

APP-002690

ENVIRONMENTAL IMPACT ASSESSMENT

**PROPOSED NEW FUEL RETAIL FACILITY IN ROCKY CREST
TOWNSHIP, IN WINDHOEK**

KHOMAS REGION



Rocky Crest Service Station

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EXECUTIVE SUMMARY

An Environmental Impact Assessment (EIA) has been commissioned by VIVO Energy Namibia Ltd, for the proposed fuel retail facility in Rocky Crest, Windhoek (22.58121°S; 17.04757°E).

Considering the nature of the proposed development and its activities, the EIA has been undertaken in accordance with the requirements of existing national legislations, of which the National Environmental Assessment Policy (1995), the Environmental Management Act (2007) and its regulations of 2012, and other relevant legislations and regulations pertaining to Environmental Assessments and protection of the environment in the Republic of Namibia are considered most important. Some existing international policies are also taken into account and are used as guidelines.

Impacts identified from baseline studies, site visits and stakeholder consultation process have been assessed making use of a comprehensive assessment methodology as provided by the Department of Environmental Affairs (DEA) of Namibia. This included looking at impact significance through, its nature, extent, duration, probability and intensity. Major issues or impacts identified are soil, surface and ground water impacts; air quality (including dust pollution); ecological impacts; risk of fires and explosions; hygiene and health impact; heritage impacts; generation of waste; traffic safety, especially during construction; noise pollution; safety and security; and cumulative impacts.

These impacts are assessed in each of the three stages of project development namely, construction, operation and decommissioning phases.

Socio-economic impacts amongst others include creation of part-time and permanent employment opportunities and economic spin-offs for the local businesses and suppliers. Cumulative impacts expected as a result of the proposed fuel retail facility include, dust and exhaust emissions from vehicles frequenting the facility during all phases of the development, coupled with the existing emissions from vehicles in the surrounding areas, the air quality will be impacted.

A slight traffic nuisance might be experienced by motorists using the nearby roads during construction. This will most likely be caused by slow moving vehicles frequenting the construction site. Minor leakages from the operations of the facility may result in a collective long-term significant impact on the groundwater.

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan (EMP) will guide and ensure that the impacts of the construction work are minimised. All environmental risks can be minimised and managed through implementation of preventative measures and sound management systems. Environmental audits should be carried out to ensure compliance of the EMP and environmental regulations of Namibia.

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List of Abbreviations

EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMA	Environmental Management Act
EMS	Environmental Management System
ESA	Environmental Scoping Assessment
I&Aps	Interested and Affected Parties
PPPPs	Projects, Plans, Programmes and Policies
LRP	Lead Replacement Petrol
ULP	Unleaded Petrol
SANS	South African National Standards



PROJECT DETAILS

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REPORT STATUS: **FINAL**

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GLOSSARY OF TERMS

Project area - Refers to the entire study area encompassing the total area as indicated on the study area map.

Project site - Refers to the geographical setting (piece of land) on which the proposed development is to be located.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

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.

Evaluation – means the process of ascertaining the relative importance or significance of information, the light of people’s values, preference and judgements in order to make a decision.

Environment – Is the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life. As defined in the Environmental Policy and Environmental Management Bill of Namibia - *“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 Impact Assessment (EIA) – process of assessment of the effects of a development on the environment.

Environmental Management Plan (EMP) - A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

Fuel retail facility / Service Station - is defined as any land, building or equipment used for the sale or dispensing of petrol or oils for motor vehicles or incidental thereto and includes the whole of the land, building or equipment whether or not the use as a petrol station is the predominant use or is only a part thereof.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.



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

Proponent (Applicant) – means a person who intends or undertakes a project, policy, programme or plan.

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

Environmental Clearance Certificate - This Certificate obtained from the Ministry of Environment and Tourism (Directorate of Environmental Affairs) approving the EIA study and providing clearance to the proponent to initiate work.

Environmental Assessment Practitioner - A person designated by a proponent to manage the assessment process.

Local Authority - Means a local authority council as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992).



1. BACKGROUND AND INTRODUCTION

Vivo Energy Ltd. has commissioned an Environmental Impact Assessment (EIA) for the proposed construction and operation of Rocky Crest fuel retail facility (22.58121°S; 17.04757°E) in Rocky Crest, Windhoek. See Figure 1.

Most aspiring fuel retail operators in Namibia now understand that good environmental practice is a business opportunity. These opportunities can be maximised when management of environmental issues is integrated with other business planning and becomes part of continuous improvement. By gaining awareness of environmental laws, and how the proposed business has the potential to affect the environment, the proponent will be in a better position to manage risk in its business.

Matrix Consulting Services was appointed to undertake the Environmental Impact Assessment of the proposed fuel retail facility. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant impacts on the environment and that they are mitigated. The environmental impact assessment was conducted to comply with Namibia's Environmental Assessment Policy and the Environmental Management Act.

1.1. *Project Rationale*

As a result of the increasing development in the Rocky Crest and adjacent townships in Windhoek, the need for a fuel retail facility rose due to an increasing population of motorists frequenting the area and its surroundings. The facility aims at alleviating the fuel shortage experienced by motorists in the area. This facility will secure fuel availability in the area.

The proposed retail fuel facility will also provide the much-needed modern fuelling point with all its associated modern services.

Potential spin-offs:

- ❖ **Employment:** The creation of approximately 12 new jobs is expected. It is estimated that the new jobs will improve the livelihoods of the new workers and their families. Given the unemployment rate of 30% in the region, this in itself is regarded as a significant benefit to the socio-economic situation in the region (Census Regional Profile, Namibia Statistics Agency, 2011).
- ❖ **Skills development:** As the construction and operation of the development requires specialised work and skills it can be expected that experts will be training locals in certain skills during development and operation.
- ❖ **Contribution to economic development** (e.g. supply of materials and goods for construction purposes; new businesses, employment etc.).
- ❖ **Technology transfer to Namibia:** The new facility includes state-of-the-art technology. The construction, operation, maintenance and support of these

new technologies will expose local artisans and industries to these technologies. This can have a positive effect on the area.

- ❖ General enhancement of the quality of life in Rocky Crest and the surrounding areas, especially the immediate businesses and residence; and
- ❖ Expansion of trade and industrial activity in the area.



Figure 1. Project location (22.58121°S; 17.04757°E)

1.2. Project Phases

The project is made up of 3 phases, namely the construction, operation and possible decommissioning. Activities involved in all phases are as follows:

Construction Phase:

- ❖ Excavation for the pipeline trenches and the tank pits.
- ❖ Transport and installation of the storage tanks and relevant material.
- ❖ Installation of fuel pipelines.
- ❖ Constructions of dispensing pump islands and installation of the pumps.
- ❖ Construction of spill control measures.
- ❖ Installation of associated electrical supply.
- ❖ Construction of associated buildings and other infrastructure.

Operational Phase:

- ❖ Filling of the underground storage tanks from road transport tankers.
- ❖ Dispensing of fuel into vehicles and other approved containers.

Decommissioning Phase:

- ❖ Removal of all infrastructure not reused during future use of land; and
- ❖ Rehabilitation of the land.

2. TERMS OF REFERENCE

Vivo Energy Ltd. has commissioned an Environmental Impact Assessment (EIA) for the proposed fuel retail facility in Rocky Crest, Windhoek. The proposed fuel retail facility will be located at 22.58121°S; 17.04757°E.

Matrix Consulting Services was appointed to undertake the Environmental Impact Assessment of the proposed fuel retail facility. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant impacts and that they are mitigated. The environmental impact assessment was conducted to comply with the Environmental Assessment Policy (1995) and the Environmental Management Act (2007) and its regulations of 2012.

3. ENVIRONMENTAL STUDY REQUIREMENTS

According to the Environmental Management Act no. 7 of 2007, the proponent requires an environmental clearance from the Ministry of Environment and Tourism (Department of Environmental Affairs) to undertake of the construction of a fuel retail facility. The certificate means that the Ministry of Environment and Tourism is satisfied that the activity in question will not have an unduly negative impact on the environment. It may set conditions for the activity to prevent or to minimise harmful impacts on the environment.

The proposed development is listed as a project requiring an environmental assessment as per the following listed activities in the environmental Management Act no 7 of 2007 and its Guidelines (06 February 2012):

Table 1. List of activities identified in the EIA Regulations that apply to the proposed project

Activity Description:	Description of Activity	Activities
Activity 8.9 Water Resource Developments	The construction and other activities within a catchment area.	The project entails activities that will be undertaken within the catchment area.
Activity 9.4 Hazardous Substance Treatment, Handling and Storage	The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one	The project entails the handling of hazardous substances.

	location	
Activity 9.5 Hazardous Substance Treatment, Handling and Storage	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.	The project includes the construction of a service station.
Activity 10.1 (a) (Infrastructure)	The construction of – Oil, water, gas and petrochemical and other bulk supply pipelines.	The proposed project includes the installation of bulk municipal services
Activity 10.1 (j) (Infrastructure)	The construction of masts of any material or type of any height, including those used for telecommunication broadcasting and radio transmission but excluding lightning conductor poles.	The intended development includes the construction of a service station flag pole.
Activity 10.2 (a) (Infrastructure)	The route determination of roads and design of associated physical infrastructure where – it is a public road;	The proposed project includes the construction of roads.

4. DESCRIPTION OF ALTERNATIVES

4.1 *No-Go Alternative*

At the moment, no fuel retail facility exists within a 1.5km radius of the project site. The nearest facility (i.e. Hochland Park Service Station, Puma Pionierspark Service Station) is situated approximately 1.3km and 1.8km respectively from the site. The proposed fuel retail facility will provide the much needed fuel facility in the area and will help secure fuel availability. The facility has the potential to yield significant benefits to numerous stakeholders in the area.

Should the proposed development not take place, development in the area and Windhoek at large is hindered due to the lack of fuel facilities. This will result in fuel shortage in the eastern-central suburbs of Windhoek. The proposed facility will provide the much-needed modern fuelling point with all its associated modern services, to motorists in the area.

The No-development option is thus not considered to be a feasible alternative at this stage.

