

ENVIRONMENTAL MANAGEMENT PLAN UPDATE FOR

*Detail Design, Tender Documentation, Contract Administration and
site Supervision for the Upgrading to Low Volume Seal Standards of
DR1635 Du Plessis Plaas to DR1668 Epukiro (47km), Omaheke
Region.*



A FIFTH DIMENSION TO ENGINEERING





2026

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<p>Project Name:</p>	<p><i>Detail Design, Tender Documentation, Contract Administration and site Supervision for the Upgrading to Low Volume Seal Standards of DR1635 Du Plessis Plaas to DR1668 Epukiro (47km), Omaheke Region.</i></p>
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1. INTRODUCTION

The Roads Authority of Namibia appointed Element Consulting Engineers (Pty) Ltd to perform consultancy services for the detail design, tender documentation, contract administration and site supervision for the upgrading to Low Volume Seal standards of DR1635 and DR1668 between Du Plessis Plaas and Epukiro in the Omaheke Region. Enviro Management Consultants Namibia therefore was appointed by Element Consulting Engineers to facilitate the Environmental Impact Assessment Process as required by the Environmental Management Act No.7 of 2007.

DR1635 starts from the intersection on TR14/1 at Du Plessis Plaas, it then proceeds until it intersects DR1668 approximately 28.8 km from the intersection on TR14/1. From this intersection the route continues as DR1668 eastwards for 19 km up to Epukiro where the alignment intersects with MR113, which continues through the settlement, and MR85 that runs in a northerly direction. The 28.8 km section of DR1635 and the 19 km section of DR1668 constitute the route to be upgraded to Low Volume Seal standards on this Project.

The objectives of this project can therefore be summarized as follows:

- Improve road transport efficiency,
- Improve rural accessibility,
- Reduce road user costs,
- Reduce travelling time,
- Reduce road maintenance costs,
- Improve general network, inter-regional and international connectivity.

The upgrading will generally entail the following:

- The upgrading to Low Volume Seal standards of the road, including vertical and horizontal alignment,
- The upgrading of all intersections in accordance with the relevant specifications,
- Improvement of the drainage facilities along the route,
- The establishment of road furniture,
- The establishment and proper demarcation of the 60 m wide road reserve.

The road will be constructed using conventional mechanized road construction methods. Certain portions of the work will however be sub-contracted to SME contractors using labour-optimized construction methods in order to provide work for the local community.

A site visit was conducted on the 23rd and 24th of August 2016 to determine the possible sensitivity of the area. Due to the fact that the existing alignment will be used during the proposed project it is envisaged that there will be limited negative impacts associated with this project.

There were no environmental specialist investigations conducted for the purpose of this Environmental Assessment Report.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This section deals with the regulatory requirements that are applicable to this project.

NAMIBIAN LEGISLATIVE FRAMEWORK

During the preparation of the Scoping Report, the following legislative and policies were considered:

- Environmental Management Act, 2007; Act 7 of 2007 ;
- Environmental Regulations of 2012;
- Roads Authority Environmental Manual

The activities listed in Table 2, as contained in Appendix B of the Republic of Namibia's Environmental Regulations, may be applicable and will require Environmental Clearance.

Table 1: Listed Activities in Terms of the Environmental Management Act

Activity No.	Activity Description
10.2	The route determination of roads and design of associated physical infrastructure where - (a) it is a public road; (b) the road reserve is wider than 30 meters; or (c) the road caters for more than one lane of traffic in both directions.

Currently, Environmental Impact Assessments are guided and reviewed by the Directorate of Environmental Affairs (DEA) in the Ministry of Environment, Fishery and Tourism. Guidelines for various projects have been compiled to help improve EIA practice in Namibia.

There are a number of sector laws in Namibia that have relevance to Scoping and EIAs. The following table provides a summary of the relevant sector legislation.

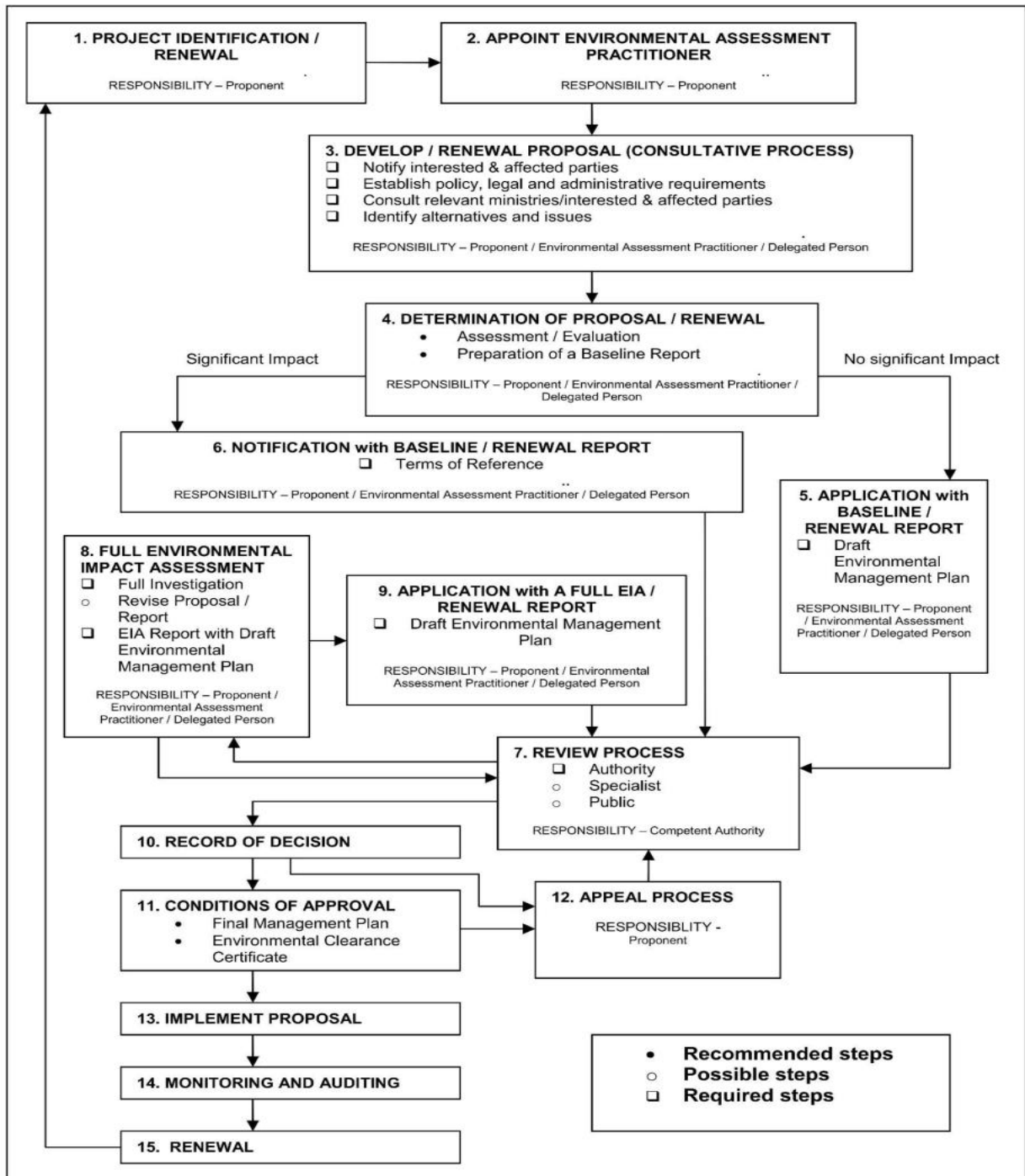
Table 2: Legislation relevant to the Project

