
Environmental Scoping Assessment

To Support an Application for an **Environmental Clearance Certificate (ECC)** to Permit a Listed Activity -the Construction and Operation of a Fuel Retail Outlet

Omuntele Village
Omuntele Electoral Constituency
Oshikoto Region



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APP006309

Final Report

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INFORMATION SHEET	
Project Title Name	<p>An Environmental Impact Assessment (EIA) Report in Support of an Application for an Environmental Clearance Certificate (ECC) to Permit the Construction and Operation (Including Renovations and Routine Maintenance) of a new Fuel Retail Outlet and Related Amenities</p> <p>Omuntele Village Omuntele Electoral Constituency Oshikoto Region</p>
MEFT Application No.	APP-006309
Applicant /Promotor	<p>Infinite Logistics and Transport CC Reg. No. CC/2020/05468 Omuntele Village Omuntele Oshikoto Region Namibia</p>
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EXECUTIVE SUMMARY

Infinite Logistics and Transport CC (the '**Promotor**') is proposing to construct and to operate a fuel retail outlet (FRO) and related amenities at the settlement of Omuntele in the Oshikoto Region. Ekwao Consulting ('**Ekwao**') was appointed by the promotor to facilitate the approval process for an Environmental Clearance Certificate (ECC) which, in terms of the Environmental Management Act and EIA Regulations, is mandatory for such kind of development.

The operation of the FRO is planned to tie in with the completion of the tarring of district road D3645 which links the settlement with the B1 highway. D3645 is a vital road facilitating movements of goods and services to numerous villages scattered in that part of the region including communal farmers herding livestock in the 'okashana' which borders Etosha National Park.

The proposed FRO will supply automobile diesel oil (ADO) and unleaded petrol (ULP) from underground storage tanks (USTs) delivered to vehicles via a system of pipelines and pumps on a forecourt area. Construction activities will entail some earthworks to bury the USTs, to install the reticulation system (fuel conveying pipelines and electrical cables), a forecourt area, pumps and buildings. The operational phase will include road tankers delivering fuel to the site, discharging of delivered fuel into USTs, dispensing fuel from USTs into vehicles of clients and day-to-day administration duties.

Ekwao has conducted a risk assessment to determine potential impacts (both real and perceived) which the proposed development will bring to bear on the receiving environment during its various phases (planning & designing, construction, operational and possibly decommissioning phases). The environmental assessment was undertaken to allow the proponent to apply for an ECC in terms of the Environmental Management Act (No. 7 of 2007) and related EIA Regulations as per GG No. 4878.

There were no impacts identified for the planning and design phase, but the construction phase, thirteen (13) environmental impacts/aspects were identified and assessed. Out of these, eleven (11) have negative impacts with significance rating ranging from low without mitigation and very low with mitigation. The majority of negative impacts associated with the project can be reduced if not completely eliminated, if the recommendations proposed in the EMP are complied with.

The socio-economic benefits that will accrue from the development include employment opportunities, skills transfer, payment of taxes to NamRa and increased revenue to the coffers of the regional council. The envisaged CapEx for the development is upwards of N\$20 million which is quite significant given the location of the project. Through the FRO, services are brought closer to the people. The settlement residents and neighbouring communities will not be required to travel long distance to access service at places such Ondangwa, Omunthiya, etc.

It is recommended that an ECC be granted to the applicant (Infinite Logistics and Transport CC) to construct and operate a FRO at the settlement of Omunthiya. There is no such service available at the settlement which is growing at a relatively fast pace and should be declared a village in the near future.

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ABBREVIATIONS AND ACRONYMS

TERM	EXPANSION
ADO	Automobile Diesel Oil
EC	Environmental Commissioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (Act No. 7 of 2007)
EMP	Environmental Management Plan
EMS	Environmental Management System
FRO	Fuel Retail Outlet
HDPE	High Density Polyethylene
HSSEQC	Health, Safety, Security, Environment, Quality – Management System
IAPs	Interested and Affected Parties
m²	Square meters
m³	Cubic meter
MEFT	Ministry of Environment, Forestry and Tourism
MIME	Ministry of Industries, Mines and Energy
MSDS	Material Safety Data Sheet
NamRa	Namibia Revenue Authority
NSI	Namibia Standards Institute
OEC	Office of the Environmental Commissioner
ORC	Oshikoto Regional Council
OV	Omuntele Village
PC	Petroleum Commissioner
PPE	Personal Protective Equipment
PPM	Parts Per Million
PV	Photovoltaic
SANS	South African National Standards
SME	Small and Medium Enterprises
ULP	Unleaded Petrol
USTs	Underground Storage Tank(s)
VOC	Vapour Organic Compounds
WHO	World Health Organisation

DEFINITIONS

TERM	EXPANSION
Assessment	The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making
Business waste	Means any waste generated on any premises used for non-residential purposes, but excluding agricultural properties and small holdings, and does not include general waste, household hazardous waste, garden waste, bulky waste, builder's waste, industrial waste, hazardous waste and health care risk waste
Construction Phase	The phase of a project preceding the Operation Phase, during which project facilities and infrastructure are assembled and installed on their foundations, and connected and tested, to ensure that they operate as designed.
Cumulative Impacts	In relation to an activity, means the impact of an activity that in itself 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.
Disposal	Means the discharge, depositing, dumping, spilling, leaking, placing of waste on or at any premises or place set aside by the Council for such purposes, and "dispose" shall have a similar meaning;
Emergency Plan	An emergency plan is a plan in writing that, on the basis of identified potential incidents at the installation together with their consequences, describes how such incidents and their consequences should be dealt with, both on-site and offsite.
Environment	As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".
Environmental Clearance Certificate	A certificate and associated conditions issued in terms of the Environmental Management Act, authorizing a listed activity to be undertaken
Environmental Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Environmental Management Plan (EMP)	A working document which contains site project specific plan developed to ensure that environmental management practices to eliminate and control environmental impacts are followed during the developmental phase of that site, project and or facility and would normally consist of construction phase, operational phase and decommissioning phases.
General Waste	Means any waste generated on or at any premises used - (a) for residential purposes, and includes agricultural properties and small holdings; or (b) as public and/or private facilities and institutions, but does not include garden waste (unless specifically determined or authorised by Town Council subject to any conditions or limitations the Council may impose), bulky waste, business waste, builder's waste, industrial waste, hazardous waste and health care risk waste.
Hazardous waste	Means - (a) any waste containing, or contaminated by, poison; (b) any corrosive agent; (c) any flammable substance having an open flash-point of less than 90 degrees Celsius; (d) an explosive or radioactive material and substance; (e) any chemical or any other waste that has the potential even in low concentrations to have a significant adverse effect on public health or the environment because of its inherent toxicological, chemical, ignitable, corrosive, carcinogenic, injurious and physical characteristics; (f) any waste consisting of a liquid, sludge or solid substance, resulting from any manufacturing process, industrial treatment or the pre-treatment for disposal purposes of any industrial or mining liquid waste, which in terms of any law, order or directive relating to drainage and plumbing may not be discharged into any drain or sewer.
Industrial waste	Means any waste generated as a result of business, commerce, trade, wholesale, retail, professional, manufacturing, maintenance, repair, fabricating, processing or dismantling activities, but does not include general waste, garden or bulky waste, builder's waste, business waste, hazardous waste or health care risk waste.
Scoping Process	Scoping is that process of the EIA during which key environmental issues and impacts that have to be addressed are identified, and ultimately defining the scope and focus of the assessment.
Operational Phase	The phase of a project during which the newly constructed tanks, pipelines, gantries and associated facilities are operated.
Pollution	Means any change in the environment caused by – (a) any waste, substance or matter; or (b) noise, odour, dust or heat, emitted from or caused by any activity, including the storage or treatment of any waste, substance or matter, building and construction, and the provision of any

	service, whether engaged in by any person or an organ of state if that change has an adverse effect on public health or well-being of people.
Public Participation Process	The process of involving all affected parties in the design, planning and operation of a project. The process requires that the proponents give the parties to be consulted notice of the matter in sufficient form and detail to allow them to prepare their views on the matter. They are also given a reasonable amount of time to prepare their views and an opportunity to present their views to the proponents, who consider the views presented, fully and impartially.
Recovery	Means the process or act of reclaiming or diverting from waste any materials, products or by-products for the purposes of being reused, or collected, processed and used as a raw or other material in the manufacture of a new, recycled or any other product, but excluding the use for purposes of energy generation;
Recyclable waste	means waste which has been separated from the waste stream, and set aside for purposes of recovery, reuse or recycling;
Waste Recycling	Means the process or act of subjecting used or recovered waste materials, products or by-products to a process or treatment of making them suitable for beneficial use and for other purposes, and includes any process or treatment by which waste materials are transformed into new products or base materials in such a manner that the original waste materials, products or by-products may lose their identity, and which may be used as raw materials for the production of other goods or materials.
Waste Recycling Facility	Means a facility which receives any waste, materials, products or by-products for the purposes of recovery, reuse or recycling, and includes a buy-back centre.
Waste Reduction	Means the process or act of reducing the nature, type, quality, quantity, volume or toxicity of any waste generated, and "reduce" shall have a similar meaning
Refuse container	Means any receptacle or other container, including a skip, stipulated or approved by the Town Council from time to time, whether supplied by the Council or not, for the storage, depositing and disposal of waste.
Waste Re-use	Means the process or act of sorting and separating, at the point of origin, different materials found in any waste in order to promote and facilitate recovery, reuse and recycling of materials and resources, and "separate" shall have a similar meaning;
Storage	Means the temporary storage or containment of any waste for a period of less than 90 days after its generation and prior to its collection for recovery, reuse, recycling, treatment or disposal;
Waste	Means any substance or matter whether solid, liquid or any combination thereof, irrespective of whether it or any constituents thereof may have value or other use, and includes – (a) any undesirable, rejected, abandoned or superfluous matter, material, residue of any process or activity, product, by-product; (b) any matter which is deemed useless and unwanted; (c) any matter which has been discarded, abandoned, accumulated or stored for the purposes of discarding, abandoning, processing, recovery, reuse, recycling or extracting a usable product from such matter; or (d) products that may contain or generate a gaseous component
Sustainable Development	"Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations" –World Commission on Environment and Development (1987). "Improving the quality of human life while living within the carrying capacity of supporting ecosystems" - Caring for the Earth: A Strategy for Sustainable Living, by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

1 PROJECT OVERVIEW

1.1 Introduction

Infinite Logistics and Transport CC (ILT, for short or the promotor) is proposing to develop a fuel retail outlet (FRO) at the settlement of Omuntele in Oshikoto region. Situated to the south of the B1 trunk road, ±16 km away, the settlement serves as the administrative seat for Omuntele Electoral Constituency in the region.

In terms of the Environmental Management (EMA), and Environmental Impact Assessment (EIA) Regulation, as per GG No. 4878, an FRO is a listed in the category of hazardous substance for which the storage and handling thereof require the proponent to be in possession of an **Environmental Clearance Certificate (ECC)**.

In this connection, the promotor has appointed Ekwa Consulting to facilitate its application for an ECC with the Office of the Environmental Commissioner (OEC) – a statutory agency in the Ministry of Environment, Forestry and Tourism (MEFT) responsible for the implementation of EMA.

1.2 The Proposed FRO

The preliminary plan is for the FRO to have two underground storage tanks (USTs) installed on the premises, each having a storage capacity of 23 m³ (23 000 liters), an overhead canopy and four pumps on an island connected to a network of pipelines for dispensing fuel and electrical wiring. One tank will be designated for the storage of 50 ppm diesel while the second tank will be dedicated to the storage of unleaded petrol (ULP). Complementing the development will be a tire workshop offering tire replacement, tire repairs, balancing and wheel alignment.

The industry practice is to have a spill control infrastructure consisting of the physical structure, equipment and procedures designed for the purpose of preventing, containing and managing any accidental release of fuel that may occur during the operational lifespan of an FRO.

The development will consist of at least three phases – the planning / design phase, construction and operational phases as more or less presented in **Table 1**.

