Environmental & Social Impact Assessment for the Upgrade to Low Volume Seal (LVS) Standard of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions

Environmental and Social Management Plan (ESMP)

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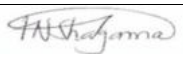
	Fredrika N. Shagama		20/09/2023

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ACRONYMS

TERMS	DEFINITION
BID	Background Information Document
BP	Borrow Pit
CE	Consulting Engineer
DAT	D&P Engineers, Archetype Project Consultants and Tweya Consulting Engineers
DEAF	Department of Environmental Affairs and Forestry
DR	District Road
EAP	Environmental Assessment Practitioners
EC	Environmental Consultant
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
ESR	Environmental Scoping Report
ESMP	Environmental and Social Management Plan
GHGs	Greenhouse Gasses
ISO	International Organization for Standardization
I&APs	Interested and Affected Parties
LVS	Low Volume Seal
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT: DEA	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs
NCEL	Namibia Civil Engineering Laboratory
NGOs	Non-governmental Organisations
NHC	National Heritage Council
N(EMA)	Namibia Environmental Management Act
PCP	Public Consultation Plan
RA	Roads Authority of Namibia
RE	Resident Engineer
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

DEFINITION OF TERMS

Alternative - A possible course of action, in place of another that would meet the same purpose and need of the proposal.

Baseline - Work done to collect and interpret information on the condition/trends of the existing environment.

Biophysical - The part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).

Consultant (Environmental Assessment Practitioner) – this refers to the team that is conducting the ESIA and the preparation of the EMP for the development, i.e., EnviroPlan Consulting.

Cumulative Impacts / Effects Assessment - In relation to an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decision-maker - The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal

Ecological Processes - Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).

Environment - As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.

Environmental Management Plan (Draft EMP) / Environmental & Social Management Plan (ESMP) - As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.

Interested and Affected Party (I&AP) - In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.

Fauna and Flora - The animals and plants/vegetation found in an area.

Mitigation - The purposeful and practical implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.

Monitoring - Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).

Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. In other words, this refers to the institutions/departments that are directly involved in the implementation of the project or it can be defined as the organization (private or public sector) or individual intending to implement a development proposal, i.e., the Roads Authority of Namibia.

Public Consultation/Involvement - A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.

Protected Area - Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended.

Scoping - An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA/ESIA.

Significant impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment

Stakeholders – this refers to the people, organisations, NGOs that are directly or indirectly affected and interested by the project.

1. CHAPTER ONE: BACKGROUND

1.1. Overview

Roads Authority (RA) of Namibia (the Proponent) intends to upgrade the District Road (DR) 3425 road to Low Volume Seal Standard (LVS). As such RA appointed DAT JV (D&P Engineers, Archetype and Tweya Consulting Engineers Joint Venture) to undertake the preliminary and detailed design, tender documentation, contract administration and full-time site supervision for the upgrading to Low Volume Seal (LVS) standards of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions.

The DR3425 originates in the Sikanduko Settlement east of Rundu and starts at a T-junction intersection with the B8 route (Trunk Road 8/3) (stake value (sv) 0+000) which links Rundu with central Namibia. According to the Road Management System (RMS) of the RA, the entire DR3425 measures 179.65km and terminates in Karukuvisa Village.

The section of DR3425 under review and the focus of this project is the portion between the settlements of Ncaute and Karukuvisa which measures approximately 87km.

The initial portion of the road from Sikanduko to Ncaute is a gravel surfaced road in a poor condition. The portion from Ncaute to Karukuvisa is presently an earth track that meanders and largely follows the Omatako River pattern. The road has been selected by the RA for upgrade from track to an all-weather two-lane single carriageway to low volume seal standard which will serve the purpose to:

- Improve local rural and regional accessibility,
- Reduction of road user costs, and
- Reduction of travel times.

The road connects multiple notable localities such as Ncaute, Ncushe, Gcwatjjinga, Naingopo, and Karukuvisa. Other smaller villages are scattered in-between those mentioned above.

It is anticipated that a new alignment close to the existing one will be established to have the upgraded road out of potential flood waters. The extent of the associated disturbance of properties due to the development such as fences, fields etc. will be determined and compensation will be made accordingly.

The project will involve inter alia the following:

- Upgrading to bitumen standards of the roadway,
- Provision of and Improvement of drainage facilities and features,
- Upgrading of intersections,
- Installation of road furniture, and
- Establishment of the 30m road reserve.

For the road upgrade and its associated activities to commence, in terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007 and the Environmental Impact Assessment Regulations of 2012), an EIA is required to obtain an Environmental Clearance Certificate from the Ministry of Environment, Forestry and Tourism (MEFT) before the project can proceed. This is because under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (EMA) No. 7 of 2007, the proposed development is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). This activity is listed under the following relevant sections (Table 1):

Table 1: Listed Activities -Environmental Management Act No. of 2007

3: Mining and Quarrying Activities	**10: Infrastructure**
3.3 Resource extraction, manipulation, conservation and related activities	10.1 The construction of- (b) public roads

Furthermore, as per the requirements of the Environmental Management Act No. 7 of 2007, Roads Authority has appointed EnviroPlan Consulting cc to conduct an Environmental and Social Impact Assessment (ESIA) and develop an Environmental & Social Management Plan (ESMP) for the proposed project.

This has been followed by an application for an Environmental Clearance Certificate (ECC) to the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA).

In this respect, this Environmental and Social Management Plan (ESMP) document forms part of the application to be made to the DEA's office for an Environmental Clearance Certificate (ECC) for the proposed upgrade to the LVS Standard of the DR3425 road and abstraction of road construction materials. The document is compiled in accordance with the guidelines and

statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts assessment regulations (GN 30 in GG 4878 of 6 February 2012).

1.2. The Environmental Consultant

The Roads Authority has appointed DAT JV as the engineer to design and supervise the proposed road upgrade project. DAT JV subsequently appointed EnviroPlan Consulting CC (EnviroPlan hereafter), on behalf of the Roads Authority, as the independent environmental consultant conducting the EA for the proposed activity.

Tendai E. Kasinganeti, a qualified Environmental Assessment Practitioner (EAP) with the assistance of Ms. Fredrika Shagama conducted this EA process. The CVs of the Environmental Consultants are attached as Appendix B of the Scoping Report.

1.3. Project Location

The DR3425 originates in the Sikanduko Settlement east of Rundu and starts at a T-junction intersection with the B8 route (Trunk Road 8/3) (stake value (sv) 0+000) which links Rundu with central Namibia. According to the Road Management System (RMS) of the RA, the entire DR3425 measures 179.65km and terminates in Karukuvisa Village. However, as mentioned above, the focus of this project is the section between the settlements of Ncaute and Karukuvisa which measures approximately 87km.

The locality (project route) is shown on the map in Figure 1.