Statute	Provisions	Project Implications
Forest Act 12 of 2001	<p>Provision for the protection of natural vegetation.</p> <p>No regulations promulgated yet.</p> <p>Section 22(1): It is unlawful for any person to "cut, destroy or remove:</p> <ul style="list-style-type: none"> • any living tree, bush or shrub growing within 100 meters from a river, stream or watercourse on land that is not part of a surveyed erf or a local authority area without a license. • Vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilizing the sand or gully. 	<ul style="list-style-type: none"> • Permits should be obtained from Department of Forestry for the removal of protected trees.
National Heritage Act 27 of 2004	Heritage resources to be conserved in development.	All archaeological sites to be identified and protected.
Nature Conservation Ordinance 4 of 1975	Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants without a permit.	In case there is an intention to remove protected species, then permits will be required.
Preservation of Trees and Forests Ordinance	Protection to tree species.	The Contractor will require a permit to remove any protected trees.
Soil Conservation Act 76 of 1969	<p>Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources.</p> <p>The Minister may direct owners or land occupiers in respect of <i>inter alia</i> water courses. No Regulations exist to this effect.</p>	<p>Removals of vegetation cover to be avoided and minimized at all costs.</p> <p>Soil pollution to be avoided.</p>
Water Resources Management Act No. 11 of 2013	<p>Section 32 states that no person may abstract or use water, except in accordance with a license issued under this Act. Abstraction of water including open waters, aquifer, brackish or marine water.</p> <p>Section 46 states that any drilling to be conducted or enlargement of an existing borehole can only be conducted under a permit issued under the Act.</p> <p>Section 56 states that a person may not discharge any effluent directly</p>	<p>Obligation not to pollute surface water bodies.</p> <p>The following permits are required in terms of the Water Act:</p> <ul style="list-style-type: none"> • water abstraction permits that will form part of the contract obligations.

	<p>or indirectly to any water resource on or under the ground or construct any effluent treatment facility or disposal site unless in compliance with a permit issued under Section 60 of the Act. Where "effluent" means any liquid discharge as a result of domestic, commercial, industrial or agricultural activities.</p> <p>Section 78 states that a person may not engage in any construction activity that impounds, blocks or otherwise impedes the flow of water in a watercourse without the Minister's written approval authorising such activity.</p>	
Public Health Act 36 of 1919	Provides for the prevention of pollution of public water supplies.	A general obligation for the Contractor not to pollute the water bodies in the area.

A flowchart indicating the entire Scoping/EIA process is shown in *Figure 1*:

Figure 1: EIA Procedure



3. PROJECT DESCRIPTION

The proposed link road between Epukiro and Du Plessis Plaas traverses the Omaheke region, which are located in the eastern-central part of Namibia and connect at Gobabis via TR14/1 to the Southern African Regional Trunk Road (TR6/2) linking Mozambique, South Africa and Botswana with Angola through Namibia.

The Omaheke Region forms part of the northern Kalahari zone, which is flat and sandy with permanent dunes in the eastern part of Namibia. With total area coverage of 84,612 km², the region is divided into seven constituencies: Otjinene, Epukiro, Otjombinde, Steinhausen, Gobabis, Kalahari, and Aminuis, with the region’s capital (and only municipality) and Regional Council in Gobabis. Most of western, central, and south-western Omaheke is occupied by privately-owned freehold farms comprising about 900 households.

There are also 924 settlement areas, with the majority being traditional villages. DR1635 and DR1668, the roads between Du Plessis Plaas and Epukiro was proclaimed by the then Department of Transport in 1977 and 1954 respectively, it is located in the Omaheke region and service various commercial, resettlement and communal farms. The two roads also provide a vital link between Epukiro, an important settlement with various facilities like schools, clinics and satellite ministerial offices in the Omaheke region and Gobabis, the capital of the region.

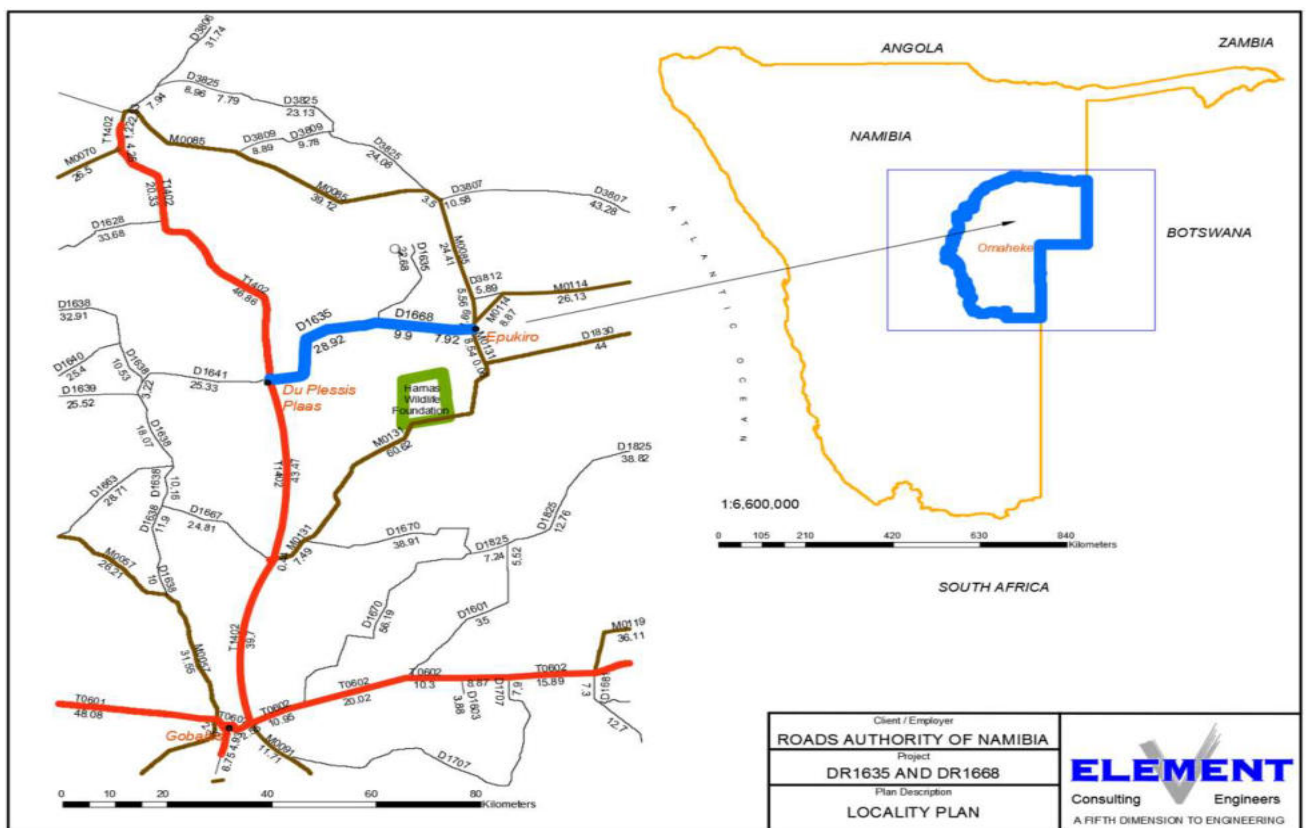


Figure 2: Locality Plan

The Omaheke region has, according to the 2011 population and housing census carried out by the Government of Namibia, a surface area of 84 981km² and an estimated population of 70 800, with an

average density of 0.8 persons per km². The economy of the Omaheke region is driven by a strong cattle-producing industry.

Commercial cattle farming, found within the western areas of the region, are well developed and are the region's major economic income generator. Communal farming, in the eastern parts of the region is generally neglected in terms of basic infrastructure. Large areas of the communal farming sector are deprived of adequate access roads, water, electricity provision and telecommunications, which are seriously hampering the economic development in those areas.

4. EXISTING ROUTE DESCRIPTION



DR1635 starts at the intersection on TR14/1 at Du Plessis Plaas, thereafter it follows an easterly direction for 6 km before turning northerly, after about 11 km it again turns easterly and after another 11 km it intersects onto DR1668. At this point DR1635 turn north and continue onwards for an additional 22.86km, this last 22.86km will not form part of this design.

Where DR1635 turns north, approximately 28.98 km from the intersection on TR14/1, the route continues toward Epukiro as DR1668. From this intersection with DR1635, DR1668 continue eastwards for 19 km up to Epukiro where the alignment intersects MR113, which continues through the settlement. MR85 which runs in a northerly direction also intersects DR1668 in Epukiro.