4.2 *Site Alternative*

The site is located within an area, which is generally suitable for this type of operation. The environmental footprint is expected to be minimal as the project location is within an urban setup, which is already disturbed and earmarked for development.



The visibility of the site from the David Hosea Merero Road and surrounding roads are considered very good, which forms an essential business perspective to the success of the project. The David Hosea Merero Road is considered a high-traffic-volume road in the city. The development also has access to the necessary existing municipal infrastructure services in the area.

The possible impacts at the project location, both environmental and socio-economic, are of such a nature that they can be mitigated through good practice and compliance to the EMP.

5. SCOPE

The scope of the EIA aims at identifying and evaluating potential environmental impacts emanating from the construction, operations and possible decommissioning of the proposed fuel retail facility. Relevant data have been compiled by making use of secondary sources and from project site visits. Potential environmental impacts and associated social impacts will be identified and addressed in this report.

The environmental impact assessment report aims to address the following:

- a) Identification of potential positive and negative environmental impacts.
- b) Provide sufficient information to determine if the proposed project will result in significant adverse impacts.
- c) Identification of “hotspots” which should be avoided where possible due to the significance of impacts.
- d) Evaluation of the nature and extent of potential environmental impacts
- e) Identify a range of management actions which could mitigate the potential adverse impacts to required levels.
- f) Provide sufficient information to the Ministry of Environment to make an informed decision regarding the proposed project.
- g) Conduct a public participation exercise.
- h) Present and incorporate comments made by stakeholders.

6. METHODOLOGY

The following methods were used to investigate the potential impacts on the social and natural environment due to the construction and operation of the fuel retail facility:

- a) Information about the site and its surroundings was obtained from existing secondary information and site visits.
- b) Neighbours, interested and affected Parties (I&APs) were consulted and their views, comments and opinions are presented in this report.



7. STATUTORY REQUIREMENTS

The EIA process is undertaken in terms of Namibia's Environmental Management act no. 7 of 2007 and the Environmental Assessment Policy of 1995, which stipulates activities that may have significant impacts on the environment. Listed activities require the authorisation from the Ministry of Environment and Tourism (DEA). Section 32 of the Environmental Management Act requires that an application for an environmental clearance certificate be made for the listed activities. The following environmental legislation is relevant to this project:

I. The Namibian Constitution

The Namibian Constitution has a section on principles of state policy. These principles cannot be enforced by the courts in the same way as other sections of the Constitution. But they are intended to guide the Government in making laws which can be enforced.

The Constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.

II. Environmental Management Act No.7 of 2007

This Act provides a list of projects requiring an Environmental assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters.

The Act defines the term "*environment*" as an interconnected system of natural and human-made elements such as land, water and air; all living organisms and matter arising from nature, cultural, historical, artistic, economic and social heritage and values.

The Environmental Management Act has three main purposes:

- (a) to make sure that people consider the impact of activities on the environment carefully and in good time
- (b) to make sure that all interested or affected people have a chance to participate in environmental assessments
- (c) to make sure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment.

Line Ministry: Ministry of Environment and Tourism



III. The Water Act (Act No 54 of 1956)

The Water Act No. 54 of 1956 as amended, aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users.

The Act broadly controls the use and conservation of water for domestic, agricultural, urban and industrial purposes; to control, in certain respects, the use of sea water; to control certain activities on or in water in certain areas; and to control activities which may alter the natural occurrence of certain types of atmospheric precipitation.

IV. Water Resources Management Act of Namibia (2004) (Guideline only)

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit.

Line Ministry: Ministry of Agriculture, Water Affairs and Forestry

V. Environmental Assessment Policy of Namibia (1995)

Environmental Assessments (EA's) seek to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT (in the context of IEM and EA's) is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.

All listed policies, programmes and projects, whether initiated by the government or the private sector, should be subjected to the established EA procedure as set out in Figure 2.

Line Ministry: Ministry of Environment and Tourism

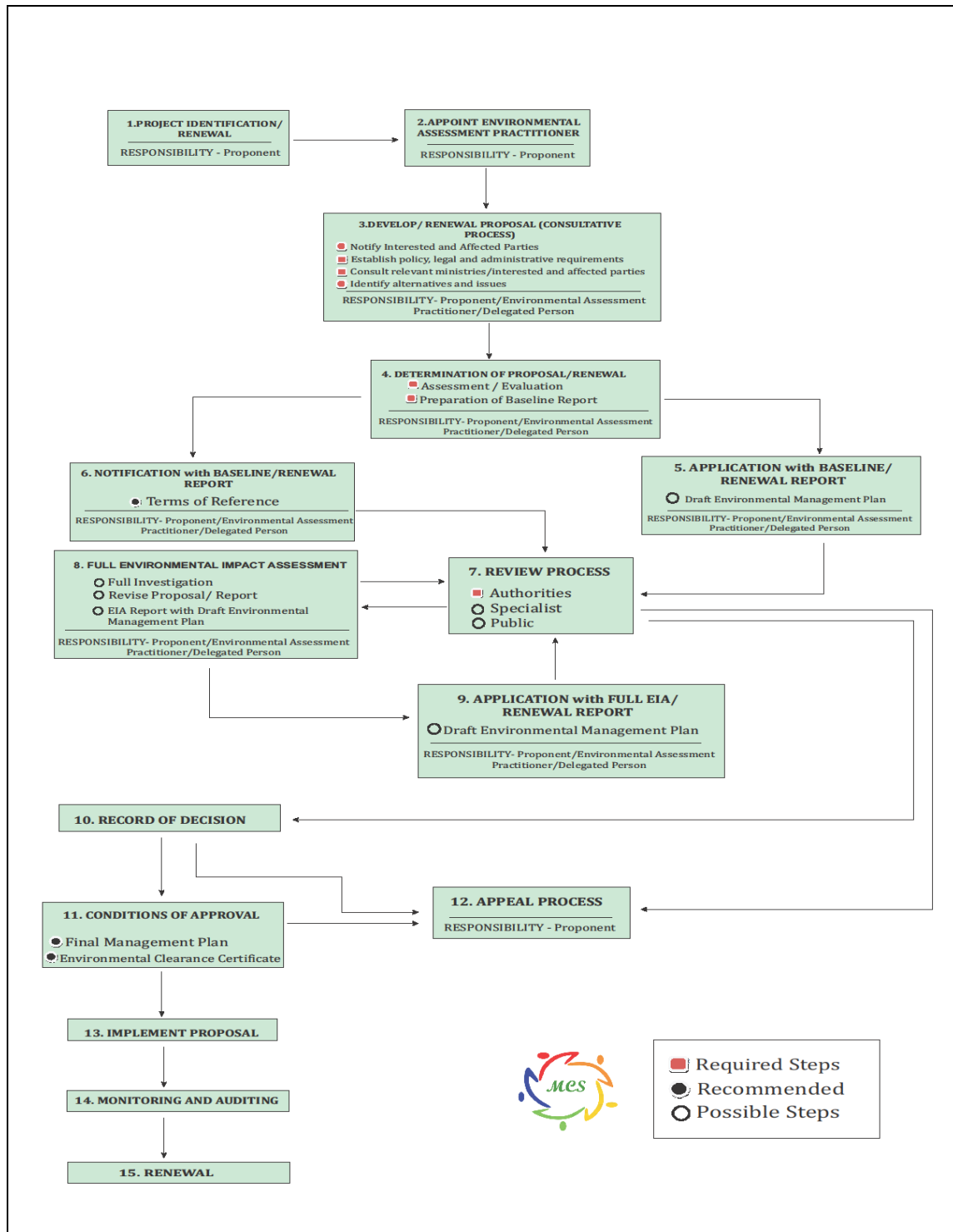


Figure 2: Environmental Assessment Procedure of Namibia (Adapted from the Environmental Assessment Policy of 1995)

Apart from the requirements of the Environmental Assessment Policy, the following sustainability principles need to be taken into consideration, particularly to achieve proper waste management and pollution control:

✓ **Cradle to Grave Responsibility**

This principle provides that those who manufacture potentially harmful products should be liable for their safe production, use and disposal and that those who initiate potentially polluting activities should be liable for their commissioning, operation and decommissioning.

✓ **Precautionary Principle**

There are numerous versions of the precautionary principle. At its simplest it provides that if there is any doubt about the effects of a potentially polluting activity, a cautious approach should be adopted.

✓ **The Polluter Pays Principle**

A person who generates waste or causes pollution should, in theory, pay the full costs of its treatment or of the harm, which it causes to the environment.

✓ **Public Participation and Access to Information**

In the context of environmental management, citizens should have access to information and the right to participate in decisions making.

VI. Petroleum Products and Energy Act of Namibia (Act No. 13 of 1990)

The Act makes provision for impact assessment for new proposed fuel retail facilities and petroleum products known to have detrimental effects on the environment.

VII. Draft Pollution Control and Waste Management Bill (*Guideline only*)

The proposed project of the fuel retail facility in Rocky Crest, only applies to Parts 2, 7 and 8 of the Bill.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

Part 8 calls for emergency preparedness by the person handling hazardous substances, through emergency response plans.



VIII. Atmospheric Pollution Prevention Ordinance of Namibia (No. 11 of 1976)

The Ordinance prohibits anyone from carrying on a scheduled process without a registration certificate in a controlled area. A certificate must be issued if it can be demonstrated that the best practical means are being adopted for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process. Best practice would be to notify the line Ministry about emissions but it is not a legal requirement.

Line Ministry: Ministry of Health and Social Services

IX. Hazardous Substances Ordinance No. 14 of 1974

The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.

Line Ministry: Ministry of Health and Social Services

8. PROPOSED INSTALLATIONS

The proposed site will be equipped with two (2) double-walled steel underground storage tanks (UST). The tanks will be lined with High Density Polyethylene sheeting and fitted with leak detectors and observation wells. These tanks are as follows;

- ❖ 1 x Tank – 46 m³ unleaded petrol (ULP),
- ❖ 1 x Tank – 46 m³ diesel UST (50ppm),

In addition to the above, the following will also be erected and installed;

- ❖ Three pump islands,
- ❖ a convenient store and quick service restaurant (QSR),
- ❖ a forecourt canopy,
- ❖ a three chamber separator pit,
- ❖ adequate parking space for cars and trucks.

