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Environmental and Social Impact Assessment for proposed fuel retail facility in Mpungu, Kavango west region-Namibia
Project proponent: **DAPPS Enterprises Cc**
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Project Name	ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION AND OPERATION OF A FUEL RETAIL FACILITY AND ASSOCIATED INFRASTRUCTURE AT MPUNGU, KAVANGO WEST REGION-NAMIBIA		
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List of Acronyms

BID	Background Information Document
DEA	Directorate of Environmental Affairs
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
IMP	Impact Management Plan
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MEFT	Ministry of Environment Forestry and Tourism's
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

EnviroPlan Consulting cc has been engaged by **DAPPS Enterprises cc** (herein referred to proponent) to conduct the Environmental Impact Assessment (EIA) and develop an Environmental Management Plan (EMP) for the proposed new fuel retail facility establishment on a T- Junction of the B10 (Nkurenkuru- Eenhana highway) and B 15 (Tsumeb highway) and to apply for an Environmental Clearance Certificate (ECC) for the proposed land use. The proposed development project has triggered the application for an environmental clearance certificate because it's listed on the activities that cannot be undertaken without an Environmental clearance certificate according to the ENVIRONMENTAL MANAGEMENT ACT of 2007, abide by THE REPUBLIC OF NAMIBIA CONSTITUTION. The project proponent intends to establish a fuel retail facility as well as convenient truck in/ truck port. Associated with the development will be a convenience travelers' shop (take away) and a modern car wash.

LAND USE AND DEVELOPMENT ACTIVITIES

Part VII of the Environmental Management ACT no 7 of 2007, ENVIRONMENTAL ASSESMENT gives a list of activities that cannot be undertaken without an Environmental Clearance certificate. This proposed project falls under Part *(vii) No 27, Subsections 2(a) and (h) which* gives a list of activities which may not be undertaken without an environmental clearance certificate. The ENVIRONMENTAL MANAGEMENT ACT works hand in glove with other environmental Conservative legislations stated in chapter 2.0 POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK in this report to ensure a Sustainable Project Development in The Republic of Namibia.

Environmental Impacts

- Moderate potential negative environmental impact.
- Relative or moderate impact (positive)

Social Impacts

- The project is generally expected to improve the socio-economic environment of Mpungu through a major boost in business archived by integrations with business partners, human wellbeing, employment and tourism on the long term. The restoration of confidences within the local people that such place and facilities can be owned by anyone regardless of color or origin. This will create inspiration and admiration among and within SMEs.
- The proposed project will enhance the development at Mpungu and surrounding villages and will add value to the existing or potential properties in the locality of the proposed area to be developed main to serve the inhabitants of Mpungu and the travelers.

- **Employment opportunities to the local people as they will be the first priority and main beneficiaries**

1.0. CHAPTER ONE: BACKGROUND

1.1. Introduction

DAPPS Enterprises cc (herein referred to as the proponent), as per the requirements of the **Environmental Management Act No. 7 of 2007**, has appointed **EnviroPlan Consulting cc** to conduct an Environmental Impact Assessment of the proposed Fuel retail facility and truck port. As indicated in the company founding statement the company proposes to do fuel retailing and its associated activities here listed, truck port, convenience tuck shop, car washing bay and Electronic Money Links. The company already acquired 1.5 ha piece of land in Mpungu Vlei, Kavango West Region. The land is allocated to the Ukwangali Traditional Authority by the state and the Environmental consultant team demarcated it as degraded since the road's developers were extracting some gravel sand and they fail to rehabilitate the gully. However, the gully was naturally healing. Therefore, DAPPS Enterprises cc hereby intends to fast track this gully reclamation process and makes the place productive again by setting up a fuel retail facility.

EnviroPlan Consulting cc Environmental Consultants has undertaken an Environmental Assessment (EA), formulate an Impact Management Plan (IMP) and will apply for an Environmental Clearance Certificate (ECC) from the Ministry of Environment Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA) in consultation with all relevant government departments and stakeholders. In this respect, this document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed establishment of a service station at Mpungu according the guidelines and statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts regulations (**GN 30 in GG 4878 of 6 February 2012**).