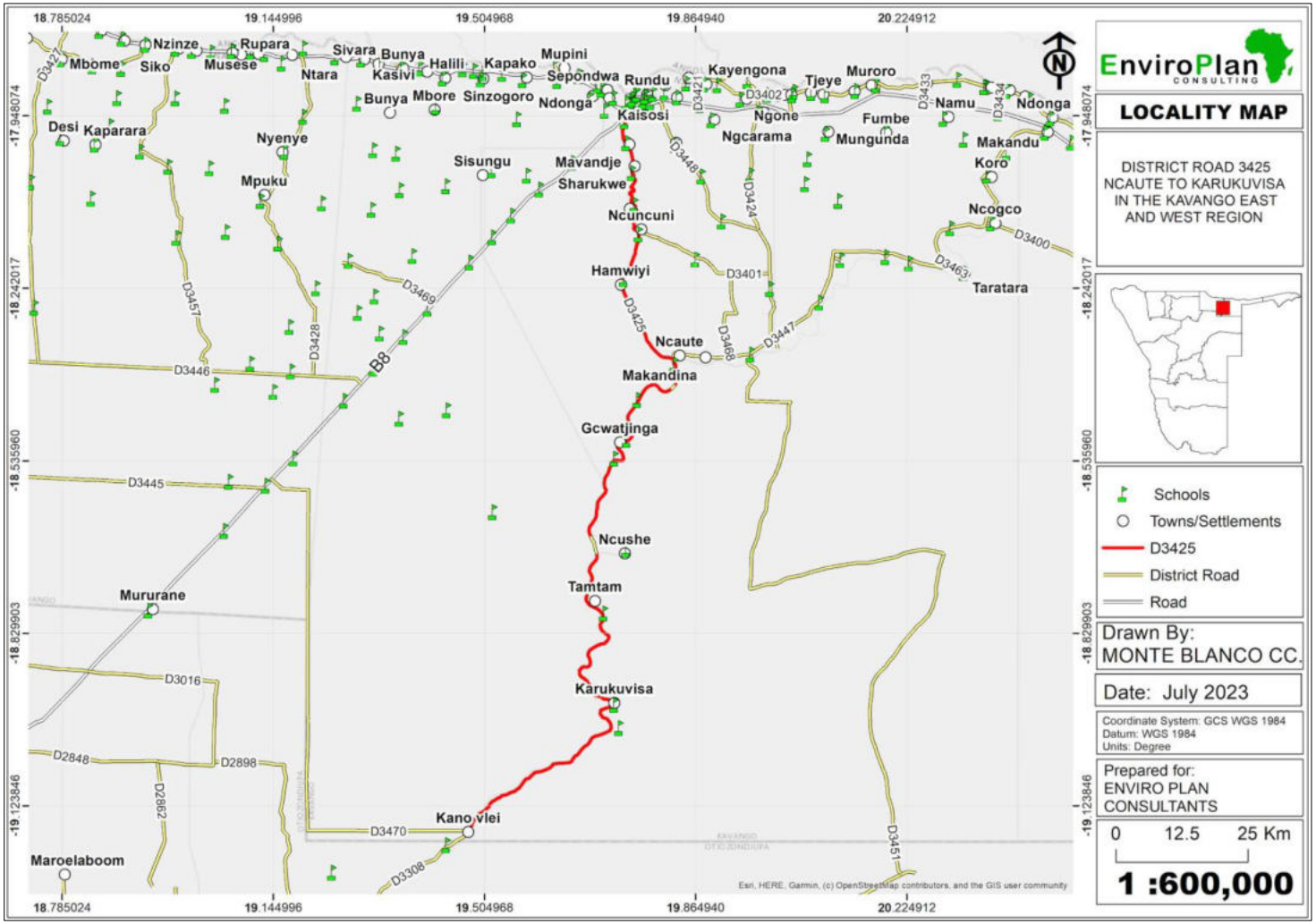

Figure 1: DR3425 route Locality.

1.4. Road characteristics

The subject road is a gravel road and it will be upgraded to LVS standard road. The project road is approximately 87km in length. The road is generally flat, with occasional dips where the roads largely follows the Omatako River pattern. The proposed road details are provided in Table 2 below.

Table 2: Project Area (DR3425) Details

Length of Road	87km
Road reserve	15m from the Centre Line
Regional Administration	Kavango East and West
Towns and settlements serviced by the road	Rundu, Ncaute, Gcwatjinga, Ncushe, Naingopo, and Karukuvisa

1.5. Materials Requirements

Construction materials for road construction will be obtained from the confirmed of the preliminary identified borrow pits (BPs) - as provided in detail in the ESR. These 8 borrow pit sites have been identified, pending materials testing result for the confirmed and final borrow pits. The BPs will be completely new. The abstraction of materials will be in a way that reduces the burrow pit slopes and allow for rehabilitation as well.

To minimize haul costs, borrow pits should ideally be spaced approximately 5km apart for selected sub-grade materials and 10km apart for sub-base and base materials as far as practicable. The materials investigation was conducted in accordance with the Roads Authority's Materials Manual.

The borrow pit field material investigations for the proposed road DR3425 were undertaken between the 8th and 13th of September 2023 as per the preliminary Materials Draft Report by Namibia Civil Engineering Laboratory (NCEL). This included test pit excavation, sampling and profiling of encountered material at pre-identified borrow pit (BP) sites. In total, eight (8) potential (preliminary) borrow pit sites were investigated at Chainage of km33, km43, km47, km54, km61.5, km68.5, km73 and km84. For the purpose of the ESIA Study, these borrow pits localities are marked in the ESR as BP1 (km33), BP2 (km43), BP3 (km47), BP4 (km54), BP5 (km61.5), BP6 (km68.5), BP7 (km73) and BP8 (km84).

2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Introduction

An important part of the ESMP is identifying and reviewing the administrative, policy and legislative situation concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in the project development and implementation. This section looks at the legislative framework within which the proposed project will operate under. The focus is on compliance with the legislation during the planning, construction and operational phases. All relevant legislation, policies and international statutes applying to the project are highlighted in Table 2 below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

The pursuit of sustainability by an Organisation is operationalised by a sound policy and legislative framework that gives operating parameters within its sphere of operation. In this section, relevant legal instruments, as well as their relevant provisions, are identified and analysed on their relevance to the proposed project. A concise explanation is given of the applicability of each of the identified pieces of legislation as well as how the Roads Authority is supposed to implement environmental compliance to the project. The summary of legal framework that governs project related environmental and social aspects as well as activities is provided in Table 3.

Table 3: Policies, legal and administrative regulations

Aspect	Legislation
The Constitution	Namibian Constitution First Amendment Act 34 of 1998
Archaeology	National Heritage Act 27 of 2004
	National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979
Environment	Environmental Management Act 7 of 2007
	EIA Regulations GN 57/2007 (GG 3812)
	National Solid Waste Management Strategy
	Pollution and Waste Management Bill (draft)
	National Waste Management Policy
	Soil Conservation Act 76 of 1969
	Hazardous Substance Ordinance (No. 15 of 1973)
	Atmospheric Pollution Prevention Ordinance, 1976
	National Policy on Climate Change for Namibia, 2010
	National Biodiversity Strategy and Action Plan (NBSAP2)
Land Use	Traditional Authority Act (Act No. 25 of 2000):
	Communal Land Reform Act 5 of 2002
Forestry	Forestry Act 12 of 2001

Aspect	Legislation
Water	Water Act 54 of 1956
	Water Resources Management Act, 2013 (Act No. 11 of 2013)
Health and Safety	Labour Act (No 11 of 2007) in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.
	Public Health and Environmental Act, 2015
Services and Infrastructure	Road Ordinance 1972 (Ordinance 17 of 1972) Road Traffic and Transport Act, No. 22 of 1999

3. CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

3.1. EMP Organisation, Responsibility and Authority

This section describes the key functionaries in the planning, implementation and monitoring of the EMP. Copies of this EMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

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

3.1.1. Site instruction entries

The Site Instruction Book entries will be used for the recording of general site instructions as they relate to the works on site and EMP measures. It will also be used for the issuing of stop-work orders issued by the ECO for the purposes of immediately halting any particular activities of the Contractor in lieu of the environmental risk that they may pose.