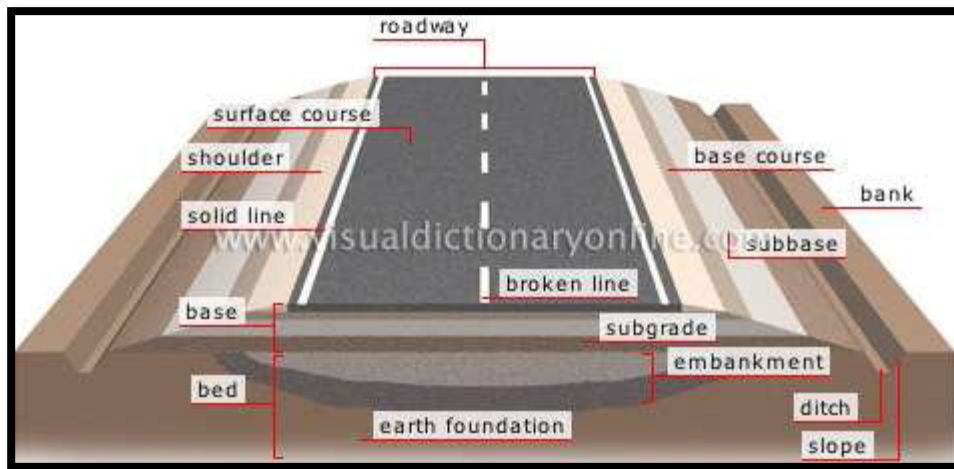


There is no storm water structures provided for on the existing roads. The storm water is mainly accommodated by means of drift like low points on the road. There will definitely be a need for provisions of new culverts on the proposed new road.

The existing DR1635 and DR1668 cross the Epukiro Omuramba at 2 places. According to preliminary indications, substantial structures need to be provided to accommodate the 1 in 25 year flood. There are also a number of smaller feeder streams crossing DR1635 and DR1668 that will need smaller structures. After the visual assessment of the position of likely drainage structures and consultation with the local communities on the history of the river flow regime, it was established that the installation of box culvert structures, at the mentioned Omuramba crossings, would be adequate. However, this assumption will be confirmed during the final design stage.

5. ROAD CONSTRUCTION DESCRIPTION

The following picture represents the typical bitumen road cross section applicable to this project and is discussed below.



Sub Base:

- It is layer of granular material provided above subgrade generally natural gravel. It is usually not provided on subgrade of good quality. This material is normally obtained from borrow pits alongside the planned route.

Base course:

- It is the layer immediately under the wearing surface (Applies whether the wearing surface is bituminous or cements concrete and or more inches thick or is but a thin bituminous layer).
- As base course lies close under the pavement surface it is subjected to severe loading. The material in a base course must be of extremely high quality and its construction must be done carefully. Normally this material is obtained from a commercial source, or if suitable material is available from borrow pits a crushing plant is erected to conduct crushing and screening.

Surface/Wearing Course in pavement cross section:

The top layers of pavement which is in direct contact with the wheel of the vehicle. Usually constructed of material in which bitumen is used as binder materials.

Bituminous Pavement:

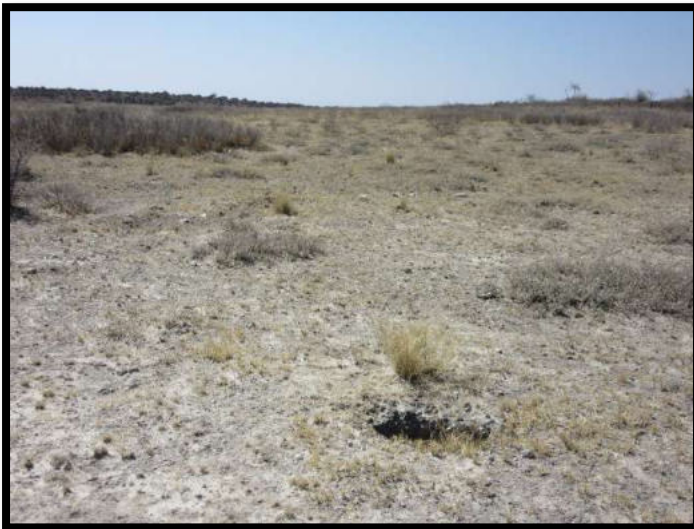
For good service throughout the full life bituminous pavement must retain following qualities.

- Freedom from cracking or ravelling.
- Resistance to weather including the effect of surface water heat and cold.
- Resistance to internal moisture, particularly to water vapours.
- Tight impermeable surface or porous surface (if either is needed for contained stability of underlying base or subgrade).
- Smooth riding and none skidding surface.

The design should be done so that to meet the above requirements for considerable number of years (need proper design and construction supervision).¹

5.1 Borrow Pits

Suitable material is needed for the Sub and Base layers during the construction of the road. Filling material is also required to ensure vertical alignment of the road is according to engineering standards required in Namibia.



To achieve the abovementioned, suitable material is required from borrow pits. These pits are opened using various heavy duty machines and the material is hauled from the pit to the required sections of the road where the material is needed. It is imperative that the material excavated fits the engineering standards required for the construction of the road and is therefore tested on a regular basis.

Another important issue is hauling distance. The borrow pits cannot be situated too far from the section of the road where the material is needed, therefore borrow pits cannot be located too far apart (incurring costs due to hauling).

It is anticipated that a total of 11 borrow pits will be used for the purpose of this project where suitable materials will be obtained for the layer works.

5.2 Construction Water Requirements

There are no perennial water sources in the project area and boreholes are the only source of water. Contractors must obtain the consent of relevant landowners prior to utilizing a water source and Clause B1219 of the Project Specifications contains requirements and standards related to the quality of water used for construction purposes. A water extraction license is required according to the Water Resources Management Act N0.11 of 2013.

5.3 Residues and Emissions During Construction

Due to the type of activities that are associated with the construction of roads it is very unlikely that any toxic materials will be present on site. The only risk might be hazardous hydrocarbon substances such as fuels (diesel and petrol) and oils used by the construction machines.

Bitumen might be used for sealing the newly constructed road (dependent on the chosen alternative to be followed). Bitumen in itself is a stable hydrocarbon substance, but the “prime” medium is very volatile and should be considered as a hazardous liquid. The cleaning of bitumen tanker nozzles and cleaning of the bitumen trucks always poses a challenge when it comes to environmental management.

Domestic and camp construction wastes generated at the contractor camps can very easily be managed due to the proximity to the existing towns of Du Plessis Plaas and Epukiro. Proper waste management principles should be enforced as stipulated by the Environmental Management Plan.

Sewage management is also a great concern at any construction camp. Proper planning of the sewage facilities should be done at the start of such a project to prevent sewage overflow and the contamination of soils and water. The number of workers should be determined, and the sewage facilities planned accordingly.

5.4 Assumptions and Limitations

It is assumed that the information provided by Consulting Team and the information in the Inception Report and other relevant documentation used for the compilation of this Environmental Report is accurate and relevant to this date. It is also assumed that the secondary data collected for the bio-physical and socio-economic environments are true and correct. These include data sources associated with printed books, data available on the internet and other studies as indicated in this report.

The Contract determined the available time and funds available to complete this project. Communication between the various team members was assured through regular meetings.

6. ENVIRONMENTAL IMPACTS ASSESSMENT PROCESS

It is important to understand the gist of any project as to understand the possible environmental impacts associated with such a project. The following activities are generically associated with the construction of a road. These activities are kept in mind during the environmental impact assessment process.

- **Site establishment**
 - Demarcation of the site
 - Protection of vegetation and natural features
 - Protection of fauna
 - Protection of cultural historical aspects
 - Topsoil conservation
 - De-bushing and de-stumping
 - **Site infrastructure**
 - Structures and accommodation
 - Contractors camp and lay-down areas
 - Batching plants
 - Crusher plants
 - Sand washing plants
 - Nurseries
 - Roads and access
 - Gates and fences
 - **Site management**
 - Rubble and waste rock
 - Solid waste
 - Liquid waste
 - Hazardous waste
 - Pollution control
 - Implements and equipment
 - Blasting
 - Air quality
 - Noise control
 - Fire control
 - Health and Safety
 - **Borrow pits and quarries**
 - **Earthworks**
 - Prospecting boreholes and test pits
 - Excavations and trenches
 - Cut and fill
 - Shaping and trimming
 - **Stockpiles, storage and handling**
 - Topsoil
 - Spoil
 - Vehicles and equipment
 - Fuel
 - Hazardous substances
 - **Erosion control**
 - Surface water management
 - Erosion protection
 - **Control of alien plants**
-

6.1 Environmental Impact Assessment Summary

The following environmental impacts were identified during the assessment procedure as described above. The impacts are classified as either positive or negative and the significance ratings as low, medium and high.