1.2. Project Location

Mpungu settlement is a former mission station of the Finnish Missionary Society in the Mpungu Constituency in the Kavango West Region in Northern Namibia. It is located Approximately 55 km south-west of Nkurenkuru, in the inland, as opposed to other former Finnish mission stations, which were located along the Kavango River. Today a tarred highway from Ovamboland to Kavango connects Mpungu to other places in northern Namibia. On a T-Junction of the B10 (Nkurenkuru- Eenhana highway) and B 15 (Tsumeb highway) lies a 1.5 ha piece of land approved by the Ukwangali Traditional Authority to be developed into a fuel retail station, truck port and a convenience tuck shop by DAPPS Enterprises cc.

Amongst the other activities and services offered in the village is four (4) grocery or tuck shops, a Namibian police station, two (3) schools comprising of one (1) combined school, one (1) kinder garden, and one Secondary school, an Agriculture Extension Office, Forestry office, Mpungu Vlei Constituency Councilor's office and a Health Care Centre. Plate 1 overleaf

portrays an aerial view of the project site and exact project location coordinates are as follows:

Table 1: Proposed Site Coordinates

CODINATE NUMBER	LATITUDE	LONGTUDE
A	-17 ⁰ 39' 08''S	18 ⁰ 14'26''E
B	-17 ⁰ 39'11''S	18 ⁰ 14'27''E
C	-17 ⁰ 39'09''S	18 ⁰ 14'30''E
D	-17 ⁰ 39'07''S	18 ⁰ 14'30''E

1.3. Terms of Reference



Figure 1: Aerial photograph showing project site

The Terms of Reference for the proposed project development are centered and regulated by the Environmental Management Act No 7 of (2007) and its Regulations (February 2012). The development obscured environmental concerns in the screening phase, EIA/EMP phase.

1.3.1 The Environmental Impact Assessment Phase

Table 2: Stages followed through the assessment phase

OBJECTIVES	CORRESPONDING ACTIVITIES
Project initiation and Screening phase	
<ul style="list-style-type: none"> • Understanding of the environmental and social baseline relating to the proposed fuel retailing and truck port setting up • Initiate the screening process • Initiate the environmental impact assessment process. 	<ul style="list-style-type: none"> • Initiate baseline studies • Early identification of environmental aspects and potential impacts associated with the proposed project (both positive and negative impacts).
EIA/EMP phase	
<ul style="list-style-type: none"> • Notify the decision-making authority of the proposed project • Identify interested and/or affected parties (IAPs) and involve them in the EIA process through information sharing. • Identify potential environmental issues associated with the proposed project. • Consider alternatives. • Identify any fatal flaws. • Provide a detailed description of the potentially affected environment. • Assessment of potential environmental impacts. • Design requirements and management and mitigation measures. • Review of EIAs by MET 	<ul style="list-style-type: none"> • Written notification submitted to Roads Authority • Notify IAPs of the project and EIA process (telephone calls, e-mails and newspaper adverts). • Compilation of draft report. • Distribute draft report to relevant authorities and IAPs for review (December 2017). • Finalization of EIA report • Forward the final draft EIA and EMP reports and IAPs comments to Ministry of Mines and Energy and Ministry of Environment and Tourism for review. • Application of Environmental Clearance certificate

1.4. Project Description

The proposed development activity will inaugurate a 24-hour open service station, establish a convenient store as well as take away, a modern car wash and a truck port. The pre- planning phase will comprehend site investigations, layout planning, acquiring all relevant/ legal certificates. Following approval to establish the proposed activity the proponent will start with the construction phase of the project and operations will follow thereafter. This report will guide the project proponent to follow all Environmental regulations/ rules to archive the goals of a sustainable project development in Namibia.

1.4.1. Accessibility

Today a tarred highway from Ovamboland to Kavango connects Mpungu to other places in northern Namibia. On a T- Junction of the B10 (Nkurenkuru- Eenhana highway) and B 15 (Tsumeb highway).

1.5. General objective

- To determine the potential environmental impacts derived from the construction, operation and decommissioning of a fuel dispensing facility/ service station as well as the convenience trucking port.

1.5.1 Specific objectives

- To establish baseline environmental conditions so that relevant impacts could be predicted and appropriate mitigation strategies could be designed to service the construction and operational phases
- To identify direct or indirect environmental impacts that may result from the proposed truck port project during all phases of the project
- To consult relevant, interested and affected shareholders so that their concerns are considered in the devising and implementation of the Environmental Management Plan
- Observe Namibia's Environmental Impact Assessment Regulation (2012), Environmental Management Act (No. 7 of 2007) and other relevant laws and regulations
- To suggest substitutes to the activities that might cause adverse effects
- To set up an Environmental Management Plan that will administer all activities of the project for the up keep of the environment.