3.1.2. ECO diary entries

The purpose of these entries will be to record the comments of the ECO as they relate to activities on the site including infringements, possible changes to the EMP or work stop orders.

3.1.3. Method statements

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ESM. A method statement forms the baseline information on which sensitive area work takes place and is thus considered a “live document” in that modifications can be negotiated between the Contractor and EC if or as required. The Contractor (and, where relevant, any subcontractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the approved methodology. Changes in the methodology must be reflected by amendments to the original approved Method Statement. Amendments must be signed by both the EC and RE, denoting that the change is environmentally acceptable. The Contractor must also sign the amended Method Statement.

All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP main document. The Method Statement shall cover applicable details with regard to:

- Construction procedures;
- Materials and equipment to be used;
- How and where materials will be sourced and stored;
- The containment of accidental leaks or spills;
- Timing and location of activities; and
- Any other information deemed necessary by the ESM.

The Contractor must submit the method statement two weeks before any particular construction activity is due to start, especially with respect to impacts on sensitive ecosystems. Work may not commence until the method statement has been accepted by the EC and Engineer, and clearly communicated to the workforce. The Contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The RE or EC may require changes to a Method Statement if the proposal does not comply with the specifications or if, in the reasonable opinion of the RE or ESM, the proposal may result in damage to the environment in excess of that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

All Method Statements listed below, shall be provided by the Contractor before the activity commences:

(i) *Bunding*

Method of bunding for static plant and bulk fuel storage.

(ii) *Camp establishment and fencing*

- *Location and layout of the Contractor's Camp.*
- *Method of installing fences required for working areas and Contractor's Camp.*

(iii) *Concrete batching*

Location, layout and preparation of concrete batching facilities, including the methods employed for mixing of concrete including the management of runoff water from such areas.

(iv) *Bulk earthworks*

Location, layout, silt/sediment management and the management of runoff from bulk earthworks areas.

(v) *Demolition*

Proposed method of demolition, including handling and disposal of materials.

(vi) *Dust*

Dust control protocol.

(vii) *Fire and hazardous substances*

- *Handling and storage of hazardous wastes.*
- *Emergency spillage procedures and compounds to be used.*
- *Emergency procedures for accidental fire.*
- *Methods for the disposal of hazardous materials.*

(viii) *Fuels and fuel spills*

- *Methods of refuelling vehicles.*
- *Details of methods for fuel spills and clean-up operations.*

(ix) *Protection of archaeological resources*

Methods for dealing with archaeological resources in the event that any are found.

(x) *Protection of environmentally sensitive resources (fauna and flora)*

- *Methods for dealing with conservation areas or areas identified as environmentally sensitive requiring protection.*
- *Locality and preparation of onsite nursery to house vegetation relocated from construction areas or propagated locally for replanting purposes.*
- *Details of methods dealing with the identification, transportation and transplanting of*

flora species of conservation value.

- *Details of methods dealing with the identification, capture and relocation of fauna species of conservation value.*

(xi) *Rehabilitation*

Rehabilitation of disturbed areas and borrow pits after construction is complete.

(xii) *Settlement ponds and sumps*

Layout and preparation of settlement ponds and sumps.

(xiii) *Solid waste management*

Solid waste control and removal of waste from Site.

(xiv) *Sources of materials*

Details of materials imported to the Site (where applicable).

(xv) *Topsoil handling and stockpiling*

Details on stripping, handling and stockpiling of topsoil.

(xvi) *Wash areas*

Location, layout, preparation and operation of all wash areas.

(xvii) *Storm water management*

Details of how storm water is to be handled on Site.

3.2. Environmental Education

Before any work is commenced on the Site, the entire Contractor's staff including foremen shall attend an environmental education talk, presented by the EC with the assistance of the Contractor. The Contractor shall liaise with the EC prior to the commencement date to fix a date and venue for the talk. The Contractor shall ensure that all the employees attend the talk.

Follow-up education talks shall be held for any new employee/s coming onto Site from time to time. The EC shall ensure that all attendees sign an attendance register, and shall provide the ECO with a copy of the attendance register.

3.3. Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ECO diary, induction records, method statements) must be kept together in an office where it is safe and can be retrieved easily. All relevant records should be kept for a minimum of two years after construction and should at any time be available for scrutiny by any relevant authority or stakeholder.

It is recommended that photographs (fixed-point photographs for better comparisons before/during/after) are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with related documents and other records related to this EMP.

3.4. Environmental Completion Statement

An Environmental Completion Statement will be prepared by the EC for submission to the Department of Environmental Affairs (Ministry of Environment and Tourism) indicating completion of the project and compliance with the EMP and conditions. This statement will be prepared after the final audit after the rehabilitation phase.

3.5. Roles And Responsibilities

3.5.1. Duties and Powers of the Environmental Consultant (EC)

The Environmental Consultant is ultimately responsible for:

- The environmental and social consultant will be responsible for the periodic monitoring and evaluation of EMP implementation.

- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications via the RE.
- Auditing the implementation of the EMP and EMP compliance on a monthly basis.
- Undertaking a continual review of the EMP and recommending additions and/or changes to the document.
- The management and continuous monitoring of the implementation of the EMP on a daily basis will be the responsibility of the Resident Engineer.

3.5.2. Duties and Powers of the Resident Engineer

The Resident Engineer is ultimately responsible for:

- The Resident Engineer (RE) of the Consulting Team will act with restricted powers and responsibilities as delegated by the Engineer in writing.
- For this project it is envisioned that the function of the Environmental Control Officer (ECO) will only require part time inputs. The RE may fulfil the function of the ECO thereby taking responsibility of the ECO's duties (see below) on this project.
- Any on-site decisions regarding environmental management are ultimately the responsibility of the RE with consultation with the environmental Consultant. Therefore, the RE must assign the role of ECO to a competent member of its site supervising team. The RE shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:
    - Ensuring that the necessary environmental authorisations and permits have been obtained by the Contractor.
    - Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary.
    - Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
    - Issuing fines for transgressions of site rules and penalties for contravention of the EMP.

3.5.3. Duties and Powers of the Environmental Control Officer

The Environmental Control Officer (ECO) will be a competent person determined by the RE to fulfil the role as the Employer's representative to monitor and review the on-site environmental management and implementation of this EMP by the Contractor.

The ECO's duties will include the following:

- Assisting the RE in ensuring that the necessary environmental authorisations and permits have been obtained.
- Maintaining open and direct lines of communication between the RE, Employer, Contractor, and interested and affected parties with regard to environmental matters.
- Facilitating all communication between the local community and the contractor.
- Regular site inspections of all construction areas with regard to compliance with the EMP.
- Monitoring and verifying adherence to the EMP by verifying that environmental impacts are kept to a minimum.
- Taking appropriate action if the specifications are not followed.
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP via the RE.