Activity	Aspect / Impact	Positive / Negative	Significance
Land use / topography, and land use cover.	The quarry operations will permanently alter the land use, land cover and, for the borrow pits - topography of the area.	Negative	Low
	Areas zoned as undetermined or agricultural will change to transport (land use).	Negative	Low
Clearance of existing land, vegetation and buildings.	Clearing of vegetation for construction operations influencing the vegetation, soils and topography.	Negative	Low
Creation of new land uses.	The existing land use will change from agricultural to road (land use).	Negative	Low
Construction activities.	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	Negative	Low
Temporary sites used for construction works or housing of construction workers?	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be mitigated.	Negative	Low
Above ground buildings, structures or earthworks including linear structures cut and fill or excavations.	The above ground earthworks will be regarded as primarily for the road construction. Permanent changes will take place (land use).	Negative	Low
Facilities for storage of goods or materials.	Pollution of soils and water.	Negative	Medium
New road, rail or sea traffic during construction or operation?	Limited traffic increase due to movement of construction vehicles.	Negative	Low
Impoundment, damming, culverts, realignment or other changes to the hydrology of watercourses or aquifers.	This aspect is probably of greatest concern for this project. The road will be built on a flood plain to the east.	Negative	Low
Stream crossings?	Various streams on the flood plain will be crossed.	Negative	Low
Changes in water bodies or the land surface affecting drainage or run-off?	The road will impact on the surface patterns.	Negative	Low
Influx of people to an area in either	Migration of people might impact on the	Negative	Low

temporarily or permanently	socio-economic structure of the area. The risk of HIV/AIDS may increase due to the influx.		
Loss of native species or genetic diversity?	Surface disturbances always impact on the bio-diversity of an area.	Negative	Low
Resources such as land and water.	Very limited agricultural land will be affected due to the construction of the road.	Negative	Low
	Water is used for domestic and construction purposes.	Negative	Low
Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Hydrocarbons always pose a risk to the environment.	Negative	Medium
Will the project affect the welfare of people eg by changing living conditions?	The proposed route will impact positively on the vulnerable groups due to improved mobility network. Safety of the road user will also greatly improve at Gobabis and Buitepos.	Positive	Medium
Pollution on site (domestic and construction waste).	Pollution of the natural environment (soil and water).	Negative	Low
Sewage sludge or other sludge from effluent treatment?	Sewage is produced at the construction camp.	Negative	Medium
Contaminated soils or other material.	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	Negative	Medium
Emissions from combustion of fossil fuels from stationary or mobile sources	Gasses such as Nox and Sox are deposited in the air from the machines.	Negative	Low
	The movement from vehicles will generate dust and gaseous emissions.	Negative	Medium
By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	The local community will benefit from the construction phase through additional employment opportunities.	Positive	Medium
Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities, etc?	New road will be constructed which will benefit the communities by improving access to schools, clinics and churches.	Positive	Medium
	New economic nodes might be	Positive	Medium

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

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Program (ESMP) will be implemented during construction. The ESMP is intended to bridge the gap between the Environmental Impact Assessment (EIA) and the implementation of the project, particularly with regard to implementing the mitigation measures recommended in the Environmental Impact Assessment (EIA). Monitoring, auditing and taking corrective actions during implementation are crucial interventions to successfully implant the ESMP.

The ESMP detail actions to ensure compliance with regulatory bodies and that environmental performance is verified through information on impacts as they occur.

ESMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated ESMP aims and objectives. Through monitoring and auditing, feedback for continual improvement in environmental performance must be provided and corrective action taken to ensure that the ESMP remains effective.

7.1 ESMP Administration

Copies of the ESMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

7.2 Roles and Responsibilities

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

Engineer's Representative (ER)

The Engineer will delegate powers to the Engineer's Representative (ER) on site who would act as the Employer's implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ESMP. The Engineer also has the responsibility to approve the appointment of the Environmental Control Officer (ECO).

Any on-site decisions regarding environmental management are ultimately the responsibility of the ER. The ER will have the following responsibilities in terms of the implementation of this ESMP:

- Controlling that the necessary environmental authorizations and permits have been obtained by the Contractor.
 - Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO (Environmental Control Officer) where necessary.
-

- Taking appropriate action if the specifications are not followed.
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Recommending and issuing fines for transgressions of site rules and penalties for contravention of the ESMP.
- Advising on the removal of person(s) and/or equipment not complying with the specifications.
- Auditing the implementation of the ESMP and compliance with authorization on a monthly basis.
- Undertaking a continual review of the ESMP and recommending additions and/or changes to the document after completion of the contract.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be a competent person from the staff of Contractor to implement the on-site environmental management of this ESMP by the Contractor. The ECO shall be on site daily and the ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorizations and permits have been obtained.
 - Maintaining open and direct lines of communication between the ER, Employer, Contractor and interested and affected parties (I&APs) with regard to environmental matters.
 - Convening and facilitating public meetings.
 - Regular site inspections of all construction areas with regard to compliance with the ESMP.
 - Monitoring and verifying adherence to the ESMP, monitoring and verifying that environmental impacts are kept to a minimum.
 - Assisting the Contractor in finding environmentally responsible solutions to problems.
-

- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.

7.3 Environmental Awareness Training

Before any work is commenced on the Site, the Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the ESMP. The Contractor shall liaise with the Engineer during establishment phase to fix a date and venue for the training and to agree on the training content.

The Contractor shall provide a suitable venue and ensure that the specified employees attend the course. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the ER with a copy of the attendance register. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

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

7.4 Public Participation

An on-going process of public participation shall be maintained during construction to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way. Public meetings to discuss progress and any construction issues that may arise shall be held at least every two months and more regularly if deemed necessary by the ER. These meetings shall be arranged by the ECO but shall be facilitated by the ER. The Contractor shall present a progress report at each public meeting. All I&APs that participated in or were informed during the EIA shall be invited to each of the public meetings.

7.5 Environmental Mitigation Measures

The following mitigation measures are sufficient to reduce or avoid negative impacts associated with the construction of a road. It is based on the activities mentioned in this report that will occur during the construction phase of the project:

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
7.5.1 MANAGEMENT AND MONITORING	To ensure that the provisions of the ESMP are implemented during construction.	<ul style="list-style-type: none"> a. The environmental and social consultant shall ensure that all aspects of the ESMP are implemented during construction. b. The environmental and social consultants shall attend regular site inspections and meetings and minutes shall make provision for reporting on every aspect of the ESMP. 	Environmental and social consultant together with the ECO.
7.5.2 COMMUNICATION AND STAKEHOLDER CONSULTATION	To ensure that all stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the consultant and client.	<ul style="list-style-type: none"> a. The Contractor shall appoint an ECO from the construction team to take responsibility for the implementation for all provisions of this ESMP and to liaise between the contractor, community, client and consultants. The ECO must be appointed at least 14 days after the site-handover. b. The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP. c. The contractor shall implement the environmental awareness training as stipulated in Section 7.3 above. d. The Contractor shall liaise with the social and environmental consultants regarding all issues related to community consultation and negotiation as soon as possible after construction commences. 	Contractor/ Environmental and Social Consultant to monitor.
7.5.3 HEALTH AND SAFETY	To ensure health and safety of workers and the public at all times during construction	<ul style="list-style-type: none"> a. The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction. b. The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule should be updated and distributed to all stakeholders. c. The Contractor shall also liaise with the Traffic Authorities in this regard. 	Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<ul style="list-style-type: none"> d. Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer and the Roads Authority. e. The Contractor must adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing, failing which the Contract may be temporarily suspended until corrective actions were taken. f. Dust protection masks shall be provided to task workers if they complain about dust. g. Surface dust will be contained by wetting dry surfaces periodically with a water bowser, sprinkler system or any suitable method. This applies for the construction site as well as all the roads. h. Potable water shall be available to workers to avoid dehydration. This water shall be of acceptable standards to avoid any illness. At least 3 litres of drinking water per person per day shall be made available during construction. i. The contractor shall enforce relevant Health and Safety Regulations for these specific activities. j. The contractor shall also comply with relevant Labour Laws as stipulated by the Labour Act. k. The Contractor shall implement a HIV/AIDS awareness programme as part of Health and Safety. l. Blasting may only be conducted by a qualified person and all laws and regulations will be enforced before and during blasting. Blasting must be done in accordance with Clause 1222 of the Standard Specification of the Roads Authority of Namibia. 	monitor.
7.5.4 CONSERVATION OF THE NATURAL AND HISTORICAL ENVIRONMENT	To minimise damage to soil, vegetation and historical resources during the construction phase. This includes soil crusting, soil erosion and unnecessary	<ul style="list-style-type: none"> a. At the outset of construction (or during construction as may be applicable), the ECO and the contractor shall visit all proposed borrow-pits, haul roads, access roads, camp sites, and other areas to be disturbed outside the road reserve. Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. b. Detailed instructions and final arrangements for protection of sensitive areas, 	Contractor will ensure the mitigation measures are enforced at his own expense.