Table 1: The Project Phases

Project Phases	Expansion
The Planning & Design Phase	<p>The activities performed under this phase are all non-intrusive in nature. They include amongst others the following:</p> <ul style="list-style-type: none"> ✚ Site selection and conceptualization. ✚ Conducting feasibility studies – which was done in that the promotor has been granted a Letter of Intent (LOI) by the line ministry. ✚ Detailed architectural and engineering designs that focus on safety, operational efficiency and compliance with regulatory provisions. ✚ Conducting an EIA (which is this process). ✚ Developing construction-ready drawings including the layout addressing the traffic flow on the premises, parking and laydown areas. ✚ Applying for a Fuel Retail Licence that permits selling of fuel products.
Construction Phase	<p>By their very nature, the activities conducted under this phase are intrusive to the environmental and have to be undertaken with the recommendation provided in the EMP section of this report. Some of these activities are:</p> <ul style="list-style-type: none"> ✚ Site clearing and levelling, i.e. the site is cleared of vegetation, and earthworks performed to prepare the ground for construction. ✚ Grading – the land is graded to the required levels to ensure proper drainage for storm water management. ✚ Installation / construction of infrastructure for the FRO, i.e. the forecourt, canopy, excavation and installation underground storage tanks, secure pump island, fuel conveying pipelines from the tanks to the dispensing pumps, buildings, parking bays and driveways. ✚ Construction, installation and connection of utilities – water, electricity and sewerage. ✚ Construction of a spill control infrastructure, i.e. containment structures to contain a liquid spill to a specific area. ✚ Post-construction Rehabilitation – this involves clearing the site and removing of all building debris (rubbles, unused materials) from site, dismantling the contractor's temporarily camp from the site, rehabilitate the surrounding areas, etc. before handing over the site to the promotor. Branding of the FRO is also done during this time
Operational Phase	<p>When compared to the construction phase, the activities performed under this phase are less intrusive to the environment and include the following:</p> <p>Day-to-day management of the FRO</p>

	<p>Tank Dipping - inventory monitoring by checking and reconciling fuel levels in USTs to detect any product loss including leaking</p> <p>Fuel Receiving - deliveries are made by road tankers and staff of the FRO must safely oversee the transfer from the tanker to the USTs.</p> <p>Dispensing Fuel – client vehicles are refueled by using the pumps installed in forecourt</p> <p>Quality Control: regular testing is conducted to check fuel quality, and all storage and dispensing equipment are to be well-maintained to prevent contamination.</p> <p>Safety & Security: management must ensure a safe environment for both customers and themselves, which includes monitoring for any suspicious activity.</p> <p>Cleanliness: The FRO premises must be kept clean, including the restrooms, sales floor, and the forecourt area around the pumps.</p> <p>Routine Maintenance: Regular maintenance is necessary to keep equipment like pumps in proper working order and prevent breakdowns.</p> <p>Emergency Procedures: All employees must be aware of and trained in safety procedures for handling fuel spills and fire emergencies</p>
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1.3 Triggered Activity

The proposed development has triggered a listed activity that are presented in Table 2 below.

Table 2: Triggered Listed Activities

Activity Category	Expansion
<p>Hazardous Substance Treatment, Handling and Storage</p>	<p>Paragraph 9.2</p> <ul style="list-style-type: none"> Any process or activity which requires a permit, licence or other form of authorisation, or the modification of changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit. <p>Paragraph 9.3</p> <ul style="list-style-type: none"> The bulk transportation of dangerous goods using pipeline, funiculars or conveyors with a throughout capacity of 50 tons or 50 cubic meters or more per day. <p>Paragraph 9.4</p> <ul style="list-style-type: none"> The storage and handling of dangerous goods, including diesel, petrol, liquid petroleum, gas or paraffin, in containers with a capacity of more than 30 m³ at any one location. Temporary storage of hazardous products during the construction phase, e.g. fuel storage for use by construction vehicles. <p>Paragraph 9.5</p> <ul style="list-style-type: none"> Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin.

1.4 Risk Assessment

The EIA was undertaken to determine the potential impacts that the proposed project phases – planning, construction, operation and possibly decommissioning - will bring to bear on the receiving environment. In assessing the potential impacts the definition of the ‘environment’ as described in the Environmental Management Act (EMA) was adopted –

“The ‘**environment**’ means 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 the land, water and air, all organic and inorganic material and living organisms, and
- (b) The human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values”

Potential impacts, both positive and negative, that are associated with the proposed project have been identified and subjected to an assessment process. In the EMP section of the report, mitigation measures have been suggested/recommended on how to reduce, minimise or eliminate such impacts.

The underlying objective is to ensure that the proposed development is implemented in a manner that meets the three pillars of sustainable development – economically is technically sound, financially viable and environmentally sustainable.

1.5 Project Information and Screening

Following the site inspection, a background information document (BID) was prepared and submitted to OEC, which allocated an application number (**APP-006309**) to the project. In terms of the screening notice issued by OEC, these reports have to be prepared and submitted:

- ✚ A Scoping Assessment Report;
- ✚ An Environmental Management Plan (EMP)
- ✚ Public Participation Process (PPP), and
- ✚ A Consent letter from the relevant authority.

1.6 Objectives and Scope of the Assignment

The main objectives of the EIA can be summarized as follows:

- ✚ To identify the baseline conditions about the project site and its surroundings.
- ✚ To conduct a public participation process (PPP) as part of the impact assessment process during which stakeholders and IAPs are accorded an opportunity to participate in the EIA process.
- ✚ To identify and assess social impacts that may result from the construction, operation and closure of the proposed site.
- ✚ To fully integrate the mitigation measures in the planning /design, construction and operational phases of the FRO.
- ✚ To develop an EMP with a set of recommended mitigation measures or management actions to avoid, reduce and or to eliminate potential impacts.
- ✚ To provide adequate information to the OEC to help the EC to make an informed decision on the site.

1.7 Approach to the Study

An investigative approach was adopted in conducting the scoping assessment to investigate the potential impacts on the social and natural environment as a result of the construction and operations of the FRO.

- ✚ Baseline information on the site and its surroundings was obtained through field reconnaissance of the proposed site and its surroundings.
- ✚ As part of the scoping process to determine potential environmental impacts, interested and affected parties (IAPs) were consulted about their views, comments and opinions, all of which are presented in this report.
- ✚ Desk studies and local knowledge from previous scoping assessments conducted by the EIA Consultant in the region of Oshikoto.
- ✚ The adverts placed in newspapers and EIA notices posted at the site, did not yield as response from members of public;
- ✚ Potential environmental impacts emanating from the construction, operations and decommissioning of the project site were determined and possible enhancement measures were listed for positive impacts while mitigation/preventative measures were provided for negative impacts.
- ✚ The findings of the scoping report, public consultation process and the Environmental Management Plan (EMP) were compiled into this report to support the application for an Environmental Clearance Certificate (ECC) submitted to the OEC.

2 PROJECT NEED AND JUSTIFICATION

The project need and justification has been described from three perspectives:

- ✚ Site Viability Assessment;
- ✚ Desirability Justification, and
- ✚ Social Justification.

2.1 Site Viability Assessment

To ensure that there is fair competition in the fuel retail space in the country; MIME has introduced guidelines on the construction of new FRO. Any entrepreneur who aspired to construct a new FRO is required to conduct a **site viability assessment** (SVA) which has to be submitted to MIME accompanied by a comprehensive business plan.

On receipt of the said SVA report from a prospective entrepreneur, MMEI proceeds by conducting its own assessment on that specific site. An applicant whose site is found viable in terms of the below listed criteria is issued a **Letter of Intent** (LOI) by MIME:

- ✚ The need for a new FRO at that specific locality;
- ✚ Expected volumes or storage tank capacity to be installed;
- ✚ Current and projected traffic volume at the specific locality; and
- ✚ Proximity to existing fuel outlets.

Only an applicant who is in possession of an LOI issued by MIME can proceed to the next stage of conducting an EIA, getting drawings for the FRO prepared and is eligible to apply for a FRL (Fuel Retail Licence). No new FRO will be constructed without a valid LOI and RFL.

An applicant whose site does not meet MIME's evaluation criteria is not issued an LOI and the application is accordingly decline.

The promoter has been issued an LIO by MIME, which demonstrates, both the need and justification for the project. Additionally, the FRO will be developed on land held by the promotor in terms of the Communal Land Reform Act.

2.2 Desirability Justification

The project site is in the Omuntele village which has been identified as a 'growth point'. A settlement whether located in the rural or urban area is specifically identified by the government as having high potential for development and therefore targeted for public and private investment. The strategy is intended to stimulate economic activity and to foster growth in disadvantaged or undeveloped regions of the country.

Omuntele is reached via district road, D3645 also known as the Engoyi-Omuntele road which starts from B1 highway looping around connecting several villages and cattle posts in the Oshikoto region, covering a distance of ±65 km until it links to B1 highway at Omunthia (Fig). The actual distance of D3645 between Ongoyi and Omuntele is about 16 km. This section of the road is currently being upgraded to bitumen standard offering numerous benefits for the local population and stimulating economic activities. An FRO at Omuntele is therefore vital and desirable.

2.3 Social Justification

The 6th National Development Plan (NDP 6) represents a new approach by GRN to promote sustainable and inclusive development in Namibia focusing on:

- ✚ Creating jobs and improvement of livelihoods;
- ✚ Poverty alleviation;
- ✚ Expanding of local infrastructure;
- ✚ Transitioning to a low-carbon economy;
- ✚ Transforming urban and rural spaces; and
- ✚ Improving education and training.

The construction and operation of a fuel site at the specific location as identified by the promotor will contribute to all of those above key focus areas.

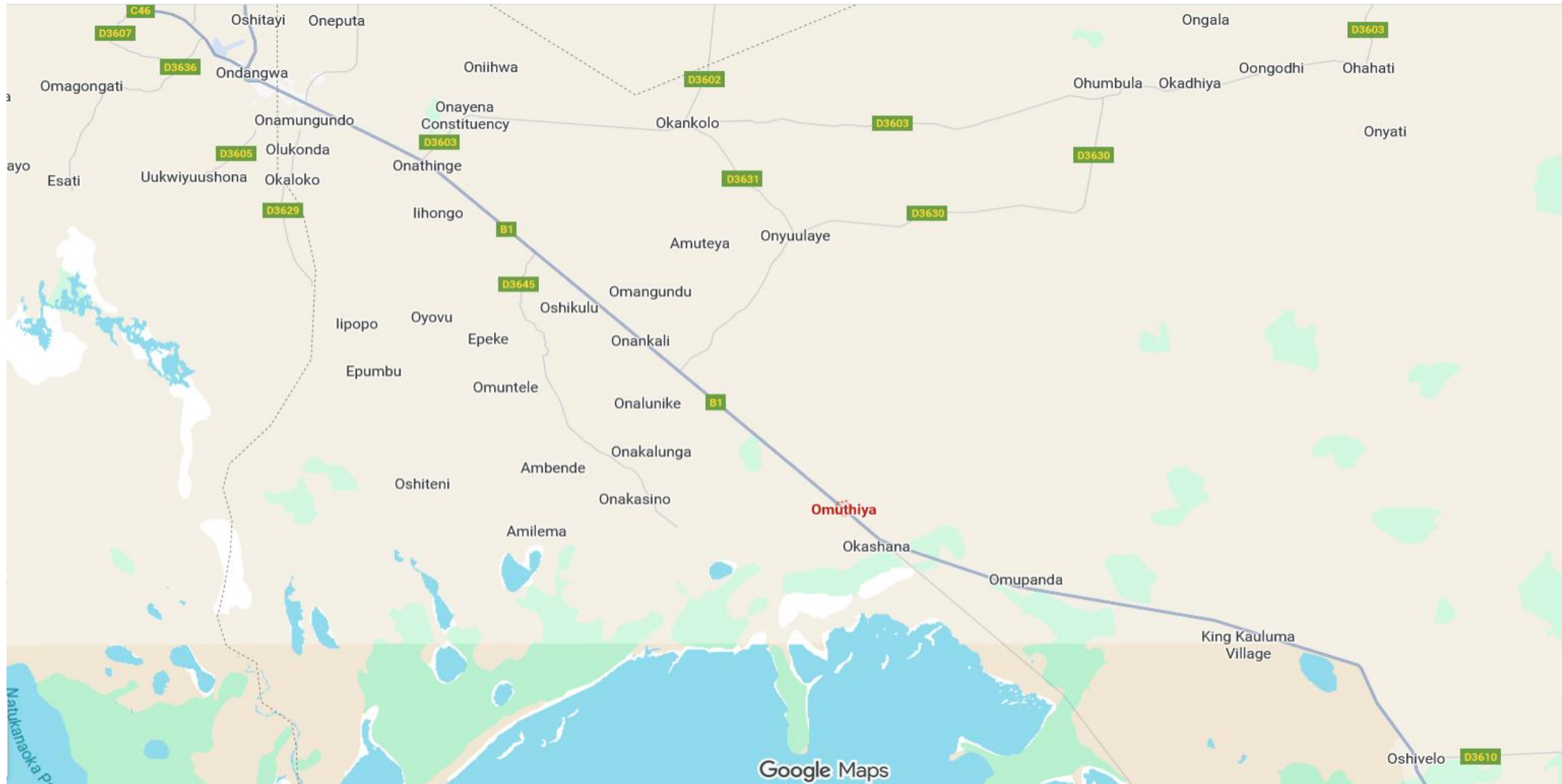


Figure 1: Project Location – Google Earth Image



Figure 2: Tarring of D3645 road to a low volume seal



Figure 3: A section of D3645 gravel road leading to Omuntele Village



Figure 4: A section of D3645 completely tarred and opened for the public



Figure 5: Omuntele Constituency Administrative Building

3 PROJECT INFORMATION

The plan of the promotor is to start with the construction of the fuel retail outlet (FRO) as soon as an Environmental Clearance Certificate (ECC) and Fuel Retail Licence are granted by MEFT and MIME respectively.