3.5.4. Duties of the Contractor

The contractor shall be responsible for the implementation of the EMP and the action plan, onsite monitoring and evaluation of the EMP through the following;

On the on-set of the project, the contractor through an Environmental Officer shall:

- Develop a Hazard Identification and Risk Assessment report on the on-set of the project to be approved by the environmental Consultant.
- Developing a waste and contractors camp management plan to be approved by the environmental consultant
- Submit a monthly Environmental Performance report to the Environmental Consultant.

In addition, the Contractor shall furthermore ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMP.

The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

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

The induction programme should be developed and submitted to the RE and environmental consultant for approval.

NB: The Contractor shall clearly describe the overall methodology proposed for the task specific related activities in particular method statements. All method statements must take environmental requirements into account.

3.6. Financing of Environmental Control

Financing of the environmental requirements as outlined in this document, apart from the appointment of the ESM and specialists, is the sole responsibility of the Contractor appointed by RA.

Therefore, it is accepted that the cost incurred for implementing this EMP by the Contractor would be allocated for in the tender document. Any responsibilities not defined in this document or where any uncertainties arise in this matter will be the responsibility of RA.

3.7. Amendments of the EMP

Any party involved with the project can suggest changes to the EMP via the EC or RE. Such suggestions will be discussed with the Environmental Forum. Approved changes will be minute and drafted into the existing EMP in the form of an appendix or amendments.

3.8. Procedures for non-compliance

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the RE to impose a penalty. This applies to the Environmental Management Plan (EMP).

In the event of non-compliance, the following recommended process shall be followed:

- The RE shall consult the environmental consultant and if agreed, issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the RE with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the RE shall impose a monetary penalty based on the conditions of contract.
- In the case of the Contractor being unable to remedy the situation due to permanent environmental damage already incurred, the RE shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the RE shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion etc, between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP etc., any party shall be entitled to require that the issue be referred to independent specialists for determination.
- The RE shall at all times have the right to stop work and/or certain activities on site in the case of safety and EMP non-compliance or failure to implement remediation measures.

3.9. Fines and Penalties

The following fines and penalties are in place for transgressions listed below. It will be issued after the procedures contained herein has been duly followed and only in severe cases and after repeated non-compliance. The graveness of the transgression is justified by each specific penalty.

FINES

Fines may be issued per incident at the discretion of the RE. Such fines will be issued in addition to any remedial costs incurred as a result of noncompliance with the EMP. The RE will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.

Fines for the activities detailed below, will be imposed by the RE on the Contractor and/or his Subcontractors.

Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a "no-go" area.	N$2,000
Any vehicle guilty of reckless driving on and in the vicinity of the site, including excessive speeds.	N$1,000
Any vehicle being driven and items of plant or materials being parked or stored outside the demarcated boundaries of the site.	N$2,000
Persons repeatedly walking outside the demarcated boundaries of the site.	N$1,000
Persistent and un-repaired spilling of hazardous materials and materials causing pollution.	N$3,000
Persistent littering on site.	N$500
Individuals repeatedly not making use of the designated toilet facilities.	N$200
Disposal of waste other than agreed on in the waste management plan.	N$5,000
Deliberate lighting of illegal fires on site (e.g. outside of the designated camp site).	N$2,000

For each subsequent similar offence, the fine may, at the discretion of the RE, be doubled in value.

The RE shall be the judge as to what constitutes a transgression in terms of this document.

PENALTIES

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is deemed NOT to have complied with this specification if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of the specification; environmental damage due to negligence;
- Safety of contractor personnel and public being compromised due to negligence;
- the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time;
- the Contractor fails to respond adequately to complaints from the public; and
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The RE will be responsible for a report on the non-repairable damage and / or non-compliance with visual and other evidence as well as issuing the penalty to the contractor with the report attached.

A copy must be handed to the ECO.

Table 4:The following penalties are suggested for transgressions:

Actions leading to erosion:	A penalty equivalent in value to the cost of rehabilitation plus 20%.
Oil spills:	A penalty equivalent in value to the cost of clean-up operation plus N$1,000.
Damage to indigenous vegetation:	A penalty equivalent in value to the cost of restoration plus N$2,000.
Damage to trees:	A penalty to a maximum of N$5,000 shall paid for each tree removed without prior permission, or a maximum of N$2,000 for damage to any tree, which is to be retained on site.
Damage to indigenous vegetation:	A penalty equivalent in value to the cost of restoration operation plus N$2,000.
Damage to sensitive environment:	A penalty equivalent in value to the cost of restoration operation plus 20%.
Damage to cultural sites:	A penalty to a maximum of N$100,000 shall be paid for any damage to any cultural historical site.
Damage to natural fauna:	A penalty to a maximum of N$2,000 for damages to any natural occurring animal.
Accident due to safety negligence:	A penalty to a maximum of N$50,000 for injuries to personnel or public.

4. CHAPTER FOUR: ENVIRONMENTAL MANAGEMENT PLAN

4.1. Planning and Design Phase

The environmental and social management measures for the planning and design phase are provided in Table 5 below.

Table 5: Planning and design Phase: Environmental and social management measures

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
High unemployment rates.	'Outsiders' are often given the employment opportunities.	During drafting of tender documents, the consultant shall include provisions designed to maximise the use of local labour. All unskilled labour shall be sourced from local communities. Specific recruitment procedures shall be spelled out.	-Ensure that contractors that tender make provision for detailed recruitment plan in their tender application	Engineering Consultant (EC) in partnership with the constituency councillor will determine employment considerations.
	Gender inequality.	At least 25% of recruits must be women for non-strenuous jobs.		
Health and social pathology.	• Increased prostitution and associated social pathologies and health risks • Sex workers are hired from the local communities by the construction team.	• Prior to commencing construction, the risk of an increase in the spread of HIV/AIDS should be explained to regional health authorities and partners be identified amongst all stakeholders to formulate a joint programme to limit the spread of HIV during the construction period. • Particular provisions shall be worked into the tender documents for the contractor to approach the Ministry of Health and Social Services to co-opt a health officer to facilitate HIV/AIDS education programmes periodically on site.	-Ensure that contractors that tender make provision for the co-opting of an HIV/AIDS health officer from the regional health office in their tender application	Consulting Engineer in partnership with National and Regional HIV task forces and NGO's working in the field
	• Health and safety risks to the workers and public due to uncontrolled	Prior to construction all construction workers should undergo environmental induction.	-Ensure that contractors that tender make provision for environmental induction	EC

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
	access to the public during construction • Unsafe traffic conditions • The lack of personal protective clothing, etc.		in their tender applications	
Hazardous road conditions	• Obstacles in road as a result of construction activity. • Changes in design speeds • Road detours	Design an information campaign to sensitise the general community with regard to the increased design speeds along the road and general road works.	-Ensure that contractors that tender make provision for an information campaign in their tender application	EC
Conflict	• Nuisances caused by the building contractor • Lack of communication between contractor and community	• A meeting should be arranged with the local community once the contractor has been appointed. • The contractor shall appoint an ECO from the construction team to take responsibility for the implementation of all provisions of this EMP.	-Ensure that contractors that tender make provision for the appointment of an ECO in their tender application -Arrange a meeting once contractor has been appointed	CE, EC, ECO
Compensation for land use (borrow pits)	• Lack of consultation, clear communication and clarity on the compensation policy	• Compensation should be communicated and explained clearly to the affected landowner/land custodian (Headmen of the respective villages / Traditional authority). • The landowner should be compensated fairly and in accordance with the Policies and ensure harmony throughout the process.	-The construction contractors make provision for compensation of land loss due to construction activities	CE, Contractor and monitored by the EC

4.2. Construction phase

The environmental and management measures for implementation during the road construction phase are provided under Table 6 below.