This facility will be constructed and operated according to relevant SANS standards (or better), with special emphasis on SANS 10089:1999, SANS 100131:1977, SANS 100131:1979, SANS 100131:1982, SANS 100131:1999.

The tanks will be filled from a common filler box. The filler point will be surrounded by secondary sleeving to prevent surface water and soil from entering the filler box.

Fuel from the tanks will be pumped through underground pipelines, which will be laid to the forecourt areas, where it will finally be dispensed into customers'



vehicles and trucks. Dispensing pumps will be fitted with emergency cut off valves as specified by the relevant legislation and standards.

As per current standard practice, and in fulfilment of the requirements of the SANS 089:1999, all storm water that may potentially be contaminated by fuel or oil spills will be directed to a separator system.

See Figure 3 for preliminary site layout design. Detailed engineering drawings are to be finalised and submitted to the Ministry of Mines and Energy for approval.

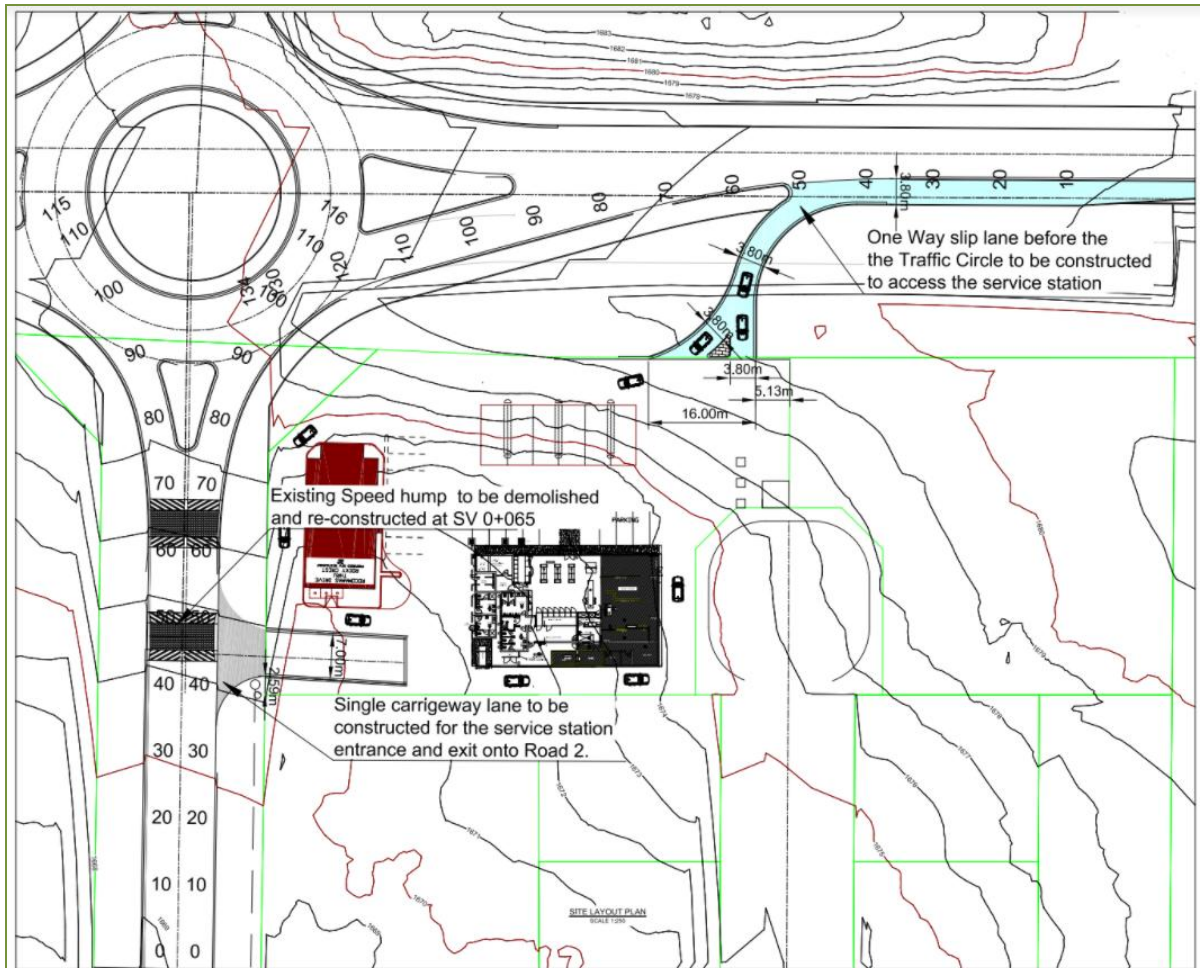


Figure 3. Proposed layout of the facility

9. GENERAL ENVIRONMENT OF THE STUDY AREA

This section lists the most important environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

9.1 Location and Land Use

The project site (22.58121°S; 17.04757°E) is situated on Erf 1479 David Hosea Meroro Road, in Rocky Crest. See Figure 1. The study area is zoned business, as per the Windhoek Town Planning Scheme.

North of the site is David Hosea Meroro Road, followed by the Rocky Crest Flats. East, west and south of the site are undeveloped ervens (open land).



Photo 1. View north of the site



Photo 2. View east of the site



Photo 3. View west of the site



Photo 4. View south of the site

9.2 Topography and Drainage

The project site gently slopes towards the west. The landscape is classified as being in the Khomas Hochland Plateau region, which is characterized by rolling hills in the west with many summit heights equivalent reflecting older land surfaces.

The reliefs of small dry river courses and streams running in and around the area remains well developed. Surface drainage takes place through these rivers and

streams in the area, eventually flowing towards the Goreangab dam. The Goreangab Dam is situated approximately 7km northwest of the site.

Proper drainage systems (e.g. erection of culverts) should be developed at the facility, in order to control the flow of surface water run-off from the site; thereby preventing any possible surface pollution emanating from daily operational activities at the fuel retail facility. Storm water management systems should form part of the engineering designs.

9.3 Climatic Conditions

Classification of climate:	Semi-arid highland area
Average rainfall:	Rainfall in the area is averaged to be between 300 mm-350 mm per year.
Variation in rainfall:	Variation in rainfall is averaged to be 30-40 % per year.
Average evaporation:	Evaporation in the area is averaged to be between 3000-3200 mm per year.
Precipitation:	Irregular and unpredictable, high intensity, highly localised storm events between October and April does occur.
Water Deficit:	Water deficit in the area is averaged to be between 1701-1900 mm per year.
Temperatures:	Highest temperatures are measured in December with an average daily maximum of 31°C and minimum of 17.3°C; the coldest temperatures are measured in July with an average daily maximum of 20.4°C and minimum of 6.4°C.
Wind direction:	Predominantly southeasterly. Southerly, easterly, and northerly airflow is also common. Wind seldom blows from the northwest and southwest. Strong westerly winds blow in the afternoons and evenings in early summer..

The aridity of the region causes the water resource to be a scarce commodity and has to be conserved and protected from pollution at all cost. Groundwater in Windhoek is an important source of potable water for the City of Windhoek.

9.3 Soil and Geology

The geology of the Windhoek area is a result of numerous folding and faulting episodes, including thrusting and rifting, to which the area has been subjected. Metasedimentary rocks of the Swakop Group, which is part of the Damara Sequence, constitute the Windhoek Aquifer.

The project area and surrounding has a relatively thin soil cover. This soil cover consists mainly of weathered schist and quartz pebbles. The underlying soil is a layer of fresher weathered schist, getting progressively harder until a depth of approximately 0.8mbgl, where hard rock is encountered.

The rock formations underlying the development consist mainly of mica rich schist containing quartz veins. All of the intersected rock formations belong to the Kuiseb formation of the Damara Sequence. The sedimentary formations of the study area strike in an east-north-easterly direction and dip 25-30° to the north-northwest. The schist has an abundance of layers (schistosity) consisting of quartz rich and mica rich layers. See Figure 4.

9.4 Hydrogeology of the Study Area

A number of north-southerly striking faults and joints found in Windhoek form the major underground water conduits of the Windhoek Aquifer and hence determine the conditions of the aquifer.

The micaceous schist found in the area is prone more plastic deformation rather than brittle, fracturing, exhibiting significantly lower secondary porosity and permeability. Groundwater flow would be mostly through secondary porosity along fractures, faults and other geological structures present within the underlying formations in the area.

According to the City of Windhoek (COW) and the Department of Water Affairs (DWA) database, no boreholes exist within a 2km radius of the project location, however 11 boreholes are situated approximately 5km west of the site (along the Aretaragas River); whilst 12 monitoring boreholes are situated approximately 5.6km northwest of the site. The northwesterly boreholes were drilled by COW to monitor groundwater pollution around the Ramatex Textile factory. Groundwater table in the area is expected to be less than 25mbgl.

Groundwater belongs to the government of the Republic of Namibia; hence the area does fall within the Windhoek-Gobabis Subterranean Water Control Area, of Government Notice 189 of 6 February 1970. This means that Government controls groundwater usage in this area.

