8.2 Designing a Rehabilitation Plan

A rehabilitation plan refers to a set of steps or measures to be taken in-order to ensure that negative impacts associated with the development at hand are mitigated. This however requires prior planning and integration of rehabilitation activities throughout the project lifespan. Meaning, rehabilitation measures should be taken right from the beginning of the project.

The environmental characteristics of an area where a project is located plays a vital role in designing a rehabilitation plan.

9 CONCLUSION

Roads are the veins of economic development and facilitate the movement of goods and services (logistics). Meaning, a comprehensive Road network is one of the key building blocks for socio-economic development in the country. However, road construction requires significant quantities of Sand and Water. Hence, sand mining and water abstraction are inevitable (cannot be avoided).

The Roads Authority Authority intent to conduct sand mining activities within the recommended mitigation and rehabilitation parameters. The proposed sand mining activities is vital in ensuring the development requirements of the region are achieved.

The Traditional Authority would like to conform to the Environmental Management Act of 2007 and EIA regulations of 2012. Upon approval of the Environmental Clearance Certificate, the proponent (Roads Authority Authority) should commit and abide to the recommended mitigation and rehabilitation measures as prescribed in the Environmental Management Plan (EMP).

10 REFERENCES

- Burke, A. (2011). Eleven Steps to Mining Rehabilitation, Windhoek, Namibia
- Madyise, T. (2013) Case studies of environmental impacts of sand mining and gravel extraction for urban development, Gaborone, Botswana

11 APPENDICES

- 11.1 Environmental Management Plan (EMP)**
- 11.2 Geotechnical Investigation Report**
- 11.3 Public Consultation Process (PPP)**
 - 11.3.1 Newspaper Adverts**
 - 11.3.2 Comments and Response Report (CRR)**
- 11.4 EAP CV**