Table 6: Construction Phase: Environmental and social management and mitigation measures

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Conflict	• Communities dissatisfied with the activities • Nuisances caused by the building contractor	• Clear communication between contractor and community and farmers, on the schedule/timeframe for operations and the duration of the construction phase. This should be provided for in the form of a Public Consultation Plan (PCP) which should include at least: o One meeting for site-handover and to introduce the local community and farmers to the Contractor o A system for the on-going management of the communication between the Contractor and local community and farmers, which should include: ▪ A means for lodging a complaint concerning construction activity ▪ Provision of feedback to the plaintiff from the Contractor stating how the issue is being addressed ▪ Report back on issues raised and how addressed from the Contractor to the RE and client	-Minutes of meetings -Draw up PCP	RE, EC and Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• RE and contractor should present detailed construction programme during a meeting with the local community and farm owners.		
		• Ensure that relevant stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the RE and client. • The contractor shall appoint a person from the construction team to take responsibility for the implementation of all provisions of this EMP.	-Meetings and communication.	RE, EC and Contractor.
	Delayed construction, which has cost implications and causes low user satisfaction.	Programme delays into the schedule and communicate this to the community.	-RE and Contractor to constantly monitor delays and adapt programme accordingly. -Constantly update communities on delays and latest schedules.	RE and Contractor.
	Poaching and trapping	• Poaching or trapping of animals is strictly prohibited and is a criminal offence.	-RE, EC and Contractor to monitor	Contractor.
Dangerous work area	Existence of dangerous/hazardous work areas	• The work areas must be set out and isolated and demarcated by means of danger tape on a daily basis. The demarcated work area	-Inspections for approval.	RE and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		may only contain materials, equipment, and personnel required to execute the work. • Once the work for the day is completed, the demarcated area must be cleaned of any spilled materials and waste products. This must be disposed of in the allocated containers. • If the work area is dangerous or sensitive, the danger tape should stay in place until work is complete or not sensitive anymore.	-Record excavation/backfill schedule in the site instruction records.	
Threats to the health and safety of construction workers.	• Insufficient provision of safety equipment • Negligent behaviour	• The contractor must adhere to the regulations pertaining to health and safety, including the provision of protective clothing, failing which the contract may be suspended with immediate effect. • Failure to remedy such lack of provision may result in the immediate cancellation of the contract according to the clauses stipulated in the Specific and General Conditions of Contract. • The contractor should comply with all relevant labour laws as stipulated by the Labour Act. • First aid kits to be readily available in case of injuries	-Regular visual inspection and records kept of safety equipment and materials issued.	RE and Contractor.
		Dust protection masks shall be provided to staff members if they complain about dust.	-Regular inspections and attendance to work complains.	RE, EC and Contractor.
		Workers in the vicinity of sources of high noise should wear necessary protection gear.	-Regular Inspection	RE, EC and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		NO person is allowed to smoke close to fuel storage facilities and in portable toilets at the construction site since the chemicals used in chemical toilets are highly flammable.	-Regular Inspection.	RE, EC and Contractor.
		Workers should not be allowed to make use of the existing neighbourhood facilities. Potable water must be provided to workers to avoid dehydration.	-Regular Inspection.	RE, EC and Contractor.
		Portable toilets should be available at the construction site in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males.	-Regular Inspection.	RE, EC and Contractor.
	Low productivity and increase health risk of workforce due to high temperatures.	• Provide hats, ample drinking water • Provide regular breaks.	-Daily checking of weather forecast.	RE, EC and Contractor.
	Fire incident.	• Foam and serviced fire extinguishers must be in close proximity to fuel kept on site and one extinguisher at the camp. • There should be two to three trained personnel and equipped with basic firefighting skills • At least two extinguishers should be placed in the workshop. • No open fires to be created by project personnel on and around the site.	-Foam fire extinguisher should be available when work commences.	RE, EC and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• Consider using gas or paraffin cooks to prepare food instead of open fires. The cooks/stoves fire should be put out before leaving the camp. • Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarettes' fire is completely put out to and disposed of in allocated bins at the smoking area. • Potential flammable areas and structures such as fuel storage tanks should be marked as such with clearly visible signage. • Raise awareness to workers on the impact of careless handing of fires and flammable substances onsite.		
Health and social pathology.	• Increase prostitution and associated social pathologies and health risks • Sex workers are hired from the local communities by the construction team.	• Prohibit unauthorized people on site and secure construction area, while monitoring entrance and exits. Contract penalties. Workers are not allowed to reside on the construction site.	-Daily monitoring by contractor. -Record visitors in a site-visit book	Contractor
	• Health and safety risks to the workers and public due to uncontrolled access to	Specify health and safety risk avoidance measures.	-Daily monitoring by contractor	Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	the public during construction • Unsafe traffic conditions, the lack of personal protective clothing, etc.			
Alcohol abuse.	Use of alcohol on construction site.	At no stage may a construction worker be allowed on site under the influence of alcohol or any narcotic substances.	-Daily monitoring by contractor. -Spot checks.	RE and Contractor
Lack of privacy.	Intrude on neighbouring properties.	Under no circumstance are workers allowed to intrude on neighbouring properties.	-Regular monitoring by RE.	RE and Contractor
CONSTRUCTION AREA				
Disorderly and unwanted settlement in the road reserve	Informal market stalls providing services to construction workers	• In consultation with the regional council and traditional authorities, to determine the conditions for of market stalls next to the road and at lay-byes. • No settlement will be allowed.	-Set conditions for market stalls -Regular inspection of site	Contractor
Construction site	Visual nuisance of the construction activities.	• The boundaries of the construction area shall be demarcated prior to any work commencing on the site • The construction area should be clearly marked.	-RE and Contractor should agree on demarcation lines.	RE, EC and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	Improper conduct on construction site.	• The construction area should adhere to the following requirements: • Access should be controlled and only workers allowed within the boundaries of the campsite: ○ Records should be kept and all visitors should sign in and sign out of a visitors logbook • The contractor should in no way permit or allow prostitution to take place at the construction area.	-Regular visual and record inspection by the RE.	RE, EC and Contractor.
Campsite Establishment				
Negative impact on the social and ecological environment.	Establishment of campsite.	• One campsite should be established for all construction activity (i.e. for all three sites). • The contractor must negotiate the use of existing facilities before considering entering new terrain. • The contractor must receive approval to use a facility or land in writing. This approval must state the remuneration and conditions of use. • Devise a layout for the site so that internal circulation of workers and vehicles in relation to the various construction functions is optimised.	-Contractor and Re should agree on a satisfactory area.	Contractor with approval of the Client, EC and RE
	Conduct on campsite.	• No one is allowed to reside on the campsite, save for construction personnel.	-Daily monitoring by contractor.	Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• The campsite may act as a facility for the storage of construction material, temporary stockpile sites, and fuel installations etc, required by the Contractor or subcontractors and suppliers. • Materials must be stored in a separate closed-off premise that is sufficiently prepared to protect the environment for pollution, such as impermeable floors, closed containers and a security fence.		
	Stockpiling materials on site.	• Stockpile materials such as bricks, sand, and stones in neat piles store sensitive materials such cement, hazardous materials, and consumables separately in a demarcated area on site. • Store only small amounts of materials on site to avoid unsupervised use that may lead to accidents and spills.	-Daily monitoring by contractor. -Regular visual and records inspection by the RE.	RE and Contractor.
		• Stockpiles must be of a safe height of less than 2m high and 45° slope angle. Cement stacks must not be higher than 1.5m. • Protect all fluids containers from low temperatures to avoid leaks and pollution.	-Regular visual and records inspection by the RE.	RE and Contractor.
BIOPHYSICAL ENVIRONMENT				
Drainage issues.	Surface run-off.	Surface protection work is recommended on the river bed.	-Daily inspection of the surface protection work.	EC, Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Soil erosion and compaction	Unnecessary soil disturbance and excavations	• Stockpiled topsoil and materials should be used to backfill the excavated and disturbed site areas such as borrow pits. • Topsoil stripped from certain site areas to enable project works and can be returned to its initial position, should be returned. This is to avoid unnecessary stockpiling of site soils which would leave them prone to erosion. • Vehicles/machinery should stick to access roads provided and not to unnecessarily create further tracks on and around the site by driving everywhere resulting in soil compaction and erosion. • Unnecessary off-road onsite and neighbouring areas is strictly prohibited. Stick to approved site access roads.	-Daily inspection of the surface protection work	EC, Contractor.
Soil pollution	Garbage, cement, concrete, sewage, chemicals, fuels, oils or any other objectionable or undesirable material.	• Hazardous waste should be disposed of in the prescribed manner in order to prevent contamination of soils (see waste management heading). • In case of accidental spills, the contaminated soil must be suitably disposed of in a container for hazardous waste.	-Daily monitoring and regular visual inspection by contractor.	EC, Contractor
	Soil pollution by fuel leaks	• If fuel is stored at the construction camp, fuel tanks must be properly bunded. The volume of the bunded area must be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area must be impermeable and the sides high enough to achieve the 1.5 times holding capacity.	-Daily monitoring by Contractor and regular visual inspection by RE	EC, Contractor
		• Drip trays should be available for all equipment that is intended to be used during construction. These trays should be placed	-Daily monitoring and regular visual	EC, Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		underneath each vehicle while the vehicles are parked. The drip trays should be cleaned every morning and the spillage handled as hazardous waste.	inspection by contractor.	
	Soil pollution by cement mixed on the ground.	• Under no circumstances should cement be mixed on open soil. A designated metal container should be made available for this purpose.	-Daily monitoring by Contractor and regular visual inspection by RE	EC, Contractor
	Cleaning of equipment.	• All cleaning of equipment should take place within the construction site and the water from washing operation should be collected in a tank and disposed of in agreed manner.	-Daily monitoring by Contractor.	EC, Contractor
	Heavy vehicles/ movement of vehicles across site.	• The movement of vehicles to and across the site should be controlled. Construction material required should be moved to where it is needed by means of wheelbarrows (when possible) instead of trucks thereby minimizing the impact on the soil. • For the safety of the homestead residents and immediate community members who utilize the existing access path (for BP access), the contractors should create safer routes to be used by the road construction vehicles only and avoid the existing community (homestead) path.	-Daily visual inspection and monitoring by Contractor.	EC, Contractor
Vehicular movements	Irresponsible driving and operations on/around sites	• Project goods, materials and services should be delivered to site once to twice a week, maximum.	-Inspection of the site by the RE and EC	Contractor, CE and EC/ECO