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
	<p>vegetation destruction.</p> <p>Management of water (domestic and construction).</p>	<p>keeping of topsoil and rehabilitation of disturbed areas shall be made, in line with the guidelines in this document. The ECO shall be consulted before any new areas are disturbed which have not yet been visited.</p> <p>c. No off-road driving shall be allowed, except on the agreed haul and access roads.</p> <p>d. Vegetation shall be cleared within the road reserve as necessary for the construction of the road, while trees with a trunk circumference exceeding 50 cm (1 meter above ground) shall be left intact. The reserves on either sides of this corridor may not be cleared of vegetation, unless permission is given to do so for detours or access roads. This measure is subjected to the Roads Authority of Namibia specifications with regards to the road reserve.</p> <p>e. A prescribed penalty will be deducted from the Contractors payment certificate for every mature tree removed without approval.</p> <p>f. No trees may be felled or live wood in the project area removed by any member of the construction team, including sub-contractors. Contravention of this arrangement is liable for a prescribed penalty.</p> <p>g. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that trees and/or branches have been broken down willfully and unnecessarily, or that any plants have been collected illegally, by any of the staff or sub- contractors.</p> <p>h. Trees that need to be trimmed should be done so with the right equipment and aesthetical acceptable. The use of any type of saw is obligatory and the branches of trees will not be broken off by the use of other machinery.</p> <p>i. Where topsoil is available, this must be stockpiled separately in 1,00 m high piles and this used to cover the damaged areas outside the road reserve such as access roads to borrow pits, and clearing and grubbing areas.</p> <p>j. Where compaction has taken place in disturbed areas, these areas must be ripped and covered with topsoil separately kept for this purpose.</p> <p>k. Poaching or collecting of wild animals is prohibited unless a permit has been obtained for legal hunting purposes.</p> <p>l. The killing of any animal (reptile, bird or mammal) is prohibited, unless for legal</p>	<p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>hunting purposes.</p> <p>m. A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that any of his staff or sub-contractors are involved in trapping, hunting or any kind of collecting of wild animals in the vicinity of the work sites. Offenders will be handed to the authorities for prosecution.</p> <p>n. Pipelines for the pumping of construction water shall as far possible run within the road reserve and along existing tracks and other roads.</p> <p>o. Water will not be allowed to be wasted. This includes water required for construction and domestic purposes.</p>	
<p>7.5.5 BORROW PIT MANAGEMENT AND REHABILITATION</p>	<p>To ensure proper soil management (combat soil erosion and promote biological activities).</p> <p>Preserve and manage natural vegetation.</p> <p>To ensure health and safety around the borrow pits (decommissioning phase).</p> <p>To stimulate ecological processes after decommissioning (to stimulate vegetation and other biological activities).</p> <p>To establish borrow pits which is aesthetically pleasing after decommissioning.</p>	<p>a. The removal of material at borrow-pit sites shall be focused where the least significant vegetation exists. If material is only available around significant mature trees (more than 50 cm circumference – 1 meter above ground), clusters of trees should be preserved while suitable material is excavated around them. A 3 meter buffer must be conserved around the cluster of mature trees. The ER shall visit all proposed borrow-pit areas and indicate where and how material may be removed, before works commence. A cluster constitutes 5 or more trees in close proximity (within 20m radius).</p> <p>b. The Contractor shall use safety tape to mark these tree clusters as to avoid confusion or misunderstandings.</p> <p>c. The Engineers and surveyors must draft a plan for approval before commencement of a borrow pit. This plan must indicate the required resources and sensitive areas that may not be mined (indication of the mature trees).</p> <p>d. The borrow pit areas will be clearly marked by using brightly painted markers. These markers will demarcate the area where materials might be removed and stored.</p> <p>e. All borrow-pits must be rehabilitated.</p> <p>f. The contractor shall liaise with the applicable local headmen OR residents regarding whether their borrow-pits shall be shaped as water reservoirs during rehabilitation.</p>	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<ul style="list-style-type: none"> g. At those borrow-pits not to be shaped as reservoirs, topsoil (the top layer of organic material, even if the topsoil is non-existent, the top layer of organic material) at borrow pits shall be stockpiled separately and the stockpile maintained for use at the end of the contract to rehabilitate the borrow pits. h. The top soil shall be marked as to inform the machine operators that the material is top soil and should be left alone for rehabilitation purposes. i. The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 18° (1:3) and evenly spreading the top soil over the slopes to allow for the growth of new vegetation. j. All spoil material at the borrow pits shall be neatly shaped and no loose material (oversized) will be left inside the borrow pits. k. Access to borrow pits shall be controlled (using gates or manned positions). l. The borrow pit floor shall be levelled evenly as part of rehabilitation. m. A Borrow Pit Rehabilitation Plan will be compiled indicating the rehabilitation schedule (time-frames) for the various borrow pits to be rehabilitated. n. After the borrow pit has been rehabilitated, the Rehabilitation Checklist will be completed and signed by the relevant parties (See Appendix B). 	
7.5.6 WASTE AND POLLUTION MANAGEMENT	<p>To avoid contribution to potential surface and groundwater pollution.</p> <p>To avoid contribution to potential soil pollution.</p> <p>To ensure that sound waste management practices are adhered to during construction.</p>	<ul style="list-style-type: none"> a. Construction rubble and other waste generated during construction will be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area will be identified and clearly marked. b. The temporary domestic waste site will be fenced off with access control to the area. c. Adequate separate containers for hazardous and domestic waste will be provided on site and at the construction camp. d. The workforce will be sensitised to dispose of waste in a responsible manner and not to litter. e. Waste bins will be placed in and around the construction site to facilitate proper waste management. f. No waste may remain on site after completion of the project. 	<p>Contractor will ensure the mitigation measures are enforced at his own expense.</p> <p>The ECO will monitor.</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<ul style="list-style-type: none"> g. The construction of properly designed sewage facilities is required at the camp site. The sewage should either be removed on a regular basis and dumped at an approved sewage facility or where it is not possible, the sewage should be managed to such an extent that it does not cause any negative effects on the bio-physical or social environments. Proof of disposal shall be kept as record in the environmental file for environmental performance assessment purposes. No free flowing sewage is acceptable. h. Toilet facilities will be available in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males. The toilets should be such that it can be transported for various site selections and to be emptied at an approved sewage site. No person should have to walk more than 1km for the use of a toilet. i. A demarcated vehicle service area will be provided. This area will have an impermeable floor, oil trap and dedicated wash bay area. All used water will first run through the oil trap before the effluent is allowed to exit. The oil trap will be cleaned on a regular basis to ensure its efficiency. j. Servicing of vehicles is only permitted in the demarcated vehicle service area, except for large immobile vehicles which may be serviced on site, on condition that oils and lubricants are prevented from spilling through the use of drip trays or other suitable containers. k. Drip trays will be available for all vehicles that are intended to be used during construction. These trays will be placed underneath each vehicle while the vehicles are parked. The drip trays will be cleaned every morning and the spillage handled as hazardous waste. l. Machines operating during the day that shows signs of excess leaking (verified by ECO or ER) should be withdrawn from the task and repaired by the contractor. m. Accidental spills will be cleaned immediately. The contaminated soil will be suitably disposed of in a container suitable for hazardous waste. 	
		<ul style="list-style-type: none"> n. Oil, lubricants, and other hazardous materials will be stored in separate containers (concrete liner, container, or metal or plastic drip tray) and stored for 	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
		<p>transport and disposal at an approved waste disposal site or for collection by an oil recycling company such as WESCO Salvage (this company collects significant quantities of oil from central locations throughout the country).</p> <ul style="list-style-type: none"> <li data-bbox="880 387 1888 539">o. Fuel tanks on site will be properly bunded. The volume of the bunded area will be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area will be impermeable and the sides high enough to achieve the 1.5 times holding capacity. There will be a valve installed in the bunded area to allow rain water drainage. <li data-bbox="880 547 1888 639">p. Foam fire extinguishers will be in close proximity to fuel kept on site. There will be trained personnel to handle this equipment. At least two extinguishers will be placed at every fuel storage area. <li data-bbox="880 647 1888 772">q. Bitumen batching areas will make use of drip trays to prevent unnecessary spillage of any bitumen products. Cleaning of spray nozzles should be done on the bypass (if it is gravel) or any other section of the road that is in use. This serves as a dust suppressor. <li data-bbox="880 780 1888 1023">r. Should large quantities of bitumen needs to be disposed, it can be done at a borrow pit with the following mitigation measures: (i) the borrow pits area should not be in the road reserve; (ii) The aquifer should not be near the borrow pit floor and the borrow pit must not be situated less than 100m from any stream or river; (iii) a plastic lining will be laid underneath the proposed dumping area and the spoiled bitumen needs to be covered with the same plastic lining as to prevent leaching; (iv) at least three meters of material will be placed on top of the plastic lining. 	
7.5.7 REHABILITATION OF CONSTRUCTION SITE, SERVITUDES AND CLEARED AREAS	<p>To rehabilitate the site office, work sites, servitude areas, tracks and other areas disturbed during construction as close to their original state as reasonably possible.</p>	<ul style="list-style-type: none"> <li data-bbox="880 1078 1888 1134">a. All bunded areas, equipment, waste, temporary structures, stockpiles etc. must be removed from the camp and work sites. <li data-bbox="880 1142 1888 1235">b. All disturbed areas shall be reshaped to their original contours; as close as possible to the natural conditions before construction commenced, including the road reserve, detours, construction camps, and temporary access routes. <li data-bbox="880 1243 1888 1299">c. Alien vegetation particularly the Downy thorn apple (<i>Datura innoxia</i>) and Wild tobacco (<i>Nicotiana glauca</i>) that occur in the project corridor must be weeded. 	<p>Contractor will ensure the mitigation measures are enforced at his own expense. The ECO will</p>