3.1 Land Information and Location

Details of the land earmarked for the construction and operation of FRO and location are provided in Table 3:

Table 3: Information of the Land & Location

Land Details & Location	
Location	Omuntele Village Along the D3645 road Oshikandjo-Omulondo
Constituency	Omuntele
Land Holder	Mr Juuso Shikongo
Land Tenure Right	Communal /Customary tenure
Jurisdiction	Ondonga Traditional Authority
Land Size	±4 000 square meters (not surveyed)
Magisterial District	Omuthiya
Regional Authority	Oshikoto Regional Council
Zoning	Not Applicable (communal land)
Current Use	Vacant
Nature of Services /Infrastructure	<p>Water</p> <ul style="list-style-type: none"> ✚ Potable water is available at the site and provided through the Rural Water Supply scheme. <p>Electricity</p> <ul style="list-style-type: none"> ✚ The Omuntele settlement has been electrified and a transformer is in close proximity to the project site. Nored Electricity is the electricity distributor in the area. is the – available in close proximity <p>Sewage</p> <ul style="list-style-type: none"> ✚ There is no sewerage reticulation installed in the settlement. The promotor will have to install a sewerage as part of the project construction. <p>Waste Removal</p> <ul style="list-style-type: none"> ✚ Waste from the government institution (clinic, schools, constituency office, etc) is collected and disposed of by the regional council clinic. <p>Site Accessibility</p> <ul style="list-style-type: none"> ✚ The site is along the D3645 road and no construction of access road is required. At the time of conducting the study, D3645 was being upgraded to bitumen standard. The entire D3645 road will eventually be tarred. be access <p>Communication</p> <ul style="list-style-type: none"> ✚ Telecommunication services in the form of mobile and fixed line phone infrastructure is available courtesy of Telecom Namibia and MTC. <p>Storm Water Drainage</p> <ul style="list-style-type: none"> ✚ The site has flat topography has and storm water drainage within the project footprint has to be managed through a civil engineering solution, i.e. an overland system can offer an effective escape of higher return period storm event flows
GPS Coordinates	-18.23947 S 16.23851 E



Figure 6: Project Site - eastwards view with a sewer manhole



Figure 7: Project Site - South View



Figure 8: Project Site - Northern view with heaps of road materials upgrade to the left



Figure 9: Project Site - View to the West

3.2 The Project Details

The proposal is to construct and to operate a FRO that consists of a forecourt with an overhead canopy and two pump islands as well as additional separate pump island dedicated for the refuelling of heavy duty trucks. It is planned to start with two underground storage tanks, each with a design capacity of 23 m³, resulting in a site having a total installed combined capacity of 46 cubic metres (46 000 litres) of combined unleaded petrol (ULP 95) and diesel (50 ppm).

Adequate parking bays will be provided to cater for the patrons with at least four parking bays specifically designated for use by disabled persons. Additionally, the facility will include the following:

- ✚ A convenience store with a bakery
- ✚ A tire repair workshop;
- ✚ Public toilets;
- ✚ ATMs;
- ✚ Refuse storage area, and
- ✚ Office for the management staff.

Industry standards will be followed during the installation of underground storage tanks. The fuel tanks are normally lined with high-density polyethylene liners and have inspection holes with separate filler points surrounded by concrete spill control slabs connected to an oil water separator via drains.

Safety systems that include emergency shutoff mechanism, and channelling of storm water in order to prevent its contamination with hydrocarbons, and firefighting equipment. Fire extinguishers and emergency stops will be placed throughout the facility and within easy reach of attendants.

3.3 Operational Activities

Fuel is delivered to the FRO by road tankers and discharged into USTs from where it is dispensed to customers via dispersers on the pump islands by pump attendants. Tank dipping is regularly undertaken to reconcile fuel volumes in the tanks against fuel dispersed which enables early detection of leaks or pilferage.

The oil water separator will be inspected regularly and cleaned when needed. Any contaminated products will be disposed of at a registered waste oil recycler or approved hazardous waste disposal facility.

Additional operations of the site include tire services – tire repair, new tire sales, tire installation, wheel alignment, etc. and general care and maintenance of the property. Domestic waste produced at the site is temporarily stored in suitable waste bins and removed weekly by the regional council for disposal at an approved landfill site in the region. The site will provide employment to about 15 people.

3.4 Project Alternatives

Only three alternatives were considered for this project, namely: design/layout, technology and the 'No-Go' option.

3.4.1 DESIGN/LAYOUT ALTERNATIVE

It is advisable to have the FRO designed in a manner that allows a smooth transition to the use of renewable energy, i.e. the building structures, layout of the roof and orientation should facilitate easier installation of solar panels ensuring maximum exposure to the sun.

3.4.2 TECHNOLOGY ALTERNATIVES

A variety of technologies are used at FRO that are regularly upgraded and updated for purpose of enhancing convenience, efficiencies and security. Such technologies include smart pumps with digital interfaces, mobile payment options, automated systems, and data analytics for fuel management and energy optimization. Things such as energy saving bulbs, dual flush toilets, etc. may be used to save consumables.

It is also important to keep in mind that the energy transition includes electrical powered vehicles. Therefore, it is wise to consider the installation of vehicle charging stations to cater for this growing number of motorists.

3.4.3 THE NO-GO ALTERNATIVE

This alternative assumes that the status quo remains unchanged in that no FRO is constructed on the premises. There will be no disturbances and the land will continue to remain in its current state.

However, this alternative is not encouraged because the absence of a FRO at the specific site would mean that Omuntele residents and the general public travelling on D3645 will not have fuel for their vehicles, and may be compelled to travel long distances to refuel elsewhere resulting in increased ambient gaseous emissions.

The goals as outlined in NDP 6 will remain unfulfilled in that no employment is created and the youths especially those in the village will remain unemployed and disgruntled. The 'No-Go alternative' option is therefore not supported.

3.5 Duration for Construction

It is estimated that the construction phase for the FRO will last for about twelve (12) months - this long period is assumed to include tender document preparation and tender appraisals. Procurement of items with long lead-times such as tanks and pumps is also expected to extend the construction period.

The capital investment for an FRO of the scale and scope proposed by the promotor is about N\$20 million – a huge investment in a rural village. The facility is expected to have an operational lifespan in excess of twenty (25) years.

3.6 Ancillary Infrastructure Required for the Construction

No major infrastructure is required on site for the construction of the development. The required infrastructure to support the construction is briefly discussed below:

3.6.1 CONTRACTOR'S CAMP AND LAYDOWN AREAS

A designated areas will be established on the premises to allow the appointed contractor to establish a temporary construction camp where to keep its plants, machines, equipment and its personnel. The area allocated should be big enough to accommodate all construction equipment and personnel.

Environmental Considerations:

When selecting an area for the campsite, choose a site that will cause minimal disruptions to existing habitats and ecosystems. Mature trees must not be chopped down.

3.6.2 SANITATION

Proper sanitation at the construction camp is crucial for the wellbeing, health and safety of personnel. Adequate facilities should be provided which include clean drinking water, toilets with running water, handwashing stations, showers, and proper waste management system to prevent disease and contamination.

Environmental Considerations:

A high standard of housekeeping must be maintained which focuses on prevention of contamination and pollution of soil, water and air from leaking sanitation facilities. Proper waste management must be maintained throughout the construction period.

3.6.3 SECURITY

To campsite must be secured and preferably fenced in with a single access point. Access to the construction camp must be restricted to construction personnel only. The Foreman must determine if a security guard is required to man the premises during working hours.

Environmental Considerations:

Poor security at the construction campsite could lead to loss of resources through theft, sabotage and or vandalism

4 SITE BASELINE ANALYSIS AND POTENTIAL IMPACTS

A brief baseline of the project site is presented in table ? below. Only those aspects of the environment that have a bearing on the project have been elaborated upon.

Aspect	Baseline Conditions/Aspects	Identified Impacts /Challenges
Land Use and Soil Characteristics	The predominant land use in and around Omuntele is subsistence farming – crop and livestock (cattle and goats). Being an extension of the Kalahari Sand basin, soil is characterised by sandy texture with poor water holding capacity, low nutrient retention and naturally acidotic.	No impacts are anticipated. The project will occupy a footprint of ±3000 m ² and is confined to an area earmarked for the development of a settlement (i.e. future urban)
Topography and Drainage	The project site (Omuntele village) is characterised by a high flat plateau at an elevation of approximately 1,089 to 1,093 meters above sea level. It is part of the extensive Kalahari sand basin resulting in generally flat, sandy landscape	Storm water may be a challenge especially during heavy down pours. No pollutants from the project site should be transported through storm water drainage systems to potentially pollute the natural environment.
Climatic Data	Rainfall: Ranging between 400 mm and 500 mm with most precipitation occurring in November through to March	The FRO must meet SANS requirements and should not pose any environmental threat due to climatic conditions.
	Temperature: Daily maximum and minimum temperatures range between the highest of 35 °C and lowest of 17 °C respectively. During winter, night temperature could drop as low as 3°C.	Water resources should be safe and not contaminated as a result of operations of the FRO.
	Sunshine: The average sunshine per season is 1 382 hours.	The benefit of sunshine hours makes the use of solar power as an alternative energy source
Surface (hydrology) and groundwater (hydrogeology) sources	The project site falls within the overall large Cuvelai-Drainage system (also known as the Cuvelai-Etoshia Basin) a transboundary wetland area shared between Angola and Namibia. It was formed between 650-600 million years ago and extends about 450 km from north to south, creating a landmass of 160 000 km ² (Figures 10 & 11). During the rainy season, water flows in the basin from north to south through a network of channels (oshonas). This is the source of both surface and groundwater available in the project area.	Groundwater remains an important resource and would be at risk if fuel spills are not contained, cleaned and disposed of properly. Proper containment should aim at preventing spillages and leakages
Geology (Regional)	A cross section of the Cuvelai basin stretching from Ruacana to Tsumeb shows the rock formation in the basin from the oldest to the youngest: Pre Damara (2600-1800 Ma), Nosib Group (900-750 Ma), Otavi Group (750-650 Ma), Mulden Group (560-600 Ma) Karoo Sequence (300-130 Ma) and Kalahari Sequence (65 Ma to present day), (Fig. , Hipondoka, 2005) Unconsolidated to semi-consolidated sands, calcrete and gravel sediments are the youngest geological formation encountered around the project site.	A high risk to groundwater pollution exists as a result of the geological sensitivity of the area – comprising of unconsolidated and semi-consolidated subsurface sands and gravel sediments.
Fauna and Flora	The arid savanna environment of the project site influences the fauna and flora diversity. The plant life is typical of the arid savanna which covers over 70% of Namibia. The landscape is dominated by grasses and drought-resistant trees and bushes including acacia trees. Wildlife includes a variety of savanna adapted species with some large animals appearing as seasonal visitors. Due to the project's close proximity to the Etosha National Park, human-wildlife conflict does occur in the area, often of elephants escaping from national park destroying cops,	The project site will be constructed within an already disturbed settlement zoned locality. Some vegetation is present on the site and will be cleared during the construction. No immediate threat to biodiversity is expected in the greater area is expected. Pollution may cause damage to any biodiversity surrounding the site but the extent is expected to be localised.
Fauna and Flora	The plant life in Omuntele is typical of the arid savanna, which covers over 70% of Namibia. Resilient species have adapted to cope with scarce moisture and nutrient-lacking soils	
Air pollution	At present Omuntele is served by two district roads – D3629 and D3645 are both gravel roads and intersect at the centre of the settlement. Dust is often generated by the traffic operated on these roads which increases the ambient air quality at	During construction activities some dust and gaseous emissions will be generated from the use of construction equipment and machines. Minimal

	the settlement. At present, the D3645 road from B1 (at Ongoyi) to a low volume seal standard road.	air pollution will occur during the operational phase.
Noise Disturbance	There are no industries at the settlement that are associated with noise disturbances. However, construction machinery used in the upgrading of D3645 road are the source of noise pollution at the settlement and surroundings.	Noise will be a factor during the construction phase as a result of construction equipment and machinery used in the operation. Activities such as welding and carpentry are generally associated with excessive noise. During the operation phase some noise will be generated by road tankers delivering fuel to the site. Since a FRO is a business that operates 24/7, noise from vehicles visiting the site will continue throughout the night.
Traffic Impacts	The traffic volume on both gravel district roads (D3645 & D3629) serving the settlement of Omuntele is currently low to moderate. Traffic flow is expected to change with the tarring of D3645.	During construction and operation of the FRO some traffic impacts can be expected in the vicinity of the project site especially where the vehicles gain access to site. Traffic flow may be impacted by road tankers delivering fuel potentially resulting in accidents and or accidents if measures are not in place.
Fire		Chemicals such as paint and thinners used during the construction may be flammable. Activities such as welding and grinding can cause sparks capable to start a fire. Unleaded petrol is extremely flammable and if not handled according to industry standards (such as SANS) can be a potential source of fire risk during the operational phase of the site.
Visual Nuisance (lighting)	At present sources of visual impacts in and around the settlement are in the form of communication towers, electrical power lines with overhead transformers, numerous road construction traffic signs as well as litters (papers, plastics, empty bottles). There are no street light at the settlement.	Lighting requirements should be carefully planned to meet the security and policing activities of the project without resulting in excessive illumination.
Cultural and Heritage Resources	At Oshikulu village alongside the Engoyi-Omuntele road, a 'living museum' showcasing the tradition of the broader heritage of Aawambo people has been established. Visitors can learn about the cultural heritages of northern Namibia	In the event of cultural or heritage items unearthed during the construction activities, management measures in the EMP should be followed.
Socio-economic environment	During the 2023 Namibia Population and Housing Census, Oshikoto region had a population of 257 302. The Omuntele constituency had 21 043 people making up 8.2% of the region. Subsistence farming in the form of growing mahangu is the primary economic activity, but the sector offers limited opportunities in terms of formal employment. The bulk of economic activities is in the informal trade. Unemployment is therefore a serious problem.	The FRO will provide formal employment to people from the area. Some skills development and training will also benefit employees during all phases of the development. The spinoff from the project will also be significant training will also benefit employees during the operational phase.