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• Operators of the vehicles and machinery should be in possession of valid and appropriate driving/operating licenses and adhere to the road safety rules. • The site speed limit should be slowly (40km/hour or less) and be on the lookout for people (children, especially) and animals. • The site access roads should be equipped with temporary clear, and visible road signs. • All vehicles should be road worthy and serviced regularly to avoid accidents owing to mechanical faults of vehicles. • No vehicle driver or machine operator should be allowed to operate vehicles/machinery while under the influence of alcohol or drugs. • Vehicles should be parked within the demarcated areas for such purpose onsite. • Site deliveries from and to site should be done during weekdays and between the hours of 8am and 5pm.		
Dust Generation and gas emissions	Dust from movement of heavy vehicles and earthworks	• Vehicles should not be driven at a speed more than 40 km/h to avoid dust generation. • At problematic areas onsite, a reasonable amount of water should be used by using regular water sprays to suppress the dust that may be emanating from such sites.	-Inspection of the site by the RE and EC	Contractor, CE and EC/ECO

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• Dust masks, eye protective glasses and other respiratory personal protective equipment (PPE) such as face masks should be provided to the workers on site excavation based areas, where they are exposed to dust as well as heavy machinery operators. • Machines, and vehicles should be regularly maintained to ensure efficiency and reduce dust generation and harmful gaseous emissions.		
Borrow Pit Sites	Sand mining/ road material mining	• The contractor in consultation with the Environmental Consultant and/or RE should visit all potential excavation sites prior to excavation. The engineers and surveyors must then draft a plan for approval before commencement of excavations. This plan must indicate the required resources and sensitive areas that may not be mined (indication of the mature trees). • No removal of trees with a stem diameter of 200mm or more. Protect clusters of trees and individual trees with a space buffer of at least 5m. • The top 150mm of topsoil must be stored separately for use to rehabilitate the borrow pit. • The removal of material at excavation sites shall be focused where the least significant vegetation exists. • The contractor shall liaise with the applicable local residents and or traditional authority regarding the location of excavation sites. • No borrow pit may be excavated from any sensitive or open space areas.	-Contractor and environmental consultant to visit all potential excavation sites.	EC, Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Accidental disturbance of archaeological or heritage objects	Inadvertent destruction or disturbance of archaeological resources during site clearing and earthworks	• Upon discovery or unearthing of archaeological materials or human burials or skeletal remains, the work in the immediate area should be halted, the finds would need to be reported to the NHC may require inspection by an Archaeologist. The ECO should have the area fenced off and contact NHC (Tel: +264 61 244 375), National Forensic Laboratory (+264 61 240 461) immediately. • Buffer zones of 1km from any significant archaeological, historical or cultural heritage sites or finds should be maintained around. This includes graves, stratigraphic profiles, or past human dwellings, and areas with cultural significance. These can be a demarcation by fencing off or avoiding the site completely by not working closely or near the known site. • -Direct damage to archaeological or heritage sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued. • -All accidental discoveries shall be reported immediately to an archaeologist/heritage practitioner so that an investigation and evaluation of the finds can be made, acting upon advice the ECO / EC will advise the necessary actions to be taken; • Any pile of stones or mound of the earth looking even remotely like a grave should be avoided at all costs (this could be a grave). • Cognizance must be taken of the larger historical landscape of the area to avoid the destruction of previously undetected heritage		