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	RESPONSIBILITY/ PARTNERSHIPS
(WHICH INCLUDES STOCKPILES)		<ul style="list-style-type: none"> d. All cuttings must be shaped with a slope to provide a natural appearance, without having to destroy significant vegetation on top of the slope (this applies to big trees as mentioned in the ESMP only). e. Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase. 	monitor.

7.6 Non-Compliance

A) Procedures

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

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

B) Offences and Penalties

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

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

- a. within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the Specification;

- b. environmental damage due to negligence;
- c. the Contractor fails to comply with corrective or other instructions issued by the ER within a specific time;
- d. the Contractor fails to respond adequately to complaints from the public.

Penalties for the activities detailed below, might be imposed on discretion of the ER should the Contractor and/or his Subcontractors be found to be Non-Compliant (Section 8.6):

- | | |
|---|--|
| a. Actions leading to major erosion. | A penalty equivalent in value to the cost of rehabilitation plus 20%. |
| b. Oil spills due to negligence and/or reluctance towards mitigation measures mentioned in the ESMP. | A penalty equivalent in value to the cost of clean-up operation plus N\$ 5,000. |
| c. Damage to indigenous vegetation due to reluctance towards the ESMP. | A penalty equivalent in value to the cost of restoration plus N\$ 5 000. |
| d. Damage to demarcated sensitive environments. | A penalty equivalent in value to the cost of restoration plus N\$ 5 000. |
| e. Damage to demarcated cultural sites. | A penalty to a maximum of N\$100 000 shall be paid for any damage to any cultural/ historical sites identified during the EIA and made known to the Contractor. |
| f. Damage to trees. | A penalty to a maximum of N\$5 000 shall be paid for each tree removed without prior permission, or a maximum of N\$5 000 for significant damage to any tree, which is to be retained on site. |
| g. Damage to natural fauna (due to negligence and/or deliberate injury to any natural occurring animal. | A penalty to a maximum of N\$5 000 |
| h. Improper storage of any hazardous materials or hydrocarbon substances (used oils / diesel / petrol). | N\$ 10,000 |
| j. Litter on site. | N\$ 1,000 |
| k. Deliberate lighting of illegal fires on site. | N\$ 1,000 |
| l. Uncontrolled leaking or overflow of | N\$ 10,000 plus |

any toilet or sewage system related to the contract.	rehabilitation cost
m. Any person, vehicle, item of plant, or anything related to the Contractors operations identified driving in any "no-go" area or driving outside the permitted areas.	N\$ 10,000 plus the rehabilitation cost

- Penalties may be issued per incident at the discretion of the Engineer. The Engineer will inform the Contractor of the contravention and the amount of the fine and will deduct the amount from monies due under the Contract.
- For each subsequent similar offence, the fine may, at the discretion of the ER, be doubled in value to a maximum value of N\$20, 000.
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.
- In the case of a dispute in terms of this section, the Engineer shall determine as to what constitutes a transgression in terms of this document.

Environmental Monitoring and Auditing

Environmental monitoring should be conducted at least once every six months during construction. Benefits derived from the monitoring and final audit process might include:

- identification of environmental risk;
- development or improvement of the environmental management system;
- avoidance of financial loss;
- avoidance of legal sanctions;
- increase in staff awareness;
- identify potential cost savings;
- improve dealings with employees, environmental groups, the community, regulators, media, shareholders, or insurance & finance institutions; and
- establish a history of environmentally responsible operations, e.g. through environmental incident reports, environmental monitoring & recording, & reporting to committees or Authorities.

Commonly, the environmental monitoring or audit of a site will cover all management procedures, operational activities & systems, and environmental issues. The environmental monitoring and final audit will be compiled objectively and be conducted by an independent, competent entity.

Documentation, Record Keeping and Reporting Procedures

It is vital that an appropriate document handling and retrieval system be developed for all EMP documentation. This will ensure that there is adequate EMP documentation control and will facilitate easy document access and evaluation. EMP documentation should include:

- EMP implementation activity specifications;
- training records;
- site inspection reports;
- monitoring reports; and
- Performance Assessment reports.

Responsibilities must be assigned to relevant personnel for ensuring that the EMP documentation system is maintained and that document control is ensured through access by and distribution to, identified personnel.

Document control is important for the effective functioning of an EMP. A document handling system must be established to ensure adequate control of updating and availability of all documents required for the effective functioning of the EMP. This procedure applies to the EMP as well as procedures and policies relating to the EMP, which must be controlled (i.e. identified, registered and changes recorded).

The Environmental Officer is responsible for ensuring that the registration and updating of all relevant EMP documentation is carried out. It is the responsibility of the Project Manager of the Contractor to ensure that all personnel are performing according to the requirements of this procedure and to initiate the revision of controlled documents, when required by changes in process, operating procedures, legislation, specifications, monitoring or audit findings or any other circumstances, by informing the Environmental Officer of the changes. A controlled document is official only if the issue/revision has been approved. The Environmental Officer and Project Manager are responsible for ensuring that the latest versions of documents are used to conduct tasks which may impact on the project environment.