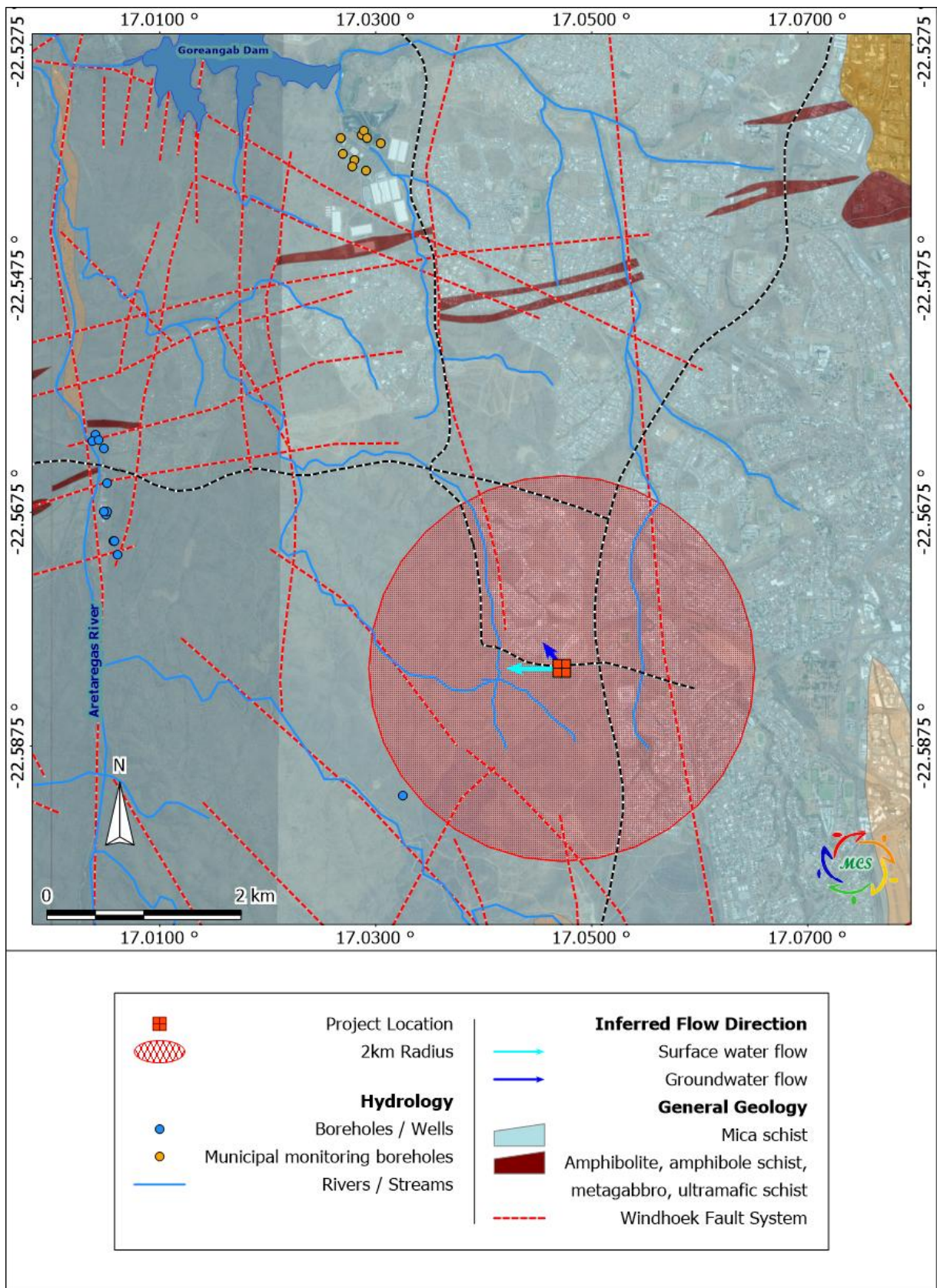


Figure 4. Hydrogeological map

9.4.1 Groundwater Pollution Vulnerability

In order to protect groundwater resources from pollution, the need to assess and map the vulnerability of the Windhoek aquifer was identified to provide the municipality with a planning tool that will form the basis for setting priorities in protecting the groundwater resource.

Infiltration water transports a large proportion of pollutants either directly or indirectly on the groundwater to underlying aquifers. As a result, a vulnerability study of Windhoek aquifer was conducted in the year 2000.

The project area was mapped during the study as having a low to very low aquifer pollution vulnerability, mainly due to the absence of sensitive geological structures in the area (see Figure 5).

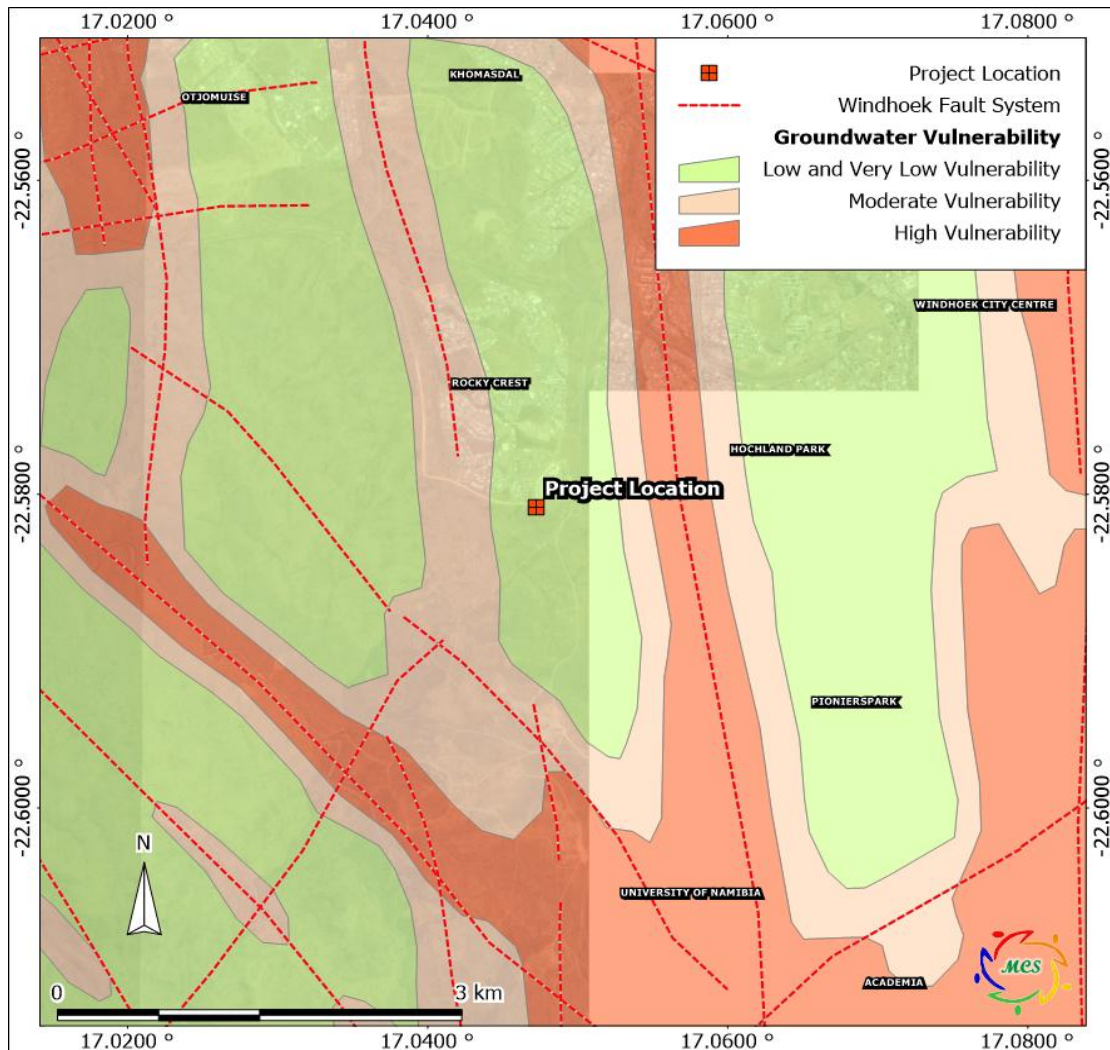


Figure 5. Groundwater vulnerability map

9.4.2 Surface- and Groundwater Pollution Monitoring

Surface water and groundwater systems are connected in most landscapes, and the project location is no different. Streams interact with groundwater in three basic ways, i.e. *streams gain water from inflow of groundwater through the streambed,*

streams lose water by outflow through the streambed, or they do both depending upon the location along the stream. It is the groundwater contribution that keeps streams flowing between precipitation events. Therefore, groundwater and surface water are essentially one resource, physically connected by the hydrologic cycle.

As a result, groundwater and surface water pollution monitoring will form an integral part of the Environmental Management Plan (EMP). Surface water pollution on site can be mitigated by the construction of proper surface water run-off drainage systems with built-in oil-water separator pits. Visual inspection of surface water pollution should be adopted, with support of water sampling at specific locations as guided by visual inspections.

The consultant recommends that groundwater pollution be monitored with the installation of four (4) monitoring boreholes around the proposed fuel retail facility. All boreholes should be drilled with a drill diameter of 165mm. The holes will be installed with 2.9m-uPVC plain (140mm OD) casing, followed by factory slotted casing to final depth. Casing bottom caps will be installed in each hole. Gravel pack and bentonite powder will be installed around casing in each installed borehole to prevent any possible surface pollution inflow from the facility. A protective manhole will then be placed over each borehole installed. The purpose of these boreholes is to quantify levels of any pollution in the subsurface and to monitor the migration of possible pollution off site. The borehole construction parameters above are designed to allow ease of groundwater remediation implementation and/or data collection (when necessary).

- 1) **Monitoring Hole 1 (MH1)** will be installed 5m south of the northern boundary of the site to monitor any pollution migration from the site toward the north.
- 2) **Monitoring Hole 2 (MH2)** will be installed 5m west of the eastern boundary of the site to monitor any pollution from site towards the east.
- 3) **Monitoring Hole 3 (MH3)** will be installed 5m north of the southern site boundary to monitor any pollution from site towards the south.
- 4) **Monitoring Hole 4 (MH4)** will be installed 5m east of the western boundary of the site to monitor possible migration of pollution westward. See figure 6 for proposed borehole location.

Baseline water samples should be collected from the boreholes immediately after borehole drilling completion, in order to represent baseline conditions at the site. As such, they can be important in forecasting potential environmental impacts should the development proceed, and can become measurements against which future changes are compared. Water samples will be collected from the monitoring holes regularly and send to laboratories for chemical of concern analysis.



Figure 6. Proposed monitoring boreholes

9.5 General Ecology

The site falls within the Tree and shrub savanna biome, which is characterised by high shrubland and thorn bush type vegetation. The vegetation structure type is classified as Dense Shrubland.