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		sites. Should any previously undetected heritage or archaeological resources be exposed or uncovered during the project activities, these should immediately be reported to the heritage specialist or heritage authority (NHC). • The Proponent and Contractors should adhere to the provisions of Section 55 of the National Heritage Act in the event significant heritage and cultural features are discovered in the course of developmental works.		
WATER CONSERVATION				
Irresponsible use of water.	Water wastage due to careless practices during construction.	• A Borehole drilling permit as well as Groundwater abstraction and use permit should be applied for from the MAWLR prior to boreholes drilling and water abstraction, respectively. • Establish a water plan which, should include at least the following: o A description of: ▪ The source of the water ▪ Where and how the water will be stored ▪ How the water will be distributed/utilised o Describe measures that will be taken to conserve water at each of the above mentioned phases	-Daily inspections and condition reports.	RE, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• Educate the work force on sustainable and effective use of water, e.g. clean equipment in containers. • No member of the construction team is allowed to wash clothes or vehicles on the construction site.		
	Leaks from tanks and taps.	• Water should be used sparingly throughout the construction duration. It is the responsibility of the site coordinator to ensure that water conservation is strictly enforced.	-Daily inspections and condition reports.	RE, EC and contractor.
		• Water tanks / taps must be fixed. The water tank or taps must have water meters and be accessible to visual inspection. All faulty and leaking taps and pipes shall be immediately repaired.	-Daily inspections and condition reports.	RE, EC and contractor.
Groundwater contamination.	Refuse, garbage, cement, concrete, chemicals, fuels, oils or any other objectionable or undesirable material.	• Accidental spills must be cleaned immediately to avoid the pollution of the wetland, and ground water, since the soil around the site is highly permeable. • No member of the construction team is allowed to wash clothes or vehicles on the construction site.	-Inspection daily, reporting, and regular clean up.	RE, EC and contractor.
CONSERVATION OF VEGETATION				
Loss of biodiversity	Clearing of vegetation (removal of trees etc).	• The area to be constructed on the site, as well as lay-down areas, access routes, etc should be clearly demarcated. The workforce must be instructed to operate within these boundaries. Any activity resulting in the chopping down of trees or removal of vegetation without the required authorisation is strictly prohibited. • All protected tree species should be tagged so that they are visible during construction works.	-Regular review of photographic records. Take photographs before construction starts as a record. -Monitoring by the EC	RE, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	Planting of alien vegetation.	• No alien vegetation may be introduced to the site in the form of seeds or plants, for beautification or any other reason. • At the end of construction all alien vegetation that has established should be eradicated.	-Regular inspection of site vegetation by the EC.	RE, EC and contractor.
WASTE MANAGEMENT:				
Construction waste.	Incorrect or infrequent disposal of building rubble.	• Construction waste should be stored in skips and should regularly be removed off the site for disposal at an applicable municipal waste disposal site.	-Regular inspection on site.	RE, EC and contractor.
	Construction waste blown by wind (e.g., cement bags).	• Empty cement bags, plastics, wrapping waste, strapping, etc. to be secured in containers for general waste to prevent wind-blown waste.	-Daily inspection and clean up.	RE, EC and contractor.
Increased general waste.	Domestic waste from construction team.	• Waste shall be separated according to cardboard/paper materials, plastic, bottles and tins. • The various waste types shall be disposed of at appropriate municipal and recycling facilities. • Appropriate containers shall be placed on site for waste separation and the workforce trained sensitised accordingly. • Only the general waste, which cannot be recycled shall be disposed of at the municipal waste disposal facility.	-Daily inspection and clean up.	RE, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Domestic waste.	Domestic waste from construction team.	• The workforce must be sensitised to dispose of waste in a responsible manner and not to litter, not at the construction site and not at the campsite. • Sufficient waste bins should be supplied.	-Daily inspection and clean up.	RE, EC and contractor.
		• Domestic waste which cannot be recycled should be stored in a skip and removed via truck once a week.	-Regular inspection.	RE, EC and contractor.
Hazardous waste.	Accidental / negligent spillages from equipment working on site.	• Spillages of any potentially toxic materials, whether by accident or through negligence, must be scooped up immediately into drums. • All waste hydrocarbon material should be collected and stored in appropriate containers and transported off-site to a suitably qualified third party which routinely handles such waste. An example is Oiltech Namibia (https://oiltech.com.na/). The City of Windhoek also has facilities to handle hydrocarbon waste (http://www.windhoekcc.org.na/depa_infra-solid_waste_management.php).	-Daily inspection and clean up.	RE, EC and contractor.
	Storage of hazardous materials.	Bitumen products waste, oil sludge, oily rags, contaminated spill clean-up materials, contaminated soils and other hazardous materials waste must be kept off-site or in a dedicated separate container on site. These containers must be locked and only accessible by the site foreman. Wesco Group should be approached to collect these wastes periodically or as needed.	-Daily inspection and clean up.	RE, EC and contractor.
Ablution waste.	Construction team.	• Only portable chemical toilets should be used on site and at the campsite. Under no circumstances may the waste from these toilets be dumped in the veld. The waste should be removed at least once a week to the nearest municipal sewage site.	-Daily inspections and clean-up.	RE, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		Alternatively, it may be pumped out into sealable containers and stored until it can be removed by truck. If stored, the containers should be kept out of direct sunlight and should not be stored for longer than a month. People responsible for cleaning these toilets should be provided with latex gloves and masks. • Spillage or leakage to be cleaned-up and fixed immediately.		
DUST CONTROL:				
Dust generation.	Dust proliferation due to fines content of soil.	• Soil stacks should be placed downwind from the main activity areas and from the road detour. • All construction areas and soil stacks should be regularly wetted.	-Visual monitoring for dust nuisance and safety	RE, EC and contractor.
NOISE CONTROL:				
Noise generation.	Noise from vehicles and construction activities.	• All machinery should be calibrated and maintained regularly. • No construction activities should be done during night-time hours, i.e., between 18h00 to 07h00 and over weekends.	-Daily monitoring. -Complaints from neighbours. -Records of how these have been addressed.	RE, EC and contractor.

4.3. Post-Construction Phase

The environmental and management measures for post-construction phase and rehabilitation are provided under Table 7 below.

Table 7: Post-construction Phase: Environmental and social management and mitigation measures

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
Hazardous unattended construction site	-Temporary structures, equipment, materials, waste and facilities used for construction activities.	• Clear and clean the construction site to the satisfaction of the RE. • Any temporary setup on site should be dismantled, and the area rehabilitated as far as practicable, to their original state.	-Inspection of the site by the RE	RE, EC
Unsightly borrow areas	-Unstable slopes of unrehabilitated borrow pit. -Loose sediment washed away from unstable slopes.	• Shape all sides of the borrow pit to 30° to horizontal. Rip the terrain and access routes and replace the stored topsoil evenly over the terrain. • The stockpiled topsoil should be levelled soon after completion of works at sites. Some of the stockpile materials should be used for rehabilitation	-Inspection by RE, EC after rehabilitation.	Contractor, EC and Engineer.
Rehabilitation of borrow pits	-Unfenced/unsecured and unrehabilitated borrow pits	• Complete rehabilitation of borrow pits is impossible, because one would need to get materials elsewhere to fill up the pit and this leaves another pit at that area where one gets materials. Therefore, the contractor should level the borrow pits as far as possible to make them less dangerous so that the pits or some of them can be used for future purposes such as water storage structures or landscaped into attractive recreation areas. • Borrow pits can also be rehabilitated by using stockpiled materials that were removed from the top layers of the pits to raise the base or fence off the borrow pits that pose as a hazard to the communities and cannot be safely rehabilitated.	-Inspection by RE, EC after rehabilitation.	Contractor, CE and EC/ECO