8. CONCLUSION AND RECOMMENDATIONS

This Environmental and Social Management Plan (ESMP) has been prepared to provide a practical framework for managing and mitigating potential environmental and social impacts associated with the upgrading of DR1635 and DR1668 between Du Plessis Plaas and Epukiro in the Omaheke Region. The ESMP translates the findings of the Environmental Impact Assessment into clear, implementable management measures to be applied during the construction phase of the project.

Provided that the mitigation measures, monitoring requirements, and responsibilities outlined in this ESMP are fully implemented and enforced, the project can be undertaken with acceptable and manageable environmental and social risk. Particular attention should

be given to borrow pit management, water use and pollution control, waste management, and ongoing stakeholder engagement throughout construction.

It is recommended that the ESMP be treated as a living document and be reviewed and updated as required in response to site conditions, monitoring results, or changes to the project design or regulatory requirements. Effective implementation, regular monitoring, and prompt corrective action in cases of non-compliance will be essential to ensure environmental protection and compliance with applicable Namibian legislation.

APPENDIX A

DAILY QUESTIONS

CONSTRUCTION SITE MONITORING CHECKLIST

Construction site name _____

Environmental/Safety/Health Site Officer Name _____

Date _____

CHECK THE FOLLOWING DAILY ON THE CONSTRUCTION SITE <u>AND</u> AT THE CONTRACTOR'S CAMP				
Category 1: Personal Protective Equipment (PPE), construction site safety, access control and hazardous substance handling				
	Question	Yes	No	If no, describe action taken
1	Have all labourers working today, including sub-contractors, been fully trained in proper health and safety procedures?			
2	Have you conducted a hazard assessment of the worksite and the planned construction activities for today with the Site Foreman and reviewed the EMP/PHPSAP to identify any new issues that might come up during the day?			
3	<p>Are all labourers and staff wearing the required Personal Protective Equipment (PPE)? Minimum PPE includes:</p> <ul style="list-style-type: none"> € Hard hat € Safety shoes € Overalls <p>Certain operations require additional PPE, such as:</p> <ul style="list-style-type: none"> € Eye protection/goggles/visors € Face masks € Gloves € Ear plugs /ear muffs € Harnesses 			
7	Are all hazardous substances (eg fuel, paint, oil containers, cement etc) stored in an area marked by danger tape or in a locked room away from public access?			

8	Are any visitors or suppliers expected to visit the construction site today? If so, ensure sufficient PPE is available for their use and that the visitors register is signed when they arrive.			
9	Are labourers and equipment a safe distance away from power lines?			
10	Are extension cords and portable tools in good condition?			
11	Is the first aid kit fully stocked and accessible in case of emergency?			

Category 2: Excavations, stockpiles, storage areas and general housekeeping

	Question	Yes	No	If no, describe action taken
12	Have all excavations been demarcated with barrier tape (minimum requirement) or fencing if the excavation is deeper than 2m?			
13	If a trench is more than 2m deep, is there a form of protection, such as: <ul style="list-style-type: none"> € Sloping or benching € Trench box or shield € Shoring 			
14	Is any stockpiling taking place today? If so, ensure the stockpile is placed in an area approved by the Site Foreman and that the height does not exceed 2m and that the slopes are not steep. Is the area demarcated with barrier tape?			
15	Are all storage areas neat and tidy with no machinery, vehicles, poles, materials or nails sticking out which may cause an injury or cause someone to trip up? Have the storage areas been demarcated with barrier tape?			
16	Is the construction site in general safe and neat with no waste lying around?			

Category 3: Solid waste management

	Question	Yes	No	If no, describe action taken
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17	Are there sufficient covered waste containers in place on the construction site and in the Contractor's camp in which to store waste material?			
18	Is waste (including construction waste) being disposed of in a designated disposal area and secured to prevent soil contamination (eg plastic lining underneath the waste pile) or covered to prevent it being blown off site?			
19	Have you checked to ensure waste is not being burnt or disposed of in pits on the site?			
20	Are there any signs of accidental/negligent spills of bitumen, fuel, oil, cement, paint etc visible on the site? If so, ensure spillages are cleared and the waste is containerised for subsequent disposal. Such waste should be treated as hazardous and be appropriately sealed prior to disposal.			
21	Is waste being disposed of off-site today and is it being sent to an approved site? Note the name of the site and keep a record of approximate waste volumes or bags taken for disposal. Waste may be separated for later recycling if this is taking place at the disposal site.			

Category 4: Water management

	Question	Yes	No	If no, describe action taken
22	Are all water taps and points functioning properly and has a paved surface been provided beneath the tap/water point to prevent erosion and channel water to a catch pit?			
23	Is cement mixing taking place within a bunded area, where excess water drains to a lined pit? Are cement mixing trays being used in confined areas?			
24	Are there any flooded areas at the site? If so, have stormwater systems been installed to manage the water drains? If groundwater is encountered in an excavation or pit, ensure the Site Foreman, RE and Environmental Consultant in the Consulting team are consulted about remedial action.			

Category 5: Social aspects

	Question	Yes	No	If no, describe action taken
25	Have community representatives been consulted			

	about any concerns related to the construction?			
26	Are HIV/AIDS and other health posters/leaflets being displayed at the work site and have sufficient condoms (male and female) been made available? Does any new material need to be ordered?			
27	Is the general hygiene and waste management at the Contractor's camp acceptable?			
28	Is all potable water and wastewater systems working properly on the construction site and in the Contractor's camp?			
29	Have any records been kept of accidents, work related illnesses or injuries that may have occurred today?			
Category 6: Other (e.g. access roads, borrow pits, dust and noise pollution)				
	Question	Yes	No	If no, describe action taken
30	Are any construction/delivery vehicles using the access roads to the construction site or the borrow pits today? If yes, ensure no impacts have occurred at these locations as a result.			
31	Are construction activities causing any dust pollution? If so, ensure mitigation measures are implemented as per the EMP.			
32	Is construction or Contractor's camp activities causing any noise pollution? If so, ensure mitigation measures are implemented as per the EMP.			
33	Did any training (including for HIV/AIDS) or "toolbox talks" take place today? If so, has a record of attendance and the training provided been kept?			
34	Are there any other environmental aspects not mentioned above that should be mentioned for the record – eg tree/vegetation removal, rehabilitation etc?			
35	Are all records pertaining to environmental management updated and on file?			

Notes in Respect of Category 1

- Ensure all excavations are secure by being sealed off with barrier tape. Should access to the excavation be required by staff, or for vehicles, machinery, building supplies or equipment, then the barrier tape should be erected nearby to prevent access to the wider construction area where the excavation is located. If the excavation is deeper than 1.5m, then consideration should be given to installing fencing or a more secure

and permanent barrier to prevent access.

- All materials, machinery and equipment should also be stored in secure areas, which as a minimum have been sealed off with barrier tape. Hazardous substances (such as fuel, cement, paints etc) should be stored in structures which can be either locked or to which general access can be prevented. Adequate safety signage should be in place (and on notice-boards) to warn about use of hazardous substances or equipment.
- No poles, planks or building/waste materials should be left outside of secure/safe storage areas unless in use. Such materials should not be placed where they can be tripped over or stacked such that they could jab passers-by. Sharp ends and nails should not be protruding. Stockpiles should not exceed 2m in height.
- Vehicles and machinery should be inspected daily to check they are not spilling any fuel or oils. Where leaks are detected, they should either be sealed or drip trays placed under the point where leaks are occurring.
- At the end of the working day, the construction site should be inspected to ensure all the above mentioned matters are addressed.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 2

- Ensure all labourers and staff are wearing the required Personal Protective Equipment (PPE). The minimum requirement is a hard hat and safety shoes. Safety glasses, visors, dust masks and gloves should be worn for activities such as welding and grinding. Scaffolding should be in place where labourers are working at a height of greater than 2m. Should gloves or a hard hat be difficult to wear for more intricate jobs (eg painting above head height), then they should still be kept at hand for use when such a task is complete. A standard overall should be worn by all employees for easy identification. Site Foremen and Team Leaders should set an example with the wearing of PPE.
- All sub-contractors should be inducted and trained regarding the EMP and they should also wear PPE.
- All visitors to the construction site should sign-in in a register, be issued with PPE and be inducted on safety matters. A record of such activity should be kept.
- No open fires should be allowed except where this is permitted for cooking and warmth purposes. Firewood should not be sourced from the environment next to the construction site.
- Ensure any fire-fighting extinguishers and first aid kits are accessible and fully operational. Emergency services contact numbers (police, ambulance, fire brigade etc) should be on hand.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 3