The site itself is partially disturbed and earmarked for development. Vegetation at the site consists mainly of grass (+30cm in height), shrubs and weedy species. Some Wild Tobacco (*Nicotiana glauca*) and Bitter Karee (*Rhus marlothii*) trees are also present at the site. No conservation worthy vegetation exists at the site. The following photos below illustrate the prominent vegetation at the project location.



Photo 5. Grass, shrubs and weedy species



Photo 6. Vegetation at the site

observed in the vicinity of the study area, with more domestic animals frequenting the site. Faunal species diversity is presented in the table below:

Table 2. General Fauna Diversity (Atlas of Namibia)

	Diversity	Endemism
Mammal	61 - 75 Species	0 Species
Scorpion	18 - 21 Species	0 Species
Bird	201 - 230 Species	0 Species
Reptile	71 - 80 Species	5 - 8 Species
Lizard	> 35 Species	N/A
Termite	7 - 9 Genera	N/A
Snakes	35 - 39 Species	N/A

10. ENVIRONMENTAL SENSITIVITY

According to City of Windhoek's Environmental Structure Plan of 2004, an environmental assessment and mapping study was conducted to provide a strategic overview of the environmental aspects of Windhoek. As a result, control zones are based upon the following;

- ✓ The critical sensitivity of the southern Windhoek aquifer.
- ✓ The sensitivity of the catchment of the Goreangab Dam, and surface water resources, including rivers and streams throughout Windhoek.
- ✓ The sensitivity of the environment or a specific critical environmental component.
- ✓ The relative importance of the 'sense of place' or the specific character of Windhoek determined through resident participation, which includes topography and landscape quality as well as cultural / historical resources.
- ✓ The need to protect open space in Windhoek, which includes the river and aquatic systems, as well as the ridgelines, hills and mountains, and natural areas surrounding the city.
- ✓ The need to protect, manage and conserve sensitive natural vegetation cover.

The project location is considered to be located in area with medium environmental sensitivity status. See Figure 7 for the environmental sensitivity map.

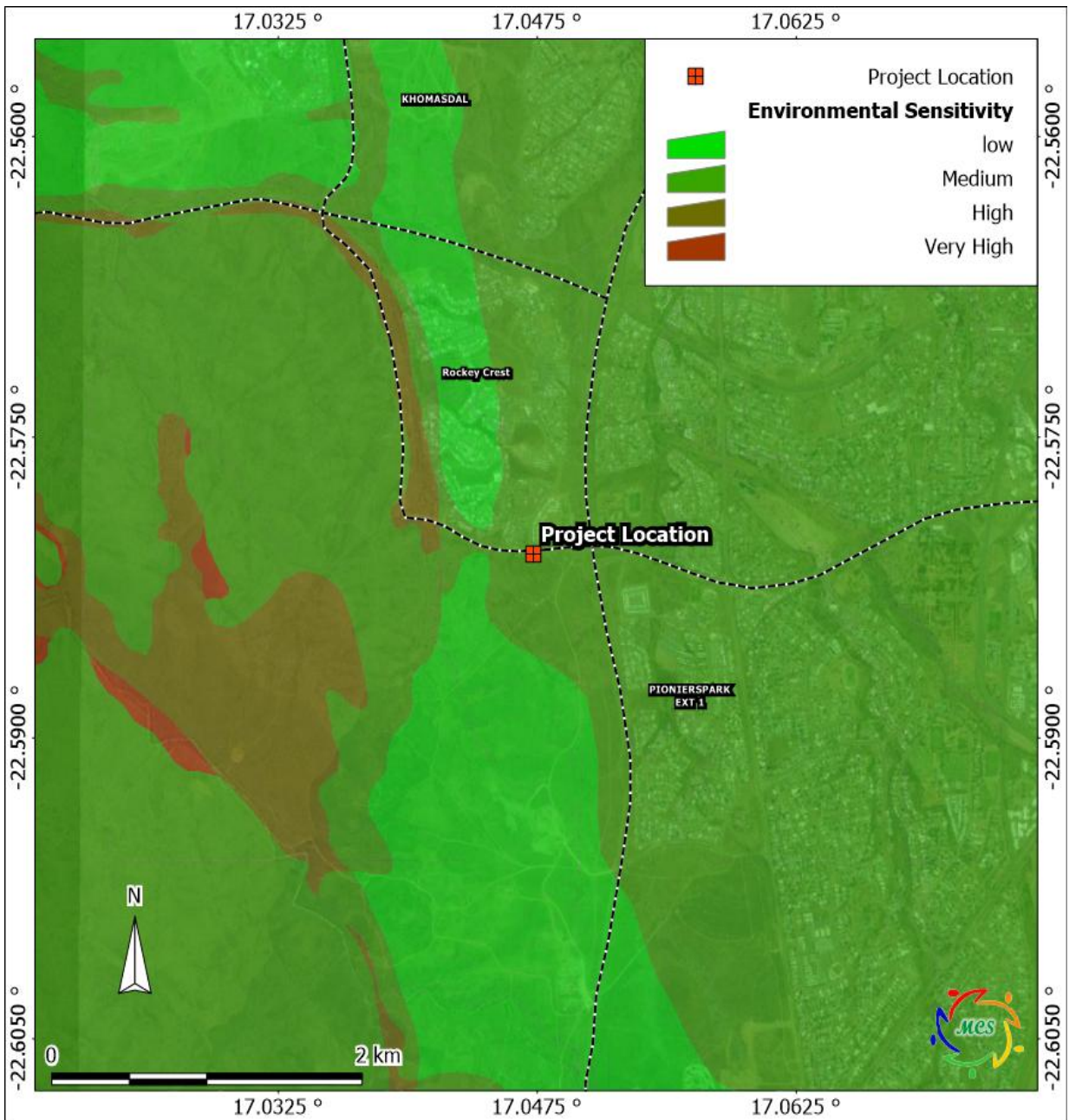


Figure 7. Environmental sensitivity of the project area

11. SOCIO-ECONOMIC ASPECTS

This section provides an overview of socio-economic characteristics of the study area. It provides regional and local information on the, economic activities, population dynamics, vulnerability, and social services currently available in the area.

11.1 Regional Information

The proposed Rocky Crest fuel retail facility will be situated in Windhoek, in the Khomas Region of Namibia. The total current population in Windhoek is estimated to be 325,858, whilst the regional population is estimated to be 342,141 (169,672 males and 172,469 females) (NSA, 2011). Ninety-seven percent of the population of the Khomas Region over 15 years of age are literate. The estimated unemployment rate in Khomas region is 30%. The population density in Khomas region is relatively high at 6.8 persons per km², compared to the national average of 2 persons per km².

The life expectancy in Khomas region is 56 years in females and 54 years in males. The Human Poverty Index in Khomas region is 17.09, meaning almost a quarter of all people living in Khomas are poverty stricken.

11.2 Windhoek

11.2.1 Economic Activities

The City of Windhoek is the capital of Namibia and is often referred to as the cleanest city in Africa. The city is the hub for all economic activities in the Khomas Region and is linked to Namibia's air, rail and road network, making it well situated to service neighbouring SADC countries and the rest of the world.

It is crucial that sustainable development contributes to the needs of the people, and to the national economy at large. Nonetheless, relying on economic growth solely is not enough to achieve sustainable development; institutional development, social development and natural resource management are also essential (UNDP, 2008; World Bank, 1990). Furthermore, using policy and legal frameworks as well as stakeholder involvement in environmental management contribute to achieving sustainable development (Camagni et al., 1998; UNCHS, 1996).

11.2.2 Employment (Job Opportunities)

Unemployment still hampers most of the developing world and Windhoek and the region at large are no exception. The proposed fuel retail facility is likely to increase the job opportunities in the region. The Construction phase of the project will provide job opportunities, of which 80% are



expected to be unskilled and semi-skilled people and can be sourced from the unemployed labour force of Windhoek and the surrounding areas.

The principle of maximising local employment creation can be applied by identifying suitable construction contractors in each region.

It is highly likely that suitable construction contractors would be identified in Windhoek. The City is well-equipped with competent small and medium enterprise (SME) construction companies to conduct the proposed development. The project would also give rise to indirect economic benefits through the procurement of materials, goods and local services.

The local economy of the Rocky Crest area and surrounding suburbs is expected to benefit from the project. A percentage of moneys derived from salaries and wages earned by construction workers is likely to be spent at the town and surrounding areas. The moneys spent in communities around the project location would create substantial flows of revenue within these communities, thus acting as a catalyst for growth in the local economy.

In addition, procurement of construction materials, goods and services would have beneficial downstream economic impacts by stimulating demand up the supply chain. The more goods and services procured from local SMEs or enterprises at the town, the greater the project's contribution to the growth of the local economy.

It is therefore recommended that, where feasible, contractors employ local labour by recruiting from local communities and the region at large; that procurement of materials, goods and services from local suppliers be encouraged.

11.2.3 Livelihoods

Economic activities in Rocky Crest and the surrounding areas are limited and livelihoods are heavily dependent on the business sector and salaries of civil servants. The livelihoods of the locals are likely to be positively impacted therefore predicted to be better than before the construction and operations of the facility in the area.

11.2.4 Tourism

Windhoek is the major tourism gateway to the rest of Namibia. The city itself also attracts a lot of tourists from all over the world, due to its range of attractions in and around the city; and the rich cultural diversity found in the capital.

This tourist city renowned for being one of the cleanest in the world, therefore the facility helps waste management in and around the city. Excessive waste, dust, noise, vibrations and appalling air quality can have

negative impacts on the tourism industry in the area, as it can become a nuisance to tourists.

11.2.5 In-Migration

Due to enhanced employment opportunities that could be created by the envisaged project, some in-migration of job seekers to Windhoek can be expected. Depending on the amount of in-migration, local areas may start experiencing overcrowdings, over use of infrastructure, local conflicts, increase of goods prices due to increased demand etc.

11.2.6 HIV & Prostitution

Namibia has a high incidence of HIV/AIDS, which has a strong and adverse socio-economic impact on livelihoods of people in the region. The HIV prevalence rate is estimated at 19.7% for Namibia (Poverty profile 2007).