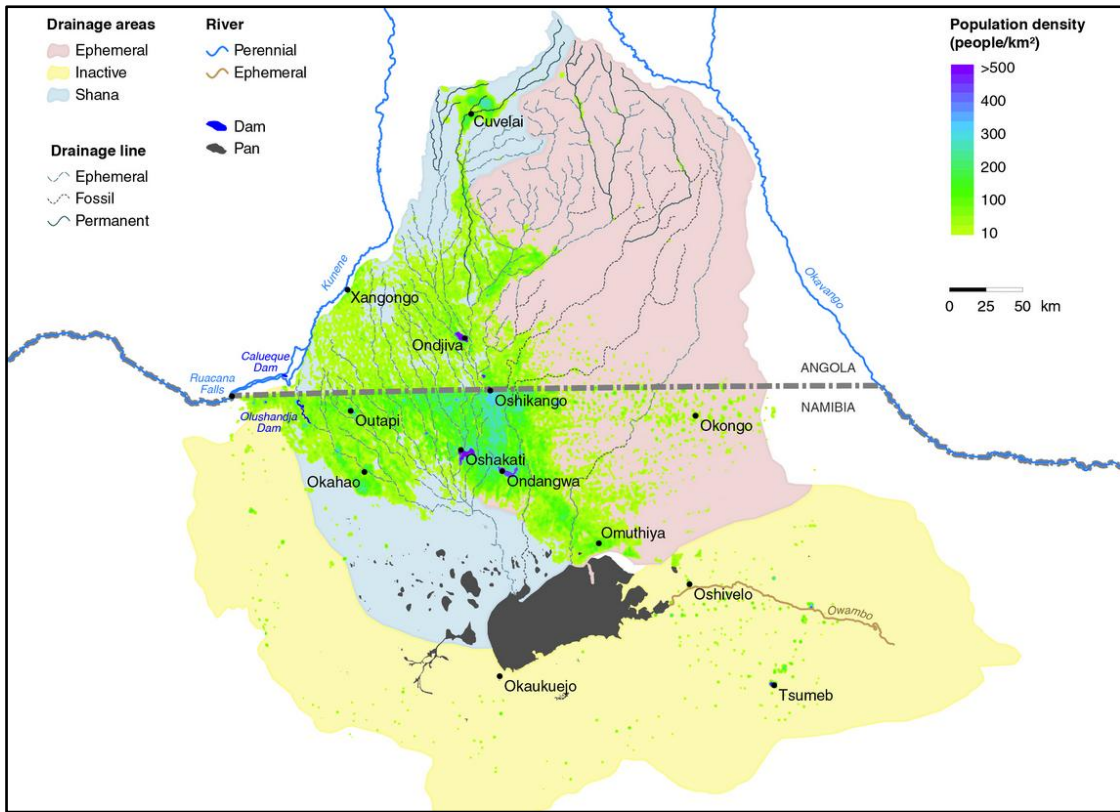


Figure 10: Owambo Basin and the Cuvelai Drainage System (source: Atlas of Namibia)

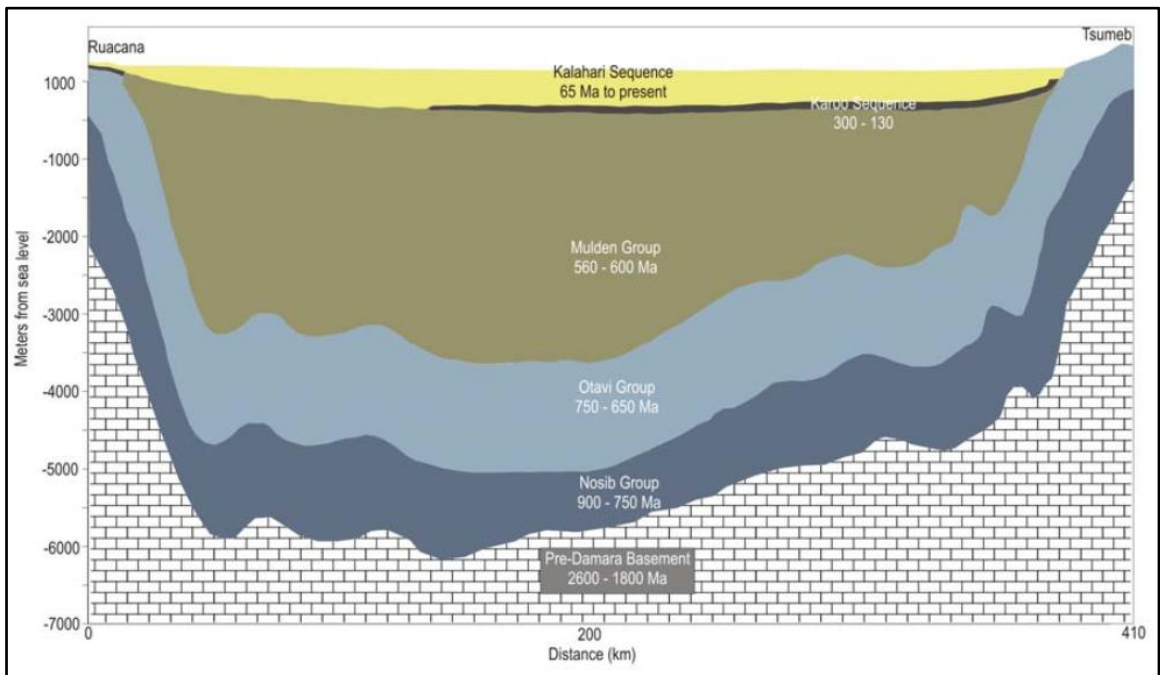


Figure 11: A cross section through the Owambo Basin (source – Evolution of Etosha by Hiponda, 2005)



Figure 12: Visual Impacts around the Project Site

5 THE REGULATIVE FRAMEWORK

For development to take place on a sustainable basis, government has formulated laws, rules and policies that require the implementation of all those projects that considered to have an adverse impact on the environment, to be preceded by an environmental scoping assessment. Some of the laws that are applicable to the activity envisaged by the promoter are as listed in **Table 5**.

Table 4: Legislative Framework

Legislation	Main Aspects
<p>The Constitution of Namibia</p>	<ul style="list-style-type: none"> • Supreme law of the land. • Encourages the welfare of the people. • Provides for environmental protection. • Recognises international agreements and corporations.
<p>Environmental Management Act (Act. No. 7 of 2007)</p>	<ul style="list-style-type: none"> • Provides for the definition of the environment. • Promotes and encourages sustainable management of the environment when natural resources are exploited/extracted for the benefit of the residents/citizens. • Provides for a process of assessment and control of activities that are likely to pose significant effects on the receiving environment.
<p>Environmental Management Regulations (GG No. 4847 of February 2012)</p>	<ul style="list-style-type: none"> • Heralded the implementation of the EMA almost five years after the Act was approved by the legislature; • Presents a list of activities that require an ECC prior to commencement, and • Regulates and provides guidelines on how EIAs must be conducted.
<p>Petroleum Products Regulations and Petroleum Products and Energy Act</p> <p>(GG Notice 2000)</p>	<p>The Act regulates the licensing and certification of fuel outlets including related facilities such as FROs, LGP bottling plants, etc.</p> <p>Section 3 (1) states that</p> <p>(1) No person shall</p> <ul style="list-style-type: none"> • operate a retail outlet or conduct the business of a wholesaler, unless authorised to do so under a retail license or wholesale license; • operate a consumer installation, unless authorised to do so under a certificate, and • shall possess or store any fuel. <p>(2) No person shall possess or store any fuel except under authority of a license or a certificate approved by the Minister of MIME.</p> <p>(3) The Minister of Mines and Energy has under regulation 44 of the Petroleum Products Regulations approved the use in Namibia of these specifications, standards and code of practice:</p> <ul style="list-style-type: none"> • the American Standards Institute (ASI); • the British Standards Institute (BSI); • the South African Bureau of Standards (SABS, and • the South African National Standards (SANS) and • <i>SABS 0131-1: 1977</i> – The storage and handling of liquid fuel Part 1 – Small consumer installations. <p><i>SABS 0131-2 : 1979</i> – Storage and handling of liquid fuel Part 2 – Large consumer installations;</p> <p><i>SABS 0131-3 : 1982</i> – The storage and handling of liquid fuel Part 3 – Bulk low-flash point fuel storage and allied facilities at large consumer installations, and</p> <p><i>SABS 0108</i> – Classification of hazardous locations and selection of apparatus for use in such locations.</p>
<p>The Local Authority Act (No. 23 of 1992)</p>	<ul style="list-style-type: none"> • Provides for the establishment of local authority councils to manage and handle the affairs of local government and defines the powers of the local councilors, duties and functions; • Outlines the structure of local authority councils, including membership, elections, and management, and • Addresses issues such as infrastructure, service provision, taxation, and financial management of local authorities.

<p>Labour Act (Act 11 of 2007 as amended)</p>	<ul style="list-style-type: none"> • The Act contains extensive and detailed provisions relating to the basic employment conditions, rules regarding termination of employment, dismissals and disciplinary action; • It also provides for the prevention of trade disputes, unfair labour practices, regulates and controls collective job action, employment agencies and all matters incidental thereto, and • The Act also provides the right to the employees to speak about work conditions, the right to say no to unsafe work, the right to be consulted about safety in the workplace and the right to workers compensation.
<p>Public and Environmental Health Act (Act No. 1 of 2015)</p>	<ul style="list-style-type: none"> • The Act provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto; • It deals and provides guidelines on noise generation and control thereof within an urban environment; • Also deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc.;
<p>Public Health Covid-19 General Regulations (as amended throughout 2020 to 2022)</p>	<ul style="list-style-type: none"> • Provides for a framework on how to deal with the challenges occasioned by the outbreak of the Covid-19 pandemics and includes issues related to restrictions on gathering, testing, contact tracing, quarantine facilities, public transport, sanitation at the work place, and • It also provides for burial protocols to be followed for those who succumbed to the pandemic.
<p>Social Security Act Act 34 of 1994 Employees' Compensation Act (as amended)</p>	<ul style="list-style-type: none"> • Compels employers and employees to make equal contributions to the Social Security Fund. Contribution is based on 0.9% of an employee's basic earnings with a minimum of N\$2.70 and a maximum of N\$81.00 • Requires employers to contribute to an insurance fund which covers injuries and accidents on duties.
<p>Hazardous Substances Ordinance (No. 14 of 1974)</p>	<ul style="list-style-type: none"> • Provides for the control of hazardous substances with potential to cause harm, injuries and even death. • Also provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances.
<p>Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)</p>	<ul style="list-style-type: none"> • Provides control of noxious or offensive gases and matters incidental thereto. • Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
<p>Water Resource Management Act (2004)</p>	<p>The following permits are required in terms of the Water Act:</p> <ul style="list-style-type: none"> • Water abstraction permits; • Domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits; • Water use for dust suppression; and water reticulation permits (pipelines), and • Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.
<p>National Heritage Act No. 27 of 2004</p>	<p>No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated.</p> <ul style="list-style-type: none"> • Section 48 sets out the procedure for application and granting of permits, such as the permit required in the event of damage to a protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment. • Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council
<p>Namibia Standard Act (Act No. 18 of 2005)</p>	<p>Responsible for the promotion of standardization and quality assurance in the industry, commerce and the public sector in Namibia, with the aim of improving product quality, industrial efficiency and productivity and promoting trade so as to achieve optimum benefit for the people of Namibia.</p>
<p>National Development Plans (NDP6)</p>	<p>NDP5 has its goal to reduce poverty such that by 2022, marginalized communities are integrated into the mainstream economy.</p>

6 IMPACT ASSESSMENT METHODOLOGY

6.1 Introduction

The methodology used to determine the **Significance Rating** of potential environmental impacts that may arise during the implementation of the proposed project is presented in this section. Environment assessment is, in essence an imprecise science, because the assessment of predicted significance of an impact for any particular project, is by its very nature inherently uncertain. To tackle the uncertainty, an empirical standardized assessment methodology has been developed. The impact assessment methodology used for this project is outlined in **Table 5**.