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
		• Respective landowners and community leaders (for communal land) should be consulted to approve and sign off Borrow Pit Rehabilitation Completion to their satisfaction.		
Monitoring of borrow pits	-Lack of monitoring of the efficiency/success of borrow pit rehabilitation	• Annual inspections should be carried out on all rehabilitated borrow pits to determine rehabilitation success and assess any potential weed infestations. • Additional seeding may be carried out using local species if adequate vegetation growth has not been achieved using the seed bank in topsoil. • If any weeds are present, weed control measures will be undertaken.	-Inspection by RE, EC after rehabilitation.	Contractor, CE and EC/ECO
Construction waste	-Improper handling of wastes towards the end of construction	• All waste generated and stored on site during construction works should be classified/sorted accordingly and disposed of at an approved nearest solid waste management sites.	-Inspection by RE, EC after rehabilitation.	Contractor, CE and EC/ECO

5. CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

Arising from the analysis by the consultants, the proposed project has environmental and social impacts on the proposed project site. Owing to the fact that the areas needs to be developed with infrastructure, there should not be detrimental environmental degradation, thus the EMP provides for the sustainable development of the road.

5.2. Recommendations

In order to alleviate any negative impacts that may emanate from the road upgrade project, the contractor and RA should follow recommendations as follows:

5.2.1. Environment Management Plan Recommendations

In order to ensure a healthy and safe environment in the proposed site and its environs, a plan for environmental management has to be instituted through monitoring. This involves the collection and analysis of relevant environmental data as well as periodic documentation and reporting.

5.3. External Auditing

The key to a successful ESMP is appropriate monitoring and review to ensure effective functioning of the ESMP and to identify and implement corrective measures in a timely manner. In the event that discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the operational phase of the facility to ensure adherence to the management measures contained in the EMP.

5.4. Recommendation to MEFT

Considering the potential impacts associated with the proposed planning, design and upgrade of the DR3425 to LVS, and the mitigation measures contained in this EMP, EnviroPlan Consulting hereby recommends that the ECC application is approved and issued an ECC on condition that the Proponent will ensure complete compliance to the developed ESMP and ECC conditions.

6. ENVIRONMENTAL MONITORING AND REPORTING

EC: ENVIRONMENTAL MONITORING REPORT

Report No:…… Date:……

Method Statements	Contractor:	Date received:

Issue	Observation	Remedial action	Compliance
1 Construction			
1.1 All plant, personnel, etc. restricted to works area?			
1.2 Contractor's Camp located in area of low environmental sensitivity as indicated by the Engineer?			
1.3 Where needed, sensitive areas adequately fenced off?			
1.4 Fencing well maintained?			
1.5 No unauthorized entry, stockpiling, etc. outside work areas?			
1.6 All vehicles and plant remain on designated routes?			
1.7 Information posters put up and maintained where needed?			
1.8 No smoking in hazardous areas?			
1.9 Basic firefighting equipment available onsite?			
1.10 No burning of wastes as a means of disposal?			

Issue	Observation	Remedial action	Compliance
1.11 Staff aware of procedures in the event of spills/leaks?			
1.12 Materials for dealing with spills/leaks available?			
1.13 Emergency contact numbers displayed at Contractor's office?			
1.14 Complaints Register up to date?			
1.15 Archaeological material found on Site mitigated?			
1.16 No animals trapped or harmed?			
1.17 No flora removed or damaged outside work areas?			
1.18 Adequate drainage and retaining works in place to control erosion/siltation?			
1.19 Restricted traffic over stabilised areas?			
1.20 No concrete mixing on bare ground?			

Issue	Observation	Remedial action	Compliance
1.21 Concrete batching restricted to area of low environmental sensitivity?			
1.22 All wastewater from concrete mixing area disposed of via wastewater management system?			
1.23 Concrete mixing area kept neat and clean?			
1.24 Suitable screening and containment of cement silos?			
1.25 All visible remains of excess concrete removed on completion of concrete work?			
1.26 No pollution from drilling operations?			
1.27 Location and rescue of plants undertaken by suitably qualified contractor?			
1.28 Rescued plants moved to nursery if direct transplantation not possible?			

Issue	Observation	Remedial action	Compliance
1.29 After vegetation clearance, all unstable areas are properly stabilised?			
1.30 Cleared vegetation properly disposed of?			
1.31 All wastes removed from cleared area and disposed of?			
1.32 Mulched vegetation stored in bags?			
1.33 Fertilizers containing phosphates not used?			
1.34 No planting undertaken where construction works have not yet been finished?			
1.35 No unauthorized traffic on revegetated areas?			
2 Materials			
2.1 Construction materials adequately secured to ensure safe deliveries?			
2.2 All materials being stored inside Contractor's Camp?			
2.3 All imported materials free of weeds, litter, etc.?			

Issue	Observation	Remedial action	Compliance
2.4 Stockpile areas approved?			
2.5 Topsoil stripped and stockpiled at a suitable site prior to earthworks?			
2.6 No spoil stockpiled outside agreed areas?			
2.7 Spoil stockpiles correctly shaped and protected?			
2.8 All plants used for landscaping/rehabilitation are local and indigenous?			
2.9 Plants adequately protected during transit and at storage facilities?			
2.10 Plants healthy and free from diseases and pests?			
3 Plant			
3.1 Fuel/oil storage facilities adequately secured and protected against leakage?			
3.2 Safety signage provided at fuel storage areas?			

Issue	Observation	Remedial action	Compliance
3.3 All electrical/petrol pumps suitably equipped and placed not cause any danger of ignition?			
3.4 Fuel storage areas comply with fire safety regulations?			
3.5 Necessary authorizations obtained for temporary above ground fuel tanks?			
3.6 Capacity of a fuel tank does not exceed 9000 ℓ?			
3.7 Fuel tanks erected at least 3.5 m away from buildings, boundaries or other flammable materials?			
3.8 Adequate toilet facilities provided for staff (min. 1 toilet per 30 workers)?			
3.9 Toilets adequately maintained?			
3.10 All workers use toilets?			
3.11 Scavenger-proof bins with lids provided at eating areas?			

Issue	Observation	Remedial action	Compliance
3.12 Waste temporarily stored inside Contractor's Camp in weather- and scavenger-proof bins?			
3.13 No burying or dumping of wastes on site?			
3.14 Waste management system in place?			
3.15 Refuse disposed of at licensed landfill?			
3.16 Adequate waste-water management system in place?			
3.17 Approval for discharge of contaminated water into municipal sewer system?			
3.18 Runoff from workshops, fuel depots, etc. directed into conservancy tanks for disposal at approved site?			
3.19 Wash areas placed and built in such a way that does not cause any pollution?			
3.20 All maintenance of plant and equipment takes place			

Issue	Observation	Remedial action	Compliance
in workshop?			
3.21 All plant is well maintained (no leaking)?			
3.22 Workshop has a bunded, impermeable floor sloping towards oil trap?			
3.23 Contractor's Camp tidy?			
3.24 All plant and machinery have drip trays, which are checked and emptied daily?			
3.25 All repairs on machinery using fuels or lubricants done over a drip tray?			
3.26 Static plant located within a bunded area?			
3.27 Measures in place to minimise dust generation?			
3.28 No handling/transport of erodible materials under high wind conditions?			