The spending powers of locals working for Rocky Crest fuel retail facility are likely to increase, and this might be a perfect opportunity for sex workers to explore. Migrant labourers from other regions and expatriates are normally vulnerable and may use the services rendered by the sex workers.

Construction camps often become a focal point for promiscuous sexual activities. Such activities, particularly when carried out without protection, can result in increases in sexually transmitted diseases (STDs) and especially AIDS among neighbouring communities, construction workers and their partners.

Should the HIV prevalence increase, the following consequential issues could arise:

- ✓ Reduced workforce in the Khomas Region.
- ✓ Diversion of income expenditure to medical care.
- ✓ Increase in orphans and households headed by children.
- ✓ Increase in pregnancy related mortality.
- ✓ The current rate of 3,129 people per doctor could increase.

Educate workers and surrounding communities on measures to prevent the spread of HIV/AIDs through awareness campaigns, provision of safety equipment for workers, child labour prohibited.

11.2.7 Infrastructure & Increased Traffic

The traffic in the area is expected to increase slightly and it might contribute to heavy traffic during peak hours and a higher number of car accidents in the area. The nearby David Hosea Meroro Road and nearby

streets will be affected due to increased traffic and heavy-duty cargo trucks accessing the site.

12. PROVISION OF MUNICIPAL SERVICES

12.1 Electricity Supply

The development will be supplied from the existing Nampower/City of Windhoek grid. Power will be connected to the ring network via underground cables from the Substations close to the site. Excavations for Electrical cables will be $\pm 1.0\text{m}$, with soil cover of a minimum 600mm.

12.2 Water Supply

City of Windhoek will provide water to the development from its existing water supply scheme and grid of Windhoek. The City is provided with water from three different sources. As of 2006, approximately 70% of the water demand was covered by dams around Windhoek, such as the von Bach Dam, 22% from the Goreangab Reclamation Plant and only between 8% come from boreholes.

12.3 Sewage

The site will be connected to the main sewage network grid of the City of Windhoek. The proposed development is expected to pose minimal stress to the existing system as no major ablution or toilet facilities are planned.

Excavations for sewer pipelines will have the maximum depth of 2.8m. The City's bulk sewer network has sufficient capacity to cope with the demand.

12.4 Access Roads

Access to the proposed development of the fuel retail facility will be obtained from the David Hosea Meroro Road and the new street west of the site. Should traffic flow become a problem around the project location, it is advised that traffic lights be installed to control traffic flow.

12.5 Waste Removal

The facility will be adequately equipped with waste bins in all point of source and active locations at the site (e.g. shop entrance, pump islands, toilets etc.). Waste removal at the site will be the responsibility of the City of Windhoek and its waste removal contractors.

13. STAKEHOLDER PARTICIPATION

Consultation with the public forms an integral component of an EIA investigation and enables I&APs e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the proposed development and to identify additional issues which they feel should be addressed in the EIA. The primary aims of public participation were:

- ❖ To initiate participation of Interested and affected parties (I&APs).
- ❖ To inform I&APs and key stakeholders about the proposed development
- ❖ To identify issues and concerns of key stakeholders and I&APs with regards to the proposed development.
- ❖ To provide information to enable informed decision making
- ❖ To develop a communication structure with stakeholder and I&APs
- ❖ To promote transparency of the project
- ❖ To ensure the public and stakeholders comments are considered for the development.
- ❖ To provide answers to I&APs queries
- ❖ To encourage shared responsibility and sense of ownership.

Public participation posters (A3 size) notices were placed at strategic locations in and around Rocky Crest (i.e. at project site itself, Westlane shopping complex and the Rocky Crest shopping complex. See Photo below. The posters provided background information about the project and gave interested and affected parties an opportunity to forward their issues and comments about the project.



Decision-making authorities were consulted throughout from the onset of the study, and have been engaged throughout the project process. Consultation with the department of Environmental Affairs (MET) included the environmental assessment procedure and application procedure.

Public participation notices were placed and run in two local newspapers on two different occasions, namely; (See Appendix C).

- ✓ The New Era, **27 April and 05 May 2021**
- ✓ The Observer, **28 April and 03 May 2021**

In the adverts an e-mail address, phone number and fax number was provided to the general public to register as interested and affected parties; and to request a background information document for the project. As indicated before, notification posters were placed at strategic locations to invite interested and affected parties for comments and concerns.

A background information document (See Appendix B) was available to all interested and affected parties who were consulted; however no environmental or social concerns regarding the development were raised. They all welcomed the development.

Mr M. Shanyengange (Environmental Specialist) at the City of Windhoek was consulted regarding the project. No major environmental objections or concerns were noted, however he advised that the EIA be conducted as per environmental Management Act no 7 of 2007 and its Guidelines of 2012. He also noted that care should be taken to avoid pollution throughout all stages of the development.

A public consultation meeting was held on 13 May 2021, at the Thuringerhof Hotel in Windhoek. Despite the public invitation for the meeting in various platforms, no attendance was recorded during the meeting. See Appendix D for I&AP register and minutes of the meeting.

Table 3. Interviewed Stakeholders/I&APS

NAME	ORGANISATION/ERF	DESIGNATION/POSITION
Mr. T. Iyambo	Ministry of Mines and Energy.	EA procedure, Consultation
Mrs. Codla Tjingovera	Ministry of Mines and Energy.	Viability Approval
Ms. S. Angula	Ministry of Environment and Tourism, Directorate of Environmental Affairs.	EA procedure
Mr. E. Uwanga	Vivo Energy Ltd / Proponent	Installation Information
Mr. M. Shanyengange	City of Windhoek / Environmental Specialist	Local Authority

Consultation with the department of Environmental Affairs (MET) included the environmental assessment procedure and application procedure.

14. ENVIRONMENTAL IMPACT EVALUATION

The Environmental Impact Assessment sets out potential positive and negative environmental impacts associated with the proposed development. The following assessment methodology will be used to examine each impact identified, see Table 4.

Table 4. Impact Evaluation Criterion (DEAT 2006)

Criteria	Rating (Severity)	
Impact Type	+VE	Positive
	0	No Impact
	-VE	Negative
Significance of impact being either	L	Low (Little or no impact)
	M	Medium (Manageable impacts).
	H	High (Adverse impact).

Probability:	Duration:
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term (impact ceases)
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 - Improbable	1 - Immediate
0 - None	
Scale:	Magnitude:
5 - International	10 - Very high/don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
	0 - None

14.1 Construction Phase

14.1.1 Erosion and Sedimentation

Clearing of vegetation during earthworks is expected to take place and can make the project site susceptible to soil erosion especially during rainy seasons. The constant movement of heavy construction vehicles during construction also tend to compact the soil surface, which can reduce infiltration capability, and increase surface water runoff.

Proposed Mitigation Measures

- ✚ Avoid unnecessary removal of topsoil cover during construction.
- ✚ Ensure stockpiles are located within the boundary of the site and are protected from erosion.
- ✚ Stabilise cleared areas as soon as possible to prevent and control surface erosion.
- ✚ Limit clearing of vegetation to those areas within the footprint of construction.
- ✚ Minimise open areas and reduce the frequency of disturbance.



Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Erosion and Sedimentation	-VE	1	1	4	2	M	L

14.1.2 Dust Pollution and Air Quality

Dust problems are expected to be site specific and may pose a slight nuisance to nearby road users. The nearest residential properties are situated approximately 50m north and northwest of the site. Dust will be generated during the construction phase and might be worse during the winter months when strong winds occur. Dust is regarded as a nuisance as it reduces visibility, affects the human health and retards plant growth.

Release of various particulates and exhaust fumes from construction vehicles and machinery during construction activities is also expected to take place.

Proposed Mitigation Measures

- ✚ Ensure measures are in place to minimise dust generated during the construction phase.
- ✚ Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather.
- ✚ Avoid excavation, handling and transport of materials which may generate dust under high wind conditions.
- ✚ Locate stockpiles of construction materials in sheltered areas where they are not exposed to erosive effects of the wind.
- ✚ Ensure all vehicle, plant and equipment are in good condition.
- ✚ Encourage reduction of engine idling.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust	-VE	1	2	6	3	L	L

14.1.3 Noise Impact

An increase of ambient noise levels at the construction site is expected due to construction activities. Noise pollution due to heavy-duty equipment and machinery will be generated. It is not expected that the noise generated during construction will impact any third parties very much.

Proposed Mitigation Measures

- ✚ Ensure the use of construction vehicles and equipment that emit reduced noise levels.
- ✚ Ensure proper maintenance is conducted on vehicles to ensure the reduction of noise emission.



- ✚ The construction staff should be equipped with ear protection equipment.
- ✚ Audio equipment (if any) should not be played at levels considered intrusive by others.
- ✚ Construction activities will be limited to a period between 07h00 and 19h00.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Noise	-VE	1	2	4	3	L	L

14.1.4 Safety & Security

Safety issues could arise from the construction vehicles, earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. Construction sites usually house construction building material and equipment on site which may attract criminal activities.

Proposed Mitigation Measures

- ✚ Display telephone numbers of emergency services at the project location.
- ✚ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material). The signage signs should be placed at strategic locations to ensure awareness.
- ✚ Demarcate and barricade any areas which may pose a safety risk (including hazardous substances, deep excavations etc). These notices must be worded in English language.
- ✚ Enforce the use of appropriate Personal Protective Equipment (PPE) for the right task or duties at all times.
- ✚ Prevent illegal access to the construction sites by implementing appropriate security measures. These security measures must not pose a threat to surrounding communities.
- ✚ Should a construction camp be necessary, it should be located in such a way that it does not pose a risk to the public.
- ✚ Equipment housed on site must be placed in a way that does not encourage criminal activities.
- ✚ For safety and security reasons it is recommended that the entire site (construction site and camp) be fenced-off and security personnel be employed to safeguard the premises and to avert criminal activities.
- ✚ Sensitize operators of earthmoving equipment and tools to switch off engines of vehicles or machinery not being used.
- ✚ The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.
- ✚ Proper barricading and/or fencing around the work sites should be erected to avoid entrance of animals and/or unauthorized persons.