Table 5: Criteria for Impact Assessment

Criteria for Ranking	Rating	Expansion
NATURE of the Impact	Positive	The activity will have effects that are socially, economically and environmentally beneficial.
	Neutral	The activity has zero effect – no impact
	Negative	The activity will have effects that are socially, economically and environmentally harmful.
INTENSITY (SEVERITY) of the environmental Impact	Zero to Very Low	Negligible change, disturbance or nuisance. The impact affects the environment in such a way that natural functions and processes are not affected. People/communities are able to adapt with relative ease and maintain pre-impact livelihoods
	Low	Minor or slight change, disturbance or nuisance. The impact on the environment is not detectable or there is no perceptible change to people's lives.
	Medium	Moderate change, disturbance or discomfort. Where the affected environment is altered, but natural functions and processes continue, albeit in a modified way. People/communities are able to adapt with some difficulty and maintain pre-impact livelihoods, but only with a degree of support.
	High	Prominent change, disturbance or degradation. Where natural functions or processes are altered to the extent that they will temporarily or permanently cease. Affected people/communities will not be able to adapt to changes or continue to maintain pre-impact livelihoods.
DURATION of impacts	Short term	Under 5 years
	Medium term	Impact ceases between 5 and 15 years if activity is stopped.
	Long term	Beyond 15 years (Impact ceases after the operational life of the activity, either by natural processes or by human intervention).
	Permanent	Where mitigation is either by natural process or by human intervention and will occur in such a way or in such a time span that the impact can be considered transient.
EXTENT /SPATIAL SCALE of the Impact	Local	Impact is confined to project or study area or part thereof, e.g. limited to the area of interest and its surrounds.
	Regional	Impacts is confined to a region, in this case, Hardap region
	National	Impact is confined to a country as a whole
	International	Impact extends beyond the national scale
PROBABILITY of the impact occurring	Improbable	Where a possibility for the impact to occur is very low either because of design or historic experience, i.e. less 30% chance of occurring.
	Possible	Where there is a distinct possibility that the impact would occur, i.e. between 30% and 60% chance of occurring.
	Probable	Where it is most likely that the impact would occur, i.e. between 60% and 80% chance of occurring.
	Definite	Where the impact would occur regardless of any prevention measures, i.e. more than 80% chance of occurring.
DEGREE OF CONFIDENCE of the assessment	Low	Below 35% sure of impact prediction
	Medium	Between 35% and 70% sure of impact prediction
	High	Over 70% sure of impact prediction
Degree to which Impact can be mitigated (reduced or eliminated)	None	No change of impact after mitigation
	Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact.
	Low	Where the significance rating drops by one level, after mitigation
	Medium	Where the significance rating drops by two to three levels, after mitigation.
	High	Where the significance rating drops by more than three levels, after mitigation.

Criteria for Ranking	Rating	Expansion
Loss of Resources – the degree to which a resource is permanently affected by the activity.	Low	Where the activity results in a loss of a particular resource but where the natural, cultural and social functions and processes are unaffected.
	Medium	Where the loss of a resource occurs, but natural, cultural and social functions and processes continue, albeit in a modified manner
	High	Where the activity results in an irreplaceable loss of a resource
Reversibility the degree to which an impact can be reversed.	Irreversible	Where Impact is permanent
	Partially Reversible	Where Impact can be partially reversed
	Fully Reversible	Where Impact is fully reversed
Determining the Significance Rating Consequence is a product of Extent, Duration and Intensity .	High	Impacts are of high magnitude and will be experienced regionally for at least the lifespan of the development or will be irreversible. The impacts could be have the no-go proposition on parts of the development in spite of mitigation measures that may be implemented.
	Medium	Natural, cultural and/or social functions and processes are altered by the activities, and management measures must be provided to reduce the significance rating.
	Low-Medium	Impacts will be experienced in the local and surrounding areas for the lifespan of the development and may result in long term changes. Management measures may be proposed to ensure that the impact remain of a low significance rating.
	Low	Neither environmental nor social and cultural receptors will be adversely affected by the impact. Management measures are usually not provided for low impacts.
	Very Low	There is no impact at all - not even a very low impact on a party or system. : Impacts will be site specific and temporary with no mitigation required

6.2 Significance Rating

Normally, the magnitude of an impact is based on specialized knowledge related to the relevant standard (threshold value specified and source referenced). For each impact, the **Extent** (spatial scale), **Magnitude** (size or degree scale) and **Duration** (time scale) are explained. These criteria are used to ascertain the **SIGNIFICANCE RATING** of an impact, initially without mitigation (WOM), and secondly when recommended mitigation measure have been applied, i.e. with mitigation (WM). The Significance of an impact is derived from temporal and spatial scale and magnitude. Such significance is informed by the context of impact.

6.3 Mitigation Measures

A mitigation hierarchy of action has been developed to respond to any proposed activity and covers aspects such as impact avoidance, impact minimization, restoration and compensation. It is imperative to enhance the environment by ensuring that positive gains are included in the proposed development or activity. Where negative impacts occur, the hierarchy indicates the steps which have to be followed. Such steps are most effective when applied at the conceptual stages of the project.

Once significance rating has been determined for each impact, management and mitigation measures must be determined for all impacts that have a significance ranking of medium and higher in order to attempt to reduce the level of significance that the impact may reflect. Based on the proposed mitigation measures, a mitigation efficiency, whereby the initial significance is re-evaluated and ranked again to effect a significance that incorporates the mitigation based on its effectiveness. The overall significance is then re-ranked, to determine a final significance rating.

7 ASSESSMENT OF ENVIRONMENTAL IMPACTS

In this section impacts with the potential to arise from the proposed FRO are assessed using the methodology described in the preceding chapter.

7.1 Planning and Design Phase Impact Assessments

Table 6: Assessment of Impacts Related to the Planning and Design Phase

Environmental Aspect	Environmental Objectives	Management Action/Mitigation
Compliance Requirements	Ensure that all the necessary permits and licenses are obtained in a timely manner prior to the project implementation.	<p>Ensure that all activities pertaining to the development are compliant with applicable laws and regulations and that all the necessary licenses and permits are secured and in place before construction work commences. Copies to be kept on file at the construction site office. e.g.</p> <ul style="list-style-type: none"> ❖ a valid ECC from MEFT; ❖ a Letter of Intent or Fuel Retail Licence from MIME; ❖ Working Drawings approved where applicable by MIME; ❖ Employment contractors signed by both parties and copies kept on file.
Design Consideration	Working Drawings (To be compliant with local authority standards and specifications – where applicable).	<ul style="list-style-type: none"> ❖ Ensure that design for the FRO and support infrastructure are prepared by a qualified and experienced professional; ❖ The FRO, underground storage tanks, conveying pipelines and pumping system must meet local or international standards and specifications; ❖ Select and implement the design and layout which result in the least environmental disturbances, and ❖ All building infrastructure must meet local building standards.
Decarbonisation Initiative	Strive to limit the carbon footprint of the facility.	<ul style="list-style-type: none"> ❖ During the planning stage, efforts should be made that embrace decarbonisation practices aimed at reducing the carbon footprint of the FRO during its construction and operational phases; ❖ The position and orientation of roof structures covering should allow for installation of solar panels; ❖ Green technology should be adopted when selecting equipment for the facility with emphasis placed on the use of hybrid systems or those systems that can be powered by wind or solar energy; ❖ Where possible, procure and install water recycling facilities including solar geysers instead of conventional geysers, and ❖ Design the facility in a manner that provides adequate day natural lighting and uses energy saving bulbs.
Visual and Sense of Place	Minimise visual impacts	<ul style="list-style-type: none"> ❖ The lighting layout at the FRO, its extent and intensity may not become a nuisance to the public and residents; ❖ Excavation and trenching activities should be carried out in a manner that ensures minimal dust being blown up into the atmosphere; ❖ Predominant wind direction should be taken into account when siting stockpiles of building materials. Mixing of cement must be avoided during windy conditions, and ❖ External walls and roof structures for the facility should be painted with colours that blend in well with the natural environment.
Archaeological and Cultural Resources	Protect items of cultural and heritage nature	<ul style="list-style-type: none"> ❖ The chances of finding items of cultural or heritage nature during the construction phase are good, and ❖ The EMP should be consulted in the event such items are uncovered.
<p>Activities associated with the planning and design phase are done mostly at desktop level. In some cases site visits maybe undertaken, but the impacts from such visits are negligible, if any. There is thus no impact with respect to this phase of the project.</p>		

7.2 Construction Phase Impact Assessments

The construction entails the development of a modern FRO and related amenities. The main construction activities will include:

- ❖ Site clearing;
- ❖ Surveying and setting out various components of the facility;
- ❖ Excavation and trenching (civil works);
- ❖ Installation of 4 x underground storage tanks (USTs) each with a storage capacity of 23 m³;
- ❖ Installation of pipelines from USTs to the Pump Island;
- ❖ Installation of Pumps, and
- ❖ Paving of parking areas around the FRO.

Table 7: Construction Phase Impact Assessments

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
(a) Impacts on the Ecosystem and Biodiversity		
<p>The proposed site is on urban land which has been subjected to human activities resulting in alteration of the ecosystem and biodiversity. The nature of impact is expected to be minimal and confined within the project footprint.</p> <p>The cumulative impact will be site specific, definitive, of low intensity and of low impact</p>	<p>Nature - Negative Extent - Site Specific Duration - Short term Intensity - Very Low Probability - Improbable Significance Rating Low - WOM Very Low - WM</p>	<ul style="list-style-type: none"> ❖ Care should be taken to confine all excavations and trenching to areas that are clearly demarcated; ❖ Have construction employees inducted on the EMP and maintain a high standard of housekeeping throughout the construction period; ❖ Develop and maintain an effective waste (solid and hazardous) handling and disposal plan for the site; ❖ Keep onsite ablution facilities tidy and clean at all times; ❖ Use lights during the construction phase for security purposes and ensure that lights is directed downwards to working surfaces and not outwards; ❖ Waste such as food items with the potential to attract scavengers to the construction site must be kept in bins with lockable lids.
(b) Soil Compaction and Erosion		
<p>The construction activities will include excavation and trenching which involve some disturbances to the soil profile. The rocky topographic nature of the site implies that substantially digging will be required hence increased soil exposure and disturbances.</p> <p>The underground tanks will require pits that are excavated and the remaining materials that are not used in backfilling of the pits could be used for levelling and landscaping.</p> <p>There is a possibility that soil may be compacted which results in reduced ability of vegetation growth and water absorption. Exposed soil is also susceptible to erosion by wind and water during high wind and rainfall conditions.</p>	<p>Nature - Negative Extent - Site Specific Duration - Temporary Intensity - Very Low Probability - Probable Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Limit excavation activities to areas that are clearly demarcated and visible to the workers executing such activities; ❖ Newly cleared and exposed areas must be promptly rehabilitated in order to avoid soil erosion; ❖ Where necessary, temporarily stabilization measures must be used; ❖ Implement appropriate erosion control measures during the construction phase, and at the first sign of erosion remedial action must be taken; ❖ Care must be taken to ensure that runoff is well dispersed so as to limit erosion; ❖ An Emergence Response Plan (ERP) to deal with any spills or a major leak which may occur must be developed, and ❖ Comply with the EMP.
(c) Surface and Groundwater Contamination		
<p>Erosion of soil, sand or poor storage and handling building materials may contaminate and or block existing surface water courses.</p> <p>Pollutants, i.e. fuel, oil, construction waste and</p>	<p>Nature - Negative Extent - Medium Duration - Short term Intensity - Low Probability - Probable</p>	<ul style="list-style-type: none"> ❖ Hazardous products required for construction activities should be stored in a secure place with an impervious floor, correctly banded with access limited to key personnel. ❖ Spill control measures must be in place and personnel trained on how to respond in the event of a spill occurring.