- Adequate waste containers should be placed on site to prevent littering. The construction sites should be regularly checked to ensure waste has not been left to blow around the site. Waste containers should also be capable of being closed or sealed off to prevent waste from being blown around.
- If waste can be recycled or reused in the region, then waste on site can be separated into different containers to assist in this regard. At some waste disposal sites, recyclers may be present who retrieve certain wastes for reuse. If this is noted, then separation of waste on the construction site may be warranted.
- When waste is taken to a landfill site for final disposal, if the site does not issue a record of the waste disposed, then keep a record at the construction site of the amount/volume of waste taken to the disposal site.
- No waste should be burned on site or in the waste containers, except in the case of paper and wood which can be safely burnt for fires used for cooking or warmth.
- Any spills of fuel, paint or other potentially hazardous substances should be cleaned up immediately and the waste containerized. This waste should ideally be taken to a hazardous waste site if one is available; alternatively, it should be adequately sealed for disposal at a general waste disposal site. Maintenance and washing of vehicles and equipment should take place on a hard impermeable (and preferably bunded) surface.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 4

- Potable water should be seen as a scarce resource and not wasted. Taps should not be left open. Leaking taps should be repaired. Water should not be allowed to run away from the ground beneath the tap and erode the soil. A hard surface should be installed beneath taps and any flow of water from the area beneath the tap should be safely channeled to plants or to an area where it does not present a hazard.
- Stormwater needs to be managed during the wet season. It should not be allowed to drain into excavations, nor should it be allowed to flood areas where materials and equipment are stored. A plan should be in place to manage stormwater and this must be approved by the RE and the environmental specialists in the Consulting Team.
- Should groundwater be intercepted during excavation work or during construction activities in the wet season, the Site Foreman and RE should be informed and a plan to protect the groundwater table must be approved by the RE and the environmental specialists in the Consulting Team. Any water pumped out from excavations or construction areas must be safely disposed of with the approval of the Site Foreman and RE.
- All wastewater from construction activities and the Contractor's camp must be channeled to lined pits. This includes wastewater from vehicle wash-down and maintenance areas, from areas used to wash tools and brushes used in concrete mixing and painting and from showers and cooking areas.
- Toilets and sanitation facilities should be checked daily for health reasons and records kept of when such facilities are emptied or replaced. Soap, toilet paper and other cleansing materials should be kept in stock.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 5

- Records should be kept of all complaints received from members of the public or local community. Key stakeholders such as headmasters of schools and community representatives should be consulted on a regular (preferably daily) basis to confirm there are no problems as a result of construction activities. The nature of any complaints should be noted together with the action taken to address the problem, including action to prevent a recurrence of the problem.
- Any observations where local community members' (or schoolchildren at school construction sites) behavior interferes with construction staff and construction activities, or where construction staff behavior affects community members/schoolchildren, should be noted and brought to the attention of the Site Foreman. Local livestock and wild animals should be left undisturbed.
- A supply of male and female condoms should be kept on site and records kept of when they are issued or supplies are replaced.
- Ensure posters, pamphlets and information about HIV/AIDS, STDs, TB and general health are readily available on site and placed on notice-boards.
- Records should also be kept of the number of women employed on site and any incidents where they feel they are being discriminated against in terms of access to facilities etc.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

Notes in Respect of Category 6

- Access roads should not be allowed to become seriously damaged or unusable as a result of construction activities.
- Borrow pits (sand mining) and the access roads to them should be restored and left safe after use.
- Any disturbances resulting in excessive dust or noise generated as a result of construction activities should

be noted and mitigation measures implemented as per the EMP.

- Ensure sensitive areas (eg watercourses, boreholes, oshanas, graveyards, neighbouring land uses, mature trees and areas of undisturbed vegetation) are taped off from the construction areas and educate the staff that such areas are off-limits.
- Ensure all safety, health and environmental awareness/training records are up to date.
- Any observations made where non-compliance with the above matters is noted should be recorded in the comments area of the checklist and the measures taken to address the problem recorded.

NB. Note that completion of the checklist each day does not absolve the on-site safety, health and environmental representative(s) from ensuring all conditions in the EMP/PHPSAPs are adhered to. If in doubt about actions to take, consult the full EMP/PHPSAP documents which should be kept on site.

APPENDIX B

Borrow Pit Rehabilitation Checklist

Date: _____

Borrow Pit Name and Number: _____

Location (road-km / GPS coordinates): _____

The above borrow pit shall only be handed over once all of the listed criteria have been met by the contractor.

Item No.	Description	Comments	Complies
			Yes / No
1.	The floor is level and no man made topographical high or low points are present in the borrow pit		
2.	The site in and around the pit is clear of any illegal dumping of foreign material, spoils and construction waste		
3.	Gradients of the pit slopes are less than 18 degrees (1:3) and are finished perpendicular to the slopes to prevent water erosion		
4.	The slopes are covered with overburden/top soil, if available, with a thickness of not more than 300 mm		
5.	Available dead vegetation is placed on the slopes of the borrow pits		
6.	The berm of excess soil outside the pit is not higher than 1.0 m, sloped 1:3 and min. 3.0 m away from the edge of the pit and min. 9.0 m away from any structure		
7.	There are no walls or steps present in or around the borrow pit, if so, then the pit has been fenced off according to spec.		
8.	All alien vegetation has been removed from the floor, the slopes and berms of the pit		

Land Owner: _____
 (Name) (Signature)

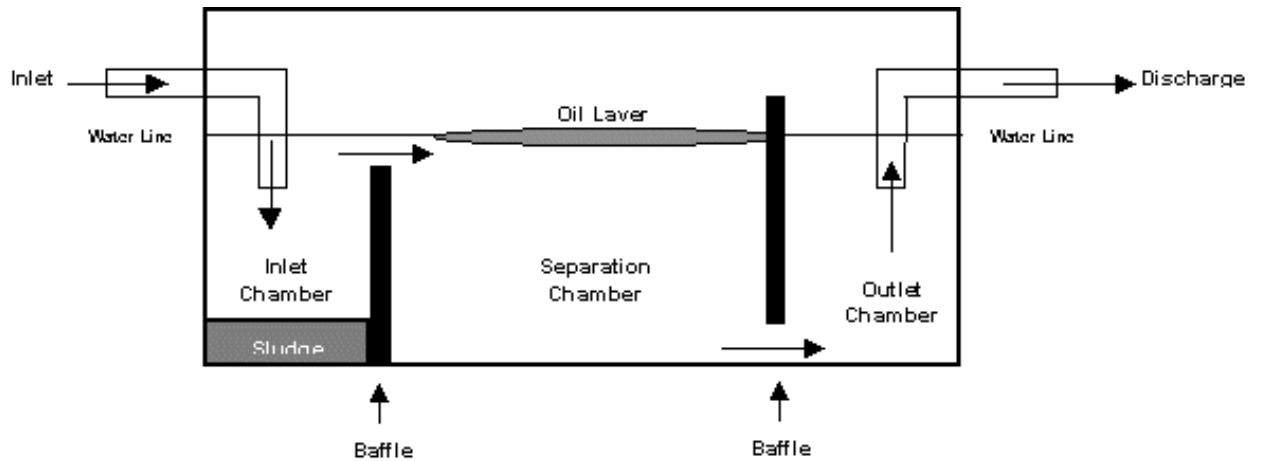
Contractor: _____
 (Name) (Signature)

Consultant: _____
 (Name) (Signature)

Client: _____
 (Name) (Signature)

APPENDIX C

Oil – Water separator



This is an example of a very simple but effective silt / oil water separator that should be constructed at the wash bays of all the construction sites. It should be noted that REGULAR cleaning is required to ensure effectiveness. Sludge removal and oil skimming is two maintenance actions required to ensure effectiveness.