- Adequate lighting within and around the construction location should be erected, when visibility becomes an issue.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety	-VE	1	2	4	2	M	L

14.1.5 Traffic

Construction vehicles will access the project location from the David Hosea Merero Road. Construction related activities are expected to have a minimal impact on the movement of traffic along these roads, due to the fact that construction vehicles will frequent the site only periodically.

No diversion of traffic or closure of the road is expected, however a slight nuisance might be experienced by motorists using the road. This will most likely be caused by slow moving vehicles frequenting the construction site. It is however expected to be short-lived.

Proposed Mitigation Measures

- Install and maintain official traffic signalling (where necessary) along the access roads / intersection in conjunction with local or national traffic regulations.
- Speed limit warning signs must be erected to minimise accidents.
- Construction vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.
- Where feasible, Construction vehicles should not travel to and from the site during peak times (07h00 to 09h00 and 16h00 to 18h00), to minimise impacts on traffic.
- Construction vehicles should not be allowed to obstruct the road, hence no stopping in the road, wholly or partially, but rather pull off the road or park on the roadside.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-VE	1	2	2	2	L	L

14.1.6 Groundwater

Groundwater quality could be impacted through leachate of petroleum, chemical, harmful and hazardous substances. In particular, oil leakages, diesel, lubricants and grease from construction vehicles, equipment and machinery utilised during the construction phase may occur. Care must be taken to avoid contamination of soil and groundwater.

Any overflow of the temporary sewage systems available, may transport the effluent to any nearby surface water bodies; or to areas where sensitive geological



structures and formations are present. Inflow into these structures and formations would cause a pollution threat.

Proposed Mitigation Measures

- ✚ Prevent spillages of any chemicals and petroleum products (i.e. oils, lubricants, petrol and diesel). Use drip trays, linings or concrete floors when evidence of leaks are observed on vehicles or equipment.
- ✚ No major servicing and maintenance of vehicles and/or equipment should be conducted at the site.
- ✚ All fuelling, storage and chemical handling should be conducted on surfaces provided for this purpose. Drip trays, linings or concrete floors must be used when removing oil from machinery.
- ✚ Spillage control procedures must be in place according to relevant SANS standards or better. Waste water collection systems should be connected to these systems.
- ✚ Should temporary toilet facilities be necessary, adequate containment systems should be erected at the site for use during the construction phase.
- ✚ Waste should properly be contained to avoid any leakages and/or spillages, and should regularly be disposed off at a suitable sewage disposal site. Run-off from these toilets due to overflows should be avoided at all cost.
- ✚ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater	-VE	1	3	4	2	L	L

14.1.7 Surface Water

Local drainage is well developed and runoff takes place through small river courses in the area, towards the Goreangab Dam. Contamination of surface water might occur through petroleum, chemical and hazardous substances. Contaminants in the form of oil leakages, diesel, lubricants and grease from the construction equipment and machinery may occur during the construction phase.

Proposed Mitigation Measures

- ✚ Use drip trays, linings or concrete floors when evidence of leaks are observed on construction vehicles or equipment.
- ✚ Remove leaking vehicles from project location immediately.
- ✚ No servicing and maintenance of vehicles and/or equipment should be conducted on site.
- ✚ Any spillage of hazardous substances including fuel, oil, paint or cleaning solvent must be cleaned up immediately and disposed off at a designated disposal facility.



- ✚ Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and hydrocarbons into the nearby water courses.
- ✚ Prevent illegal washing out of containers in nearby water courses.
- ✚ Properly secure all temporary / portable toilets (if any) to the ground to prevent them toppling due to wind or any other cause.
- ✚ Maintain toilets in a hygienic state and remove waste to a licensed disposal facility.
- ✚ Ensure that no spillages occur when the toilets are cleaned or emptied. Prohibit urination on site, other than at designated facilities.
- ✚ Contain contaminated water from batching operations and allow sediments to settle before being disposed of as waste water.
- ✚ Stabilise cleared areas as soon as possible to prevent and control surface erosion.
- ✚ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
- ✚ An emergency plan should be in place on how to deal with spillages and leakages during this phase.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Surface water	-VE	2	3	6	2	M	L

14.1.8 Generation of Waste

Waste material will be generated during the construction activities of the fuel retail facility. Waste in the form of rock cuttings, pipe cuttings, electrical cuttings, oil spills or leakages of petroleum products might occur during the construction phase.

Proposed Mitigation Measures

- ✚ Ensure that sufficient weather- and vermin- proof bins / containers are present on site for the disposal of solid waste. Waste and litter generated during this phase must be placed in these disposal bins.
- ✚ Empty bins regularly as required.
- ✚ The Contractor shall institute a waste control and removal system for the site.
- ✚ All waste shall be disposed off site at an approved landfill site.
- ✚ No disposal of /or burying of waste on site should be conducted.
- ✚ No waste should be burned on site.
- ✚ The hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members.
- ✚ Solid and liquid hazardous waste shall be stored in separate containers. Hazardous waste should be disposed of at the approved hazardous waste disposal site at Kupferberg.



- ✚ Regular inspection and housekeeping procedure monitoring should be maintained at all times.
- ✚ Awareness of the hazardous nature of various types of waste should be enforced.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste	-VE	1	3	6	4	M	L

14.1.9 Heritage Impacts

There are no known heritage areas envisaged to be impacted by the new development; however the contractor might come across archaeological features or objects that possess cultural values during construction activities.

Proposed Mitigation Measures

- ✚ If such remains or objects with cultural values (e.g. bones, weapons, ancient cutlery, graves etc) are uncovered at the project location or surrounding, it should be barricaded off, and
- ✚ The relevant authorities (i.e. the local police and National Heritage Council of Namibia) should be contacted immediately.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Heritage	-VE	1	2	2	2	L	L

14.1.10 Ecological Impacts

No other conservation worthy vegetation is present at the site.

Proposed Mitigation Measures

- ✚ Limit clearing of vegetation to those areas within the footprint of construction, minimise open areas and reduce the frequency of disturbance.
- ✚ Disturbance of areas outside the designated working zone is not allowed.
- ✚ No vegetation should be removed outside the designated project area.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology	-VE	1	2	2	2	L	L

14.1.11 Socio-Economic Aspects

Temporary employment opportunities are anticipated to be created during construction, both directly through construction workers and indirectly through suppliers, service providers, and informal traders attracted to the project site.

Proposed Mitigation Measures

- ✚ Construction contractor(s) should be sourced from Windhoek, and its surrounding areas.



- ✚ Construction workers should be sourced from Windhoek, and its surrounding areas.
- ✚ Suppliers of construction materials should be sourced from Windhoek, and its surrounding areas.
- ✚ Locally source services required during the construction process, such as securities, rental of portable toilets, plant hire, etc.
- ✚ Designate an area outside the construction site for informal traders (if any), to allow them to trade.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Socio-economic	-VE	1	1	8	2	L	L

Summary of all potential impacts during the construction phase:

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan (EMP) will guide and ensure that the impacts of the construction work are minimised. It is further advised that traffic signs and barricades be installed around any excavations to ensure safety. Proper storm water management plans must be in place to minimise the risk of flooding and pollution, and must form part of the engineering designs.

The appointed contractor should be made aware of the content and environmental requirements of this report through proper induction training.

14.2 Operational Phase

14.2.1 Spillages

Spillages are bound to occur during delivery of fuel to the tanks; overfilling of tanks and vehicles during dispensing of fuel over the operational phase of the fuel retail facility.

Proposed Mitigation Measures

- ✚ Risk of impact from this can be lowered through proper training of staff.
- ✚ Installation of suitable containment structures and installation of spill containment areas around the dispensing points.
- ✚ Staff must be provided with emergency response procedures which they should be familiar with.
- ✚ Fuel storage tanks should be placed in suitable containment structures, such as bund walls or plastic liners to avoid the spread of spills.
- ✚ Staff should at all times be aware of the precautions associated with the handling of petroleum / chemical products as described in the relevant Material Safety Data Sheets.



A spill management plan should be written to ensure effective response to spills. Ensure all staff is familiar with the plan and it is regularly updated. The general response to a fuel spill in service station is:

- Switch off all pumps using the automatic pump cut-off. Switches should be located within easy reach of the console attendant and be clearly marked. Cut-offs at the fuse board is not acceptable;
- Contain the spill. Use booms or a sand/soil dam to prevent the spill from entering stormwater drains. Use the absorbents in the spill kit to soak up as much fuel as possible;
- Notify the site manager and/or local authority;
- Call the local Fire Brigade if a major spill occurs;
- Keep the public away from the spill;
- Contact a licensed waste contractor to dispose of the absorbents used in the clean-up operation.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Spills	-VE	1	2	6	4	M	L

14.2.2 Air Quality

Air quality around the site could be impacted by exhaust fumes from the vehicles accessing the facility. Hydrocarbon vapours will be released during delivery and dispensing, as liquid displaces the gaseous mixture in the tanks. In terms of fuel storage tanks, the vapours will be released through vent pipes on the tanks.

Vapour emissions are wasteful in terms of product loss and also add volatile organic compounds (VOCs) to the atmosphere, which contribute to the formation of photochemical smog. This is the haze that can be seen over cities on a warm summer's day. Fuel vapours are also a significant source of benzene, a known carcinogen for humans.

Proposed Mitigation Measures

- ✚ Vent pipes should be placed in such a manner as to prevent impact on potential receptors.
- ✚ Use vapour recovery equipment and techniques to avoid air pollution and minimise fuel loss.
- ✚ Ensure fuel is delivered in the forecourt containment area, and can't contaminate stormwater or land.
- ✚ Encourage reduction of engine idling at the project site.
- ✚ Regular air quality monitoring should be conducted at the facility.