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
<p>general waste generated during construction activities may enter surface water sources if not managed correctly.</p> <p>Pit excavations for fuel storage tanks has the potential to disturb the surface profile. Incorrect installation of such USTs could lead to leakage of contents with the potential to contaminate groundwater.</p> <p>Incorrect handling of hazardous chemicals used during construction activities could result in spills or leaks with the potential to contaminate both surface and groundwater.</p>	<p>Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Correct procedures as recommended by the manufacturer of hazardous products must be followed when using such products. ❖ Toilets are to be secured to the ground and must have a closing mechanism. Toilet papers must be provided at these facilities. ❖ The contractor must ensure that spillage does not occur when toilets are cleaned/serviced, and contents must be properly stored and disposed of properly; ❖ Discharge of waste into the environment and/or burial of waste is strictly prohibited; ❖ Maintenance of equipment and construction vehicles is not allowed at the construction site. Faulty equipment must be removed from site and repaired at a designated area or workshop; ❖ A designated wash bay area must be provided where construction vehicles and equipment are cleaned. Drip trays and emergency spill kit must be provided at the repair/maintenance workshop; ❖ No washing of plants outside of designated wash bay is allowed; ❖ Leaking equipment to be repaired immediately or removed from the site. <p>Concrete Mixing:</p> <ul style="list-style-type: none"> ❖ Cement mixing must take place on an impervious surface (e.g. plastic or cement mixing pit), and ❖ Unused cement bags are to be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement. <p>Spill Prevention and Management:</p> <ul style="list-style-type: none"> ❖ Vehicles suspected of leaking must be fixed as soon as possible. ❖ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods. ❖ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle. ❖ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. ❖ Spilled substances must be contained in impermeable containers.
(d) Air Pollution		
<p>Dust will be generated, especially where there is exposure of soil stockpiled from excavation work. Other activities that may contribute to the release of dust include offloading and stockpiles of building materials (sand, stones, exposed excavated materials, handling of cement, etc.) and movement of heavy vehicles.</p> <p>Dust generation could be exacerbated during windy conditions and dry periods. In addition to dust, air pollution may result from exhaust fumes emitted by construction vehicles, especially if the vehicles are poorly serviced and maintained.</p>	<p>Nature - Negative Extent - Small Duration - Temporary Intensity - Very Low Probability - Improbable Significance Rating Low - WOM Very Low - WM</p>	<ul style="list-style-type: none"> ❖ A speed limit of 20km/h should be maintained on all internal routes on construction premises; ❖ Dust suppression measures such as wetting of the project area should be employed during windy periods or east wind storms. Recycled water to be used, instead of potable water, to save water; ❖ Where practical, large cleared areas may not be left exposed for longer periods than necessary; ❖ The area of disturbance must be kept as small as possible at all times; ❖ No unnecessary clearing of vegetation, digging or scraping should occur; ❖ All construction vehicles and machinery should be well maintained to allow such equipment to operate efficiently. Idling times of vehicles and machinery to be minimised; ❖ All vehicles used during the project development should be properly maintained and kept in good working order, and

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
		<ul style="list-style-type: none"> ❖ All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.
(e) Noise Pollution		
<p>Construction activities are associated with an increase in noise levels as a result of construction vehicles, plant generators, concrete mixers and various other equipment being used on site. While these activities will produce noise, it is unlikely to have a significant impact on the surrounding area.</p>	<p>Nature - Negative Extent - Small Duration - Temporary Intensity - Very Low Probability – Probable</p> <p>Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ No construction activities must take place between sunset and sunrise. ❖ Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; ❖ Construction vehicles must be well maintained and regularly serviced with defective silencers replaced; ❖ Employ noise reduction methods, i.e. no idling of construction vehicles, no unnecessary hooting, no loud music equipment on the premises, etc. and ❖ Employees working in areas where noise levels are elevated should be provided with suitable PP
(f) Solid Waste Generation		
<p>Various waste types are generated during the construction period, i.e. Building rubble, excavated soil, excess concrete and general waste such as litter, etc.</p> <p>Poor waste management during construction has the potential to lead to contamination of surface water, groundwater, visual nuisance, etc.</p>	<p>Nature - Negative Extent - Medium Duration - Medium Term Intensity - Low Probability - Probable</p> <p>Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ A waste management plan for the construction phase must be developed and implemented. ❖ Building rubble and other construction waste produced must be re-used if possible and, where unfeasible, it must be disposed of at the nearest registered waste disposal facility. ❖ Rubble, which cannot be reused, must be removed from site on a regular basis; ❖ If rubble is stored on site, it should be stored on a designated area which is enclosed and impermeable; ❖ Domestic waste must be stored in containers with lockable lids that must be emptied on a weekly basis or frequently before reaching safe holding capacity; ❖ No waste shall be buried or burned anywhere on the construction site; ❖ Waste may not cause any nuisance to employees or guests visiting the construction site, (e.g. odour); ❖ Construction waste stored on site must be collected and put into suitable closed bins on a daily basis; ❖ Provide suitable waste skips on site. These skips should be sufficient in number, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away; ❖ The construction site must remain litter free and regular inspections for litter must be carried out. The activity must not contribute to any surrounding windblown litter; and ❖ Cement bags must be kept in sealed containers.
(g) Traffic Impacts		
<p>During the construction period, there will be construction vehicles around the project site delivering building materials, i.e. sand, concrete stones, cement, etc. Traffic flow at the C20 intersection may increase causing some congestion.</p>	<p>Nature - Negative Extent - Small Duration - Temporary Intensity - Very Low Probability - Probable</p> <p>Significance Rating Low - WOM Very Low - WM</p>	<ul style="list-style-type: none"> ❖ Large construction vehicles used on the construction site must comply with road regulations; ❖ Any complainants received from any stakeholder with respect to traffic infringement on public road around the construction site, must be recorded, investigated and corrective measures taken; ❖ All construction machinery and vehicles operated on public roads must have their headlights switched on at all times; ❖ Clear signage with respect to access point and exit point to the construction site should be clearly displayed; ❖ All vehicles of the contractor used in construction activities and operated on public roads must be

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
		<p>licensed, roadworthy and driven by operators with valid drivers and third party public license permits;</p> <ul style="list-style-type: none"> ❖ Give truck drivers an induction training workshop on the EMP.
(h) Health and Safety Risks		
<p>Use will be made of construction equipment and machinery (excavators, graders, tippers, concrete mixers, compactors, welding, etc.) which poses potential risks to the health and safety of people working at the construction site as well as members of the public who may be visiting the construction site.</p> <p>A limited amount of hazardous products (fuel, LPG, thinners, paint, etc.) will be kept and stored for use during the construction. Poor storage and handling of such chemicals has the potential to cause environmental harm.</p>	<p>Nature - Negative Extent - Medium Duration - Medium Term Intensity - Low Probability - Probable</p> <p>Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Control access to the construction site with access allowed to workers who have been inducted on the EMP; ❖ Store and handle all chemicals for use at the construction site in accordance with MSDS instructions; ❖ Take the predominant wind direction into account when selecting areas where to store bulky construction materials that are prone to wind dispersal, i.e. building sand, aggregate, cement mixing areas, etc.; ❖ Provide employees with suitable PPEs and enforce wearing thereof; ❖ Train selected employees on how to provide First Aid in the event of an accident/incident occurring. First Aid kits should be available and adequately stocked; ❖ Develop and implement a proper emergency response plan for the construction site; ❖ Ensure that the necessary materials and equipment to deal with any spills and leaks of hazardous products that may occur during the execution of the project, are available; ❖ Make available contact details of persons to be notified in case of a major spillage or accidents on site - nearest police, ambulance, hospital, etc., and ❖ Apply and adhere to all industry specific health and safety procedures and regulations applicable to the fuel sector.
(i) Fire Risks		
<p>Activities such as welding and handling LPG and other flammable products on a construction site can make them sources of very high-risk areas for fire outbreaks.</p> <p>Not only can fire cause major damages to materials and structures, it can also cause undue delays in the execution of project deadline, but it can also pose serious threats to life.</p> <p>Any electrical installations must be thoroughly inspected and undergo PAT testing in accordance with relevant regulations. When it comes to general housekeeping, employees must make sure that all power tools and sockets are switched off when not in use, and any faulty equipment must be removed from the site immediately.</p>	<p>Nature - Negative Extent - Site specific but can spread to impact wider areas if not quickly contained Duration – Depends on response Intensity – Depends on size of fire Probability – Probable</p> <p>Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Compliance to industry standards and effective training of personnel are key requirements to ensuring that all fire safety measures, guidelines and standards are adhered to; ❖ Ensure that a comprehensive fire risk assessment is carried out at the site to lower the risk of fire outbreak; ❖ It is advisable to take out a short term fire risk protection insurance for the duration of the construction; ❖ All electrical installations must be carried out by qualified persons. Employees must ensure that all power tools and sockets are switched off when not in use, and that any faulty equipment is removed from the site immediately; ❖ A designated area must be dedicated for food preparation (cooking) and eating meals at the construction site; ❖ Fire control mechanisms (firefighting equipment) must be routinely inspected to ensure that they are in good functional status at all times; ❖ All staff on site to be made aware of general fire prevention and control methods, and the name of the responsible person to alert in the event of fire occurring; ❖ Burning of waste on the construction is not permitted; and ❖ Designated smoking areas should be provided, with special bins for discarding of cigarette butts.

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
(j) Site Security Risks		
<p>During the construction phase, building materials, construction vehicles and equipment at the project site are exposed to the general public which presents opportunities for theft and or vandalism unless proper security is maintained.</p>	<p>Nature - Negative Extent - Site specific if EMP is implemented Duration – Temporary (during construction period only) Intensity – Low Probability – Probable Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Strictly control access to the construction site and no unauthorised persons may be allowed onto the site; ❖ Unsocial activities such as excessive consumption of alcohol, or illegal selling of alcohol, drug utilization or selling of any items on site, are prohibited; ❖ Any person found engaged in such activities shall face disciplinary action, and in severe cases dismissed; ❖ All visitors/guests are to report at the site office on arrival, then undergo a brief safety induction, sign an indemnity form unless in possession of a correct PPE clothing to wear on site; ❖ The induction briefing must communicate the safety rules and regulations to be adhered to by all persons entering the construction site. No person may remain on site without having first completed an induction training; ❖ No hunting of wildlife (game) is allowed, as well as trading and selling of items of any kind is allowed at the construction site. Employees found engaging in such activities will be disciplined or have their employment terminated; ❖ The construction site must be secured so as to reduce the opportunity of criminal activities occurring including theft and or vandalism; ❖ No drugs, alcohol, fire arms or dangerous weapons of any kind (pangas, machete, cutlass, butcher’s knives, cutlass, traditional spears, etc.) are allowed on the construction. Only security personnel is allowed to carry fire arms; ❖ Intoxication while on site is not allowed, and if deemed necessary, breathalysing may be instigated for all construction personnel.
(k) Visual Intrusions and Sense of Place		
<p>Construction sites are often a hive of activities with movements of construction vehicles, machinery, equipment and overhead cranes. The site can therefore be a source of visual annoyance with scaffolding and cranes lifting construction materials often visible from a distance.</p>	<p>Nature - Negative Extent - Site Specific Duration - Temporary (during construction phase) Intensity - Very Low Probability - Probable Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Position construction machinery and equipment and associated facilities in such a way that it is out of sight of human receptors using public road – C20; ❖ Employ techniques to suppress dust especially during strong east wind as well as smoke generation during the construction; ❖ Where possible, use suitable screening during the construction to minimise visual impacts; ❖ Specific activities that are prone to generating excessive dust should be suspended during high windy conditions or avoided altogether; ❖ Direct security light at night inwards where it is required and where feasible make use of LED bulbs, and ❖ Maintain a high standard of housekeeping with zero tolerance on littering and waste.
(l) Heritage and Cultural Resources		
<p>Items of cultural or heritage nature should always be expected to be unearthed in activities that involve some form of excavation and trenching. In the event of items of cultural or heritage nature are found ‘the chance find procedure’ must be followed as per the EMP</p>	<p>Nature - Negative Extent - Site Specific Duration - Temporary Intensity - Very Low Probability - Probable Significance Rating Low - WOM Very Low - WM</p>	<ul style="list-style-type: none"> ❖ Protect items of cultural and heritage nature if found during earth excavation works; ❖ Should any archaeological or cultural sites or objects be located during the construction of the proposed project, the measures proposed in the EMP should be followed; ❖ Brief all construction site personnel to immediately report any sites or objects of cultural or heritage nature; ❖ In the event of finding what appears to be an archaeological site or a cultural and/or historic site or

Summary of Impact	Impact Assessment	Proposed Mitigation Measures
		object, work should be terminated until a qualified archaeologist or historian can examine the item; and ❖ Comply with the measures provided in the EMP.
(m) Socio-economic Environment		
<p>(i) Investment in the local economy:</p> <p>The project CapEx for the FRO is in the order of N\$20 million while the average OpEx for modern FROs is about N\$3.5 million per month.</p>	<p>Nature - Positive Extent - Medium Duration - Short term (construction work is temporary) Intensity - Medium Significance Rating Low - WOM Low Medium - WM</p>	<p>❖ The investment is a major boost to the settlement of Omuntele, and to the Oshikoto Region in general. During the construction phase, the bulk of the funds invested in the project is spent in the local economy for the procurement of building materials (cement, building sand, building stones, etc.), and</p> <p>❖ The national economy will also benefit from import duties, PAYE taxes and VAT paid to NamRa – the collector of state revenue.</p>
<p>(ii) Support to Local Community</p> <p>Where applicable strive to source and to procure construction materials and services required for the project from the local and neighbouring communities</p>	<p>Nature - Positive Extent - Medium Duration - Short term Intensity - Medium Probability - Probable Significance Rating Low Medium - WOM Medium - WM</p>	<p>❖ Provide and offer building trade opportunities to local or SME companies from the neighbouring communities, e.g. trenching, plumbing, tiling, paving, bricklaying, joinery, etc.;</p> <p>❖ Ensure that employment is offered in a transparent manner without discrimination on the basis of colour, race, tribe, religion, gender or political affiliation, and</p> <p>❖ Employment of non-Namibians must be justified to the line ministry.</p>

7.3 Operational Phase Impact Assessments

The operation phase will entail these activities:

- Delivery of bulk fuel by road tankers.
- Discharging into onsite USTs.
- Refueling of patrons vehicles.
- Day-to-day management of the facility (tank dipping, record keeping, cleaning, etc.).
- Maintenance of the facility, etc.

Table 8: Operational Phase Impact Assessments

Impact Description (Summary)	Impact Assessment	Mitigation Measures
(a) Contamination of Surface and Groundwater Sources		
<p>Contamination of stormwater may occur during the operational phase when vehicles are refuelled at the filling station. Spilled fuel, oil or other contaminants may be washed into the stormwater system unless mitigated.</p> <p>The underground fuel tanks that will be used for the storage of fuel products have the potential to leak and result in the spillage of fuel into groundwater sources. This is a potentially cumulative impact which can have far reaching negative impacts.</p>	<p>Nature - Negative Extent - Medium Duration - Short term Intensity - Low Probability - Probable Significance Rating Low Medium - WOM Low - WM</p>	<p>❖ Develop and implement a site specific spill contingency plan for the operation;</p> <p>❖ Monitor fuel volumes in the USTs on a daily basis to detect unexplained losses due to leakages;</p> <p>❖ Inspect the condition of the tanks, piping and pumping systems on a regular basis;</p> <p>❖ Test tanks integrity at least 5 years after installation, with repetition on a 5-year cycle thereafter;</p> <p>❖ Extract the tanks at the end of their lifespan and replace as governed by the supplier specifications;</p> <p>❖ All waste oil, greases, fuels, chemicals, etc. should be collected and disposed of in an appropriate manner at a licensed offsite facility;</p> <p>❖ The contents of grease traps and other waste oil, grease, etc. should not be emptied and dumped to the surrounding area;</p> <p>❖ Clean water (e.g. surface runoff) and dirty water (e.g. contaminated water from the forecourt and filling points) must be separated to prevent contaminated run-off from entering stormwater, groundwater and soil;</p> <p>❖ The forecourt area and the filling points have to be concreted and graded so that any effluent run-off will not enter the natural environment, but pass through an oil</p>

Impact Description (Summary)	Impact Assessment	Mitigation Measures
		<p>water separator sump/s before discharging into a collection ditch;</p> <ul style="list-style-type: none"> ❖ The oil/water separator sump/s must be checked regularly and kept clean to prevent blockage and overflow. In addition, regular monitoring and clearing of oil/water separator sump/s will prevent hydrocarbon liquids from discharging onto sewer/stormwater system; and ❖ Waste from the separator must be disposed of at a suitable waste handling site where a Safe Disposal Certificate is issued.
(b) Hazardous Waste Generation and Handling		
<p>Hazardous waste is likely to occur as a result of a large number of vehicles entering and exiting the FRO on a daily basis. The filling station management will have limited control as regards to vehicles entering the facility with oil or fuel leaks. Additionally, hazardous waste will be generated during the cleaning of oil separators and may occur as a result of split fuel or oil during refueling or servicing of vehicles.</p>	<p>Nature - Negative Extent - Site Specific Duration - Short term Intensity - Low Probability - Probable Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ Paved surfacing coming in contact with vehicles must be bunded such that stormwater flows into an oil/water separator, to allow for treatment of hydrocarbons and other hazardous wastes; ❖ A designated vehicle wash bay must be put in place and must have an impermeable surface, with a drainage system directing wastewater to an appropriate classified waste site; ❖ Maintain silt traps, sumps and oil separators as part of the stormwater management system; ❖ Hazardous substances should be disposed of an appropriate classified waste site; ❖ Sludge from the oil separator must be disposed of to a suitable waste handling waste handling contractor or to an offsite licensed facility; ❖ All product spills within the bunded area must be effectively cleaned up; ❖ All contaminated spill material such as fibres soil, sandbags, etc. must be disposed of in appropriate hazardous waste landfill site; ❖ Ensure safe disposal of Methanol/water mixture used for removal of any residual water from the fuel tanks; ❖ Any split material must be disposed of in a suitable licensed waste disposal facility; ❖ Transport, handling and storage of hazardous and flammable substances must comply with all provisions of the Hazardous Substance Act and related regulations.
(c) Solid Waste Generation and Handling		
<p>Once operational, the FRO is expected to generate solid waste in the form litter primarily from the convenience store, take-away and minor solid waste from the fuelling activities. Unless well managed, solid waste has the potential to pollute the surrounding area including the onsite sewerage system.</p> <p>Solid waste can also be considered a cumulative impact as it will contribute to the overall waste produced within the settlement if not managed well.</p>	<p>Nature - Negative Extent - Site Specific Duration - Short term Intensity - Low Probability - Probable Significance Rating Low Medium - WOM Low - WM</p>	<ul style="list-style-type: none"> ❖ A Waste Management Plan must be developed for the FRO and implemented by Management; ❖ Handle waste and waste management plan as per the EMP; ❖ Encourage and put waste recycling practice in place at the facility; ❖ Domestic waste must be stored in containers that are labelled or colour coded. The waste bins must be properly secured and covered to prevent scavengers from tipping them over; ❖ Vermin / weatherproof bins to be provided in sufficient numbers and capacity to store domestic waste. ❖ Solid waste shall be stored in a designated general waste storage area which is enclosed and impermeable; ❖ Adequate refuse collection must occur to ensure no build-up of refuse occurs at the filling service station. Waste may not cause any nuisance, e.g. odour; and ❖ No waste shall be buried or burned anywhere on the site.
(d) Sewerage and Wastewater Generation		
<p>The new FRO will generate effluent and wastewater during its operational activities. Sewerage and wastewater has the potential to leak and contaminate the soils, stormwater and groundwater in the surrounding area.</p>	<p>Nature - Negative Extent - Small Duration - Temporary Intensity - Low Significance Rating</p>	<ul style="list-style-type: none"> ❖ Wastewater and effluent management must be implemented at the FRO; ❖ Ablution facilities and associated piping system must be adequately lined and checked for leaks on a regular basis; ❖ All waste generated from the site must be discharged into the onsite sewerage system onsite.

Impact Description (Summary)	Impact Assessment	Mitigation Measures
	Low Medium - WOM Low - WM	
(e) Air Pollution		
<p>Vapour emissions may result from exhaust fumes emitted by vehicles passing through the FRO, particularly from those vehicles that have not been serviced correctly. Vapour emissions are likely to be produced during the refueling when hydrocarbon vapours are displaced by the liquid petrol and diesel</p> <p>Point source emissions from the facility including SO₂; PM₁₀; NO₂ and CO may alter air quality</p> <p>Area source emissions including Volatile Organic Compounds (VOCs) from the whole site during operation may alter air quality and impact on surrounding properties.</p>	Nature - Negative Extent - Small Duration - Short term Intensity - Low Probability - Probable <u>Significance Rating</u> Low - WOM Very Low - WM	<ul style="list-style-type: none"> ❖ Volatile Organic Compound (VOC) Vapour Recovery System, should be installed onto fuel dispensing nozzles at the refuelling and forecourt areas; ❖ Operators must ensure that every effort is made to limit gaseous emissions; ❖ All equipment used must manufactured to limit VOC vapour emissions; ❖ Operational refuelling procedures must be put in place to limit vapour emissions during refuelling of vehicles and storage tanks; ❖ Develop and maintain environmental management system for emission control; ❖ Monitor gaseous emissions on a yearly basis measuring these parameters: <ul style="list-style-type: none"> o Particulate Matter (PM₁₀), o Sulphur dioxide (SO₂), o Nitrogen dioxide (NO₂), and o Carbon monoxide (CO)
(f) Noise Pollution		
<p>The FRO is expected to be operated 24-hours each day. The movements of vehicles on adjacent roads are also expected to generate some noise.</p> <p>Overall the noise generated at the facility is expected to be negligible.</p>	Nature - Negative Extent - Small Duration - Short term Intensity - Low Probability - Probable <u>Significance Rating</u> Low - WOM Very Low - WM	<ul style="list-style-type: none"> ❖ Establish noise level threshold consistent with WHO guidelines and comply accordingly; ❖ The facility is located in a remote rural area of the country in which ambient noise levels are quite low and this should be maintained; ❖ Equipment such as pumps to be used at the FRO must comply with the manufacture's specifications on acceptable noise levels; ❖ Air conditioners at the FROs must be well maintained and regularly serviced to ensure minimal noise generation; ❖ Workers must not produce any unnecessary noise, e.g. no loud music to be played, no whistles to be used, etc; ❖ No hooting signs must be displayed to inform patrons not blow their horns.
(g) Visual Intrusions		
<p>The proposed FRO is situated in Omuntele settlement along the district road D3645 – the main road cutting through the village running from north to south and therefore visible to many travellers and settlement residents.</p>	Nature - Negative Extent - Small Duration - Medium Intensity - Low Probability - Probable	<ul style="list-style-type: none"> ❖ Buildings finishes of the FRO should be of appropriate design and quality and must be regularly maintained to prevent visual decay; ❖ Buildings should also be designed in such a way that they fit into the surrounding natural environment of the location; ❖ Waste must be removed from the filling service station and disposed of at an approved designated landfill site in order to avoid unnecessary litter being viewed as visual nuisance on site; ❖ Lights at the FRO must be used for security purposes only and must point inwards and not outwards; ❖ Maintain a high standard of housekeeping at the facility
(h) Health and Safety Risks		
<p>During the operational phase – flammable liquids on site poses a potential fire and explosion risk throughout the lifespan of the proposed FRO. In addition to this, health and safety risks occur with regards to onsite vehicle movement, as well as cooking within the convenience shop and take-away outlet.</p>	Nature - Negative Extent - Small Duration - Medium Intensity - Low Probability - Probable <u>Significance Rating</u> Low - WOM	<ul style="list-style-type: none"> ❖ Management must develop a health and safety management plan for the FRO; ❖ It is a specific requirement to comply with all health and safety standards as specified in the Labour Act and related Legislations; ❖ Smoking should be prohibited in the vicinity of all flammable substances; ❖ Adequate firewater tie-in points must be installed at the facility and functioning;

Impact Description (Summary)	Impact Assessment	Mitigation Measures
	Very Low - WM	<ul style="list-style-type: none"> ❖ Adequate fire extinguishers must be installed and regularly checked for proper functioning; ❖ All employees must be made aware of emergency /contingency plans and the procedure to be followed in the event of an emergency situation; ❖ Records of all environmental and/or health and safety related incidents must be maintained and reported to the relevant authority; ❖ All personnel working at FRO must be adequately trained in relevant health and safety aspects; ❖ A selected employees should be trained on First Aid. A trained First Aider must be present on site at all times. First Aid Kits that are adequately stocked must be available; ❖ A maintenance registry of all equipment whose malfunction can lead to injury or exposure to hazardous substances should be kept; ❖ Apply and adhere to all industry specific health and safety procedures and regulations applicable to the fuel sector.
(i) Stormwater Runoff and Potential for Erosion		
While below average rainfall is generally received in the projects area, the development will consist of impervious surfaces (paved surfaces) and this will result in increased runoff and potentially increased erosion	Nature - Negative Extent – Small Duration – Medium Intensity – Low Probability – Probable <u>Significance Rating</u> Low Medium - WOM Low - WM	<ul style="list-style-type: none"> ❖ A site-specific stormwater management plan must be developed and implemented by Management aimed at handling any increased stormwater runoff that may occur from time to time; ❖ All stormwater runoff from hard paved areas on the site must be diverted into a stormwater treatment system or device capable of removing litter, sediment or oil products; ❖ The stormwater treatment system should include a high flow by-pass system to maintain the quality of the discharged water during periods of high rainfall or first rains; and ❖ At the first sign of erosion, the correct procedure must be undertaken to manage, resolve and prevent it from occurring.
(j) Management of Resources		
Resource at the FRO should be managed and use therefore measured and managed.	Nature - Negative Extent – Small Duration – Medium Intensity - Very Low Probability – Probable <u>Significance Rating</u> Medium - WOM Low - WM	The measures recommended are: <ul style="list-style-type: none"> ❖ Electricity: <ul style="list-style-type: none"> ○ Use electricity sparingly, ○ Measure electricity consumption monthly, and ○ Consider the use of alternative energy such as solar power or wind in order to reduce the carbon footprint of the facility. ❖ Water: <ul style="list-style-type: none"> ○ Use electricity wisely; ○ Enforce water saving strategies which include recycling and reuse; ○ Measure water consumption and ensure that leaking taps are repaired. ❖ Sanitation: <ul style="list-style-type: none"> ○ Monitor consumption; ○ Guard against misuse; ○ Maintain a high standard of housekeeping.
(k) The Socio-economic Environments		
(a) Employment Creation The FRO will help to combat unemployment as new jobs will be created – both temporarily and permanent.	Nature - Positive Extent - Medium Duration – Medium to long term Intensity - Medium	<ul style="list-style-type: none"> ❖ Offer employment opportunities in a transparent manner without discrimination on the basis of gender, religion, race, origin or political affiliation ❖ People from marginalized communities should also be considered for employment; ❖ Employing of non-Namibians must be justified to the line ministry.
(b) Working Conditions Provide a safe and hazardous-free working environment.	Nature - Positive Extent – Medium Duration – Medium	<ul style="list-style-type: none"> ❖ Provide good working conditions to employees with clear defined roles and responsibilities. ❖ Provide adequate ablution facilities with clean drinking water and sanitation facilities (soap, toilets, etc.) and suitable PPE.