- ✚ Keep a complaints register regarding vapour smells at the site; and act on it if becomes a regular complaint.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Air Quality	-VE	1	4	4	2	L	L

14.2.3 Fire and Explosion Risks

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

Proposed Mitigation Measures

- ✚ Emergency response procedures should be in place so as to alert the employees on how to react to fire and explosions incidents.
- ✚ An incident reporting procedure should also be implemented to make the employees aware of how, when and to whom to report fire and explosion incidents.
- ✚ Regular inspections should be carried out to inspect and test fire fighting equipment and emergency response at the fuel retail facility.
- ✚ Ensure sufficient water is available all the time for fire fighting purposes.
- ✚ It is highly recommended that electrical wiring of the facility be installed and approved by a qualified electrician who will issue a Certificate of Compliance.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Fire & Explosions	-VE	1	2	6	4	M	L

14.2.4 Generation of Waste

Waste such as contaminated soil, litter, empty cans of engine oil will be generated during the operational phase.

Proposed Mitigation Measures

- ✚ Contamination of soil should be prevented through the use of containment areas as provided.
- ✚ Any contaminated soil generated must be contained, disposed off and/or bioremediated accordingly.
- ✚ Waste bins must be available at the retail facility at all times.
- ✚ Waste must be appropriately collected and disposed off at an approved appropriate waste disposal site.
- ✚ Oil-water separator effluent originating from storm water runoff, tank bottoms and washing activities should be separated before disposal of the water.



- ✚ Regular monitoring of the oil-water separator outflow must be conducted.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste	-VE	1	2	5	2	L	L

14.2.5 Surface Water

Spillages might occur during fuel delivery to the underground storage tanks from road transport tanker trucks. This may also occur during filling of vehicles. Spillages and leakages may also occur due to failure of reticulation pipelines or storage tanks. Contaminated soil might pose a risk to surface water.

Proposed Mitigation Measures

- ✚ Proper containment mechanisms installed should be able to contain any spillages that might occur during the operation of the facility.
- ✚ Use drip trays, linings or concrete floors when evidence of leaks are observed on construction vehicles or equipment.
- ✚ Remove leaking vehicles from project location immediately.
- ✚ The presence of an emergency response plan and suitable equipment is advised, so as to react to any spillage or leakages properly and efficiently.
- ✚ Ensure all stormwater drains or channels are clear of litter or obstructing material.
- ✚ Remove all excess sedimentation, rubble and any other waste material present in the waterway and dispose of in a suitable manner to ensure proper drainage runoff.
- ✚ Ensure that stormwater management systems are regularly maintained and tested, and are in good working order.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Surface water	-VE	2	2	6	3	M	L

14.2.6 Groundwater

Spillages might occur during delivery of fuel; and overfilling of vehicles at the site. Overfilling of underground storage tanks may also take place during fuel delivery.

Proposed Mitigation Measures

- ✚ Ensure that fuel is delivered in the forecourt containment area, and must not contaminate stormwater or land.
- ✚ Proper monitoring of the product levels must take place to eliminate overfilling.



- ✚ All operational surfaces at the facility must be installed with spill containment areas.
- ✚ Ensure that any petroleum products, such as grease, waste oils and lubricants are contained in containment structures (e.g. plastic liners, drip trays etc.).
- ✚ Avoid discharge of pollutants (such as cement, concrete, lime, chemicals, contaminated waste water or leachate) into stormwater channels and water courses.
- ✚ All hazardous wastes generated in the project area should be safely contained, transported and disposed of or treated at a designated hazardous waste disposal or bioremediation facility.
- ✚ Consultation with the Windhoek municipality should be sought in this regard.
- ✚ Equipment and materials to deal with spill cleanup must be readily available on site and staff must be trained as to how to use the equipment and briefed about reporting procedures.
- ✚ Develop and implement a groundwater monitoring system and programme, with the aim of monitoring possible contamination to the water resources.
- ✚ Groundwater monitoring boreholes installed should be sampled and analysed periodically.
- ✚ Regular tank and pipeline tightness inspections are advised to eliminate the risk of impact on the environment due to leakage.

Other guiding principles to the prevention of potential leakages and/or spillages that could lead to groundwater pollution include:

- Spillage control procedures must be in place according to SANS 10089-1:1999 and SANS 100131-2 standards, or better, including impounding around the loading areas by bunding with appropriate slopes of 1:100, construction of bund walls and floors that are liquid tight and that are not prone to deterioration under the effects of any petroleum product;
- The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, including the correct use of sumps and regular reporting of spillages must be audited and corrections made where necessary;
- The condition of the fuel reticulation system will have to be checked regularly and repaired to prevent leakages;
- Any spillage of more than 200 litres must be reported to the relevant authorities and remediation instituted (refer to section 49 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990)).

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater	-VE	1	3	6	3	M	L

14.2.7 Health and Safety

The operations of the facility can cause health and safety risks to workers on site. Employees could be exposed through to the skin contact with fuel and inhalation of fuel particulates during handling of such products.

Safety issues could also arise from the operational vehicles, equipment and tools that will be used on site during the operational and maintenance activities. This increases the possibility of injuries and all project personnel must be made aware of the potential risks of injuries on site.

Proposed Mitigation Measures

- ✚ Staff must be properly trained and made aware of all the MSDS (Material Safety Data Sheets) sheets of all chemicals on site.
- ✚ Fire fighting equipment and first aid kit should be made available and must be serviced regularly.
- ✚ Employees are expected to be trained on how to use all equipment and how to handle petroleum products, and training attendance lists must be kept.
- ✚ Display contact details of emergency services in the area at strategic locations of the facility.
- ✚ Demarcate and place signage on any areas which may pose a safety risk (including trenches, excavations etc).
- ✚ The project personnel are advised to ensure that proper personal protective gear and first aid kits are available, at all times.
- ✚ Staff should be properly trained in first aid and safety awareness.

Impact
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Health & Safety	-VE	1	3	6	3	M	L

14.2.8 Traffic

Although negligible, a slight increase in traffic will be experienced along the David Hosea Merero Road and nearby street. This impact will be long-lived, as motorists seeking fuel will be frequenting the site.

Proposed Mitigation Measures

- ✚ Speed limits and road signs as set out by the local and national traffic regulations should be adhered to in order to minimise accidents.
- ✚ Appropriate road signs should be erected to reduce these impacts and their spin-offs.



Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-VE	1	4	6	3	M	L

14.2.9 Ecological Impacts

The proposed facility operations will have minimal impacts on fauna and flora.

Proposed Mitigation Measures

- The operational activities would not exceed the demarcated area of the fuel retail facility as zoned by the local authority.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology	-VE	1	2	2	2	L	L

14.2.10 Socio-Economic Aspects

The creation of new employment opportunities is considered to be a positive impact. At this stage, it is unclear how many permanent employment positions will be created but jobs will be created.

Proposed Mitigation Measures

- Employment creation should be targeted at the immediate communities of the project site, or Windhoek at large.
- Suppliers of operational stock should be sourced from Windhoek, or the region at large.
- Locally source services required during the operational process, such as securities, rental of portable toilets, plant hire, etc.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Socio-economic	-VE	1	1	8	2	L	L

14.3 Detecting Loss of Product

Leaks and spills of products do not necessarily indicate the potential spill size, however the accuracy of stock monitoring techniques is critical to detecting leaks at an early stage. It follows that a larger quantity of product may leak to soil and groundwater from a long running undetected pipe work leak than from a catastrophic failure of an underground tank. Thus, it's very important to that proper stock management techniques are implemented prior to the operation of the filling station.

Losses of product are often indicated by stock reconciliation systems, upon investigation it may be determined that losses are not caused by leaks. Dispenser meters should be checked periodically and other sources of loss (e.g. theft, faulty gauge probes etc.) should be considered. The elimination of apparent losses should



improve business, performance and improve the leak detection capacity of the systems in use.

14.5 Decommissioning Phase

The impacts associated with this phase will be similar to that of the construction phase. The supplier’s guidelines for tank removal must be followed to reduce the risk of spillage and groundwater contamination. The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the development.

15. CUMMULATIVE IMPACTS

Construction: Possible cumulative impacts associated with the construction phase include an increase in traffic visiting the site. An increase in emissions from these vehicles will be experienced, decreasing the air quality around the proposed development. Wear and tear on the roads could be expected, coupled with increased risks of road traffic incidences. These impacts will be short lived for the duration of construction.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Cumulative impacts	-VE	2	2	6	2	L	L

Operational: Potential cumulative impacts associated with the operational phase include increase in traffic around the site. Emissions from vehicles visiting the proposed fuel retail facility are expected, coupled with the existing emissions from vehicles in the surrounding areas, the air quality will be impacted. Coupled potential hydrocarbon pollution from the existing fuel retail facility and the proposed facility could become significant if not managed properly. These impacts can be long-term as long as the retail facility is operating.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Cumulative impacts	-VE	2	2	6	2	M	L

16. ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (**EMP**) provides management options to ensure impacts of the proposed development are minimised. An EMP is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and the positive benefits of the projects are enhanced.

The objectives of the EMP are:

- ✓ to include all components of the development;



- ✓ to prescribe the best practicable control methods to lessen the environmental impacts associated with the construction of the development;
- ✓ to monitor and audit the performance of construction personnel in applying such controls; and
- ✓ to ensure that appropriate environmental training is provided to responsible construction personnel.

The EMP acts as a stand-alone document, which can be used during the various phases of the proposed fuel retail facility. All contractors taking part in the construction of the facility should be made aware of the contents of the EMP. An EMP for the construction, operational and decommissioning phases of the proposed fuel retail facility has been developed and is attached as Appendix A.

17. CONCLUSIONS

In general, the proposed development would pose limited environmental and social risks.

The site is generally suitable for the proposed fuel retail facility. All environmental risks can be minimised and managed through implementing preventative measures and sound management systems. It is recommended that this information be made available to the community on a regular basis.

The Environmental Management Plan should be used as an on-site tool during all phases of the proposed fuel retail facility. Monitoring of water pollution should be conducted every quarter month of the year.

Future environmental audits should be carried out to ensure compliance of the EMP and environmental regulations of Namibia. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

The environmental clearance is valid for 3 years only, as per the environmental management act No.7 of 2007, thus it is the responsibility of the proponent to commission an application for renewal of the permit by submitting an updated EIA/EMP document before it expires.

Matrix Consulting Services

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June 2021



18. REFERENCES

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