Impact Description (Summary)	Impact Assessment	Mitigation Measures
	Intensity – Medium	
(c) Technology and skills transfer Provide opportunities for training and skills transfer	Nature - Positive Extent - Small Duration - Medium Intensity - Medium	<ul style="list-style-type: none"> ❖ Ensure that training opportunities are offered to all employees which ultimately benefits the business; ❖ New technologies are continuously being developed and implemented in the fuel retail subsector – employees should benefit from such technology through training
(d) Communication Keep and maintain good communication with stakeholders	Nature - Positive Extent - Small Duration - Medium Intensity - Medium	<ul style="list-style-type: none"> ❖ Ensure that a project Information Board is procured and installed where it is clearly visible to the general public, prior to starting with construction activities. ❖ Maintain good communication with stakeholders such that at all times.

7.4 Decommissioning Phase Impact Assessments

Considering the CapEx to be invested, it is not projected for decommissioned to happen within the three years which is the validity period of an ECC. The management measures provided under the EMP for decommissioning, are only provided in the event of the project ceasing operation in a premature manner for factors beyond the control of the promotor.

If such a stage is reached, the proponent needs to remove all materials resulting from the demolition from the site. For this specific project, decommissioning will cover aspects such as:

- ❖ Removal of USTs from the site.
- ❖ Rehabilitation of the site to pre-construction conditions.
- ❖ Landscaping by flattening the mounds of soil and planting indigenous trees.
- ❖ Dismantling of all equipment (pipes, pumps, electrical cables, etc.).
- ❖ Removal of all dismantled equipment and disposing off in a responsible manner.
- ❖ Fencing and signposting unsaved areas until natural stabilisation occurs.
- ❖ Retrenching employees, etc.

Table 9: Decommissioning Phase Impact Assessments

Environmental Aspect (Summary)	Impact Assessment	Mitigation Measures
(a) Communication		
Provide information on decommissioning to relevant statutory stakeholders	Significance Rating Low Medium - WOM Low - WM	<ul style="list-style-type: none"> ❖ Inform the relevant GRN Ministries and agencies (MIME, MEFT, Labour, NamRa, SSC, etc.) of the planned decommissioning; ❖ Inform affected employees and their trade union representative giving notices as provided for in the Labour Act; and ❖ Hire a reputable company to carry out the decommissioning.
(b) Underground Fuel Storage Tanks		
Fuel vapour escaping into the atmosphere; Explosion Health issues Contamination of soils from residual fuel	Significance Rating Medium - WOM Low - WM	<ul style="list-style-type: none"> ❖ Ensure there is no spillage of any residual fuel during the emptying and removal of underground tanks. Pumps and associated equipment must be removed by qualified personnel to ensure their safety; ❖ Any fuel removed from the tanks and surrounding soil that maybe contaminated must be removed and disposed of at a licensed landfill site.
(c) Noise and Air Pollution		
Dust released from breaking structures, walls, etc.	Significance Rating Low Medium - WOM Low - WM	<ul style="list-style-type: none"> ❖ Maintain plant and equipment well during the decommissioning phase; ❖ Demolition works to be carried out during daytime only; ❖ Provide workers working in noisy areas with suitable PPEs ❖ Spray dust areas, and ❖ Install dust trappers around the site;

Environmental Aspect (Summary)	Impact Assessment	Mitigation Measures
(d) Solid Waste		
Solid waste can have significantly environmental and societal impacts, building debris, scrap metals, etc.	<u>Significance Rating</u> Low - WOM Very Low - WM	<ul style="list-style-type: none"> ❖ Demolished debris should be stored in a secure place and disposed of in a responsible manner; ❖ Demolished waste should be re-used or backfilled; ❖ All waste generated should be collected by a waste collection company, and ❖ Adequate waste receptacles with bulk storage facilities should be provided at convenient points to prevent possible littering during the dismantling process.
(e) Occupational Health and Safety		
Exposure to harm; Exposure to chemicals; Fire risks; Incidences of accidents, injuries, long term health issues, etc.	<u>Significance Rating</u> Low - WOM Very Low - WM	<ul style="list-style-type: none"> ❖ Provide suitable PPEs to employees; ❖ Train the workers on personal safety and on how to handle equipment and machines; ❖ Ensure that a well-stocked First Aid Kit is on site and maintained by a qualified personnel; ❖ Report any accidents/incidents and treat and compensate any affected workers, and ❖ Provide suitable sanitary conveniences which should be kept tidy and clean.
(f) Socio-economic environments		
Closure can lead to layoff of employees, Financial hardships, Poverty, Emotional stress, etc.	<u>Significance Rating</u> Low - WOM Very Low - WM	<ul style="list-style-type: none"> ❖ The safety of the workers should surpass all other objectives during the decommissioning process; ❖ Adapt a project completion policy – identifying key issues to be considered; ❖ Compensate the retrenched workers and assist them in seeking opportunities elsewhere

7.5 Summary of Impact Assessment

A summary of those impacts that have been assessed is presented in **Table 11**.

Table 10: Summary of Impact Assessments

TABLE 5 : SUMMARY OF IMPACT ASSESSMENTS – CONSTRUCTION AND OPERATIONAL PHASES				
POTENTIAL IMPACTS		NATURE OF IMPACT	IMPACT SIGNIFICANCE	
			Unmitigated	Mitigated
Planning & Design	(a) Compliance Requirements	None		
	(b) Design Parameters			
	(c) Decarbonisation			
	(d) Visual and Loss of Sense			
	(e) Archaeological and Cultural Resources			
Construction	(a) Impacts on Ecosystem and Biodiversity	Negative	Medium	Low
	(b) Soil Compaction and Erosion	Negative	Medium	Low
	(c) Surface and Groundwater Contamination	Negative	Low	Very Low
	(d) Air Pollution	Negative	High	Medium to Low
	(e) Noise Pollution	Negative	Low	Very Low
	(f) Solid Waste Generation	Negative	Low	Very Low
	(g) Traffic Impacts	Negative	Low	Very Low
	(h) Health and Safety Risks	Negative	Low	Very Low
	(i) Fire Risks	Negative	High	Low
	(j) Site Security Risks	Negative	Low	Very Low
	(k) Visual Intrusion	Negative	Low	Low
	(l) Heritage & Cultural Heritage	Negative	Low	Very Low
	(m) Socio-economic Impacts			
	o Investments in the Local Economy	Positive	Medium	Medium
	o Support to Local Economy	Positive	High	High
Operational	(a) Contamination of Surface and Groundwater	Negative	Medium	High
	(b) Hazardous Waste Generation and Handling	Negative	Low	Very Low
	(c) Solid Waste Generation and Handling	Negative	Low	Very Low
	(d) Sewage and Wastewater Generation	Negative	Low	Very Low
	(e) Air Pollution	Negative	Low	Very Low
	(f) Noise Pollution	Negative	Low	Very Low
	(g) Noise Intrusion	Negative	Low	Very Low
	(h) Health and Safety Risks	Negative	Medium	Low
	(i) Stormwater Runoff and Potential for Erosion	Negative	Low	Very Low
	(j) Management of Resources	Negative	Medium	Low
	(k) Socio-economic Environment			
	o Employment Creation	Positive	Medium	Low
	o Working Conditions	Positive	Medium	High
o Transfer of Skills and Knowledge	Positive			
o Communication	Positive			

For the construction phase thirteen (13) environmental aspects were identified and assessed. Out of the thirteen (13), twelve (12) have **negative impacts** while one (socio-economic) has a positive impact. Without mitigation measures; the **Significance Ratings** of the negative impacts ranging from **Low** (8), **Medium** (2) and **High** (2). The **Significance Rating** for the positive impacts were High (1) and Medium (1). With mitigation measures, the significant rating for impacts assessed for the construction ranged from **Very Low** (7), **Low** (4) and **Medium** (1).

Construction activities would result in a localised increase in dust, noise levels and visual impacts. These impacts may be nuisance to the settlement residents but the duration is of a short duration (construction period only). During the operation, some noise may be generated from general operational activities and air quality may be impacted by emissions released from vehicles refueling at the FRO. The nuisance impacts (air quality, noise and visual) during the construction and operation phases are expected to be of a **Very Low** to **Low** significant after mitigation for the construction and operation phases respectively.

During the construction period, handling and storage of hazardous substances, batching of concrete may increase the potential occurrence of spillages, which could impact groundwater resources. For the operation, potential leakages from underground storage tanks may contaminate groundwater resources. With the implementation of appropriate mitigation measures, the impact on groundwater resources are deemed to be **Very Low**.

The proposed FRO has the inherent risk of fire because of the nature of the products handled – fuel is highly flammable liquids. An electrical spark from a malfunctioning equipment can start a fire. Fire could impact on the health and safety of the employees as well as the patrons of the FRO. With effective measures put in place, the significance of the impact is deemed **Low** after mitigation.

8 CONCLUSIONS AND RECOMMENDATION

The development of the FRO at Omuntele settlement has positive impacts on the socio-economic environment (creation of employment, transfer of skills, boost to the settlement and to the broader constituency economy, reduction of traffic of D3645 travelling to urban centres along B1 highway to refuel hence minimal gaseous emissions. Communal farmers will also benefit from the facility because they do not have to travel long distances to refuel their vehicles. Once developed and fully operational, the project as a whole will be vital to the local and regional economy with the potential to improve overall efficiencies in the tourism sector and to accelerate the upgrading of the settlement to a village.

Provided management measures as recommended in the EMP are implemented and complied with, all potential negative impacts associated with the project can be effectively reduced, avoided or completely eliminated.

It is recommended that an ECC be granted to the promoter for the implementation of the project subject to the terms and conditions which the EC may wish to impose.

REFERENCES:

Lithium, BGS, July 2016

Lithium Potential in Namibia, Evaluation of Economic Suitability, Bundesanstalt für Geowissenschaften und Rohstoffe, by Michael Schmidt, 2020 Opportunities

Best Guide Practices – Environmental Principles for Mining in Namibia, A Joint Publication Proudly published by Chamber of Mines of Namibia (CoM), Namibia Chamber of Environments (NCE), the Namibian Government and Members of the Namibian Mining Industry

Linning K, Economic Geology Series. Open File Report EG 070, Geological Report on the Cape Cross Salt Pan, 1965, Geological Survey of Namibia, Ministry of Mines and Energy

Small Scale Mining and Sustainable Development within the SADC Region, August 2001, Bernd Dreschlar

An Artisanal Mining Environmental Code of Practice for Namibia

- January 2011
- Rosina Ndahafa & Morgan Hauptfleisch

Small Scale Mining and its Impacts on Poverty in Namibia. A case study of Miners in

Erongo Region of Namibia

- December 2009
- Jacob Nyambe & Taimi Aumunkete

Adshad, Samuel AM : Salt and Civilisation, MacMillan, 1992

Lac Business Group Inc. Salt Technology & Engineering, RR 3-79 Marple Road, Dalton <http://www.lacsolarsalt.com/Brochure-08.pdf>

Veld Management Principles and Practices

- Fritz Van Oudetshoorn

Namibia's 5th National Development Plan (NDP 5) 2017/18 - 2021/22

NDP 5 - GRN Portal – Erongo Regional Council

National Planning Commission (NPC) 2011: Population and Housing Census Erongo Region, Windhoek, Government Press

Chamber of Mines of Namibia, Annual Reports for 2016, 2017 & 2018

Interventions for Ensuring the Sustainability of the Small Scale Mining Sector in Namibia

- Harmony K. Musiyarira*, Ditend Tesh, Mallikarjun Pillalamarry and Nikowa Namate
- Department of Mineral and Process Engineering, Namibia University of Science and Technology, Windhoek, Namibia

BERRY HH 1975. History of the Guano Platform on Bird Rock, Walvis Bay, South West Africa. *Bokmakierie* 27: 60-64.

CRAWFORD RJM, COOPER J, SHELTON PA 1981. The Breeding Population of White Pelicans *Pelecanus Onocrotalus* at Bird Rock Platform in Walvis Bay, 1947-1978. *Fisheries Bulletin of South Africa*

Boorman M (2011) Unpublished data of ephemeral wetland counts in 2011.

Coastal Environment Trust of Namibia (CETN) (2012) Unpublished data of Walvis Bay counts in 2011.

Simmons R 1992. The status of coastal wetlands in Namibia. Matiza T, Chabwela HN (eds) Wetlands conservation conference for southern Africa. Gland: IUCN: 125-132.

Underhill LG, Whitelaw DA 1977. An ornithological expedition to the Namib coast. Cape Town: Western Cape Wader Study Group: 1-106.

Williams AJ 1991. Numbers and conservation importance of coastal birds at the Cape Cross lagoons, Namibia. Madoqua

Stauth, R. (1983) *Environmental Economics* in Fuggle, R.F. and Rabie M.A. (1983)

Mendelsohn J, Jarvis A, Roberts C and Robertson T (2002) Atlas of Namibia. Published for the Ministry of Environment & Tourism by David Philip.

Kinahan, J. (2012) Archaeological Guidelines for Exploration & Mining in the Namib Desert.

AREVA Resources. Retrieved from www.aveva.com Bitter A (2010) Ground Water Specialist Report to the EIA: Improved water supply to the Langer Heinrich Mine