1.6. Methodology used for the study

The methodology used by the consultant is also mentioned in the Terms of Reference (ToR) prepared the consultant, and embraces of the following techniques:

- (i) **Primary Data:** Primary data was collected using questionnaires to gather information relevant to the project. Questionnaires were disseminated to entities neighbouring the project site. By so doing, the researcher (consultant) intends to compile relevant information on how the neighbours to the site handled the development of a fuel retail station at Mpungu Vlei (area under study). The researcher used questionnaires because they can be quantified and analysed more scientifically and they are tangibly goal oriented than any other form of research. The researcher used structured questionnaires,

whereby the questions were drafted to meet the project description and people's opinions. Open ended and closed questions were very instrumental, whereby the respondent was able to express their views and ideas.

- (ii)** Secondary Data: Secondary data is data which previously exists and which was formerly composed for determinations than the problem at hand. Secondary data which was instrumental in this research involves documentation on policies, laws, regulations and guidelines related to environmental management, labour, waste management etc., at the national level as well as the international level. These were acknowledged and are available in the Reference page.
- a) Field Observations: Observation involves the direct image of phenomena in their natural setting (Gorman and Clayton 2005). The consultant therefore visited the site two times and necessary qualitative and quantitative data was obtained. During the site visit, the consultant managed to note all the necessary attributes all-encompassing GPS coordinates, soil type, vegetation, topography, water source and the local socio-economic environment.
 - b) Stakeholder consultation: The consultant considered key relevant partners/stakeholders and these were including the town council, constituency office and neighbours to the site.
 - c) Mapping and zoning of the site: Maps which convey to the area of study were drawn and these comprise the location map extracted from Google Earth.

Reporting: the final stage was reporting whereby data and information collected was organized and compiled into a report.

1.7. Topography, Storm water and Wind Patterns

The area is relatively flat and supports little grasses, small shrubs and one big tree. Because of the landscape and surface terrain the storm water and floodwater flow channels flow from the South-west to the North-east. The area is not prone to flooding but experience rain water



Figure 2: Topography of the proposed site

runoff from the north-eastern direction because of the gradient. The existing sewerage system was designed following this gradient. South Easterly heavy dusty winds frequently experienced in the town.

1.7.1. Infrastructure and Services

Water and electrical services will be linked to the existing bulky services and networks. The waste water sanitary system must be designed for the safe handling of liquid waste in the particular flat and sandy- loamy soils of Kavango West. Amongst the other activities and

services offered in the village is four (4) grocery or tuck shops, a Namibian police station, two (3) schools comprising of one (1) combined school, one (1) kinder garden, and one Secondary school, an Agriculture Extension Office, Forestry office, Mpungu Vlei Constituency Councilor's office and a Health Care Centre.

1.7.2. Proposed Infrastructure

The study will specifically look at the activities in the following implementation of a new service station, a truck port and convenience shop.

Construction phase

- Excavation of trenches and pits for services and infrastructure
- Installation of engineering services, underground storage tanks, oil separator, spill control infrastructure, submersibles, generator and dispensing pumps
- Electrical reticulation above and below ground
- Construction of buildings, paving, pump islands, storm water drainage, site access streets and related infrastructure
- Transportation of equipment, components, machines and building material to site
- Site clean-up and housekeeping

Operational phase

- Decanting fuel to the underground storage tanks from street tankers
- Fuel dispensing into vehicles and approved containers
- Car wash operations

- Operations of a quick shop
- Site clean-up and housekeeping
- Running water management

1.8. Land Use Planning

The area is within the Ukwangali Traditional authority area of jurisdiction. The area is designated for business by the local authority. Based on the information contained within this report, proposed project appears to meet all the relevant and acceptable solutions and as such should be considered a permitted use or development. The project proponent was given a leasehold period from 26.05.2016 until 26.05.2051 following the Communal Land Reform Act, 2002 (Section 33, Regulation 16).

1.9. Project Desirability

The proposed development is operating and falls on a well-established route of Nkurenkuru Tsumeb highway, thus civil services such as sanitation, water, storm water and electricity are already developed and will be seen as an advantage for further development. Consequently, targeted service station users will access on traveller's convenience and the availability of services such as ATM's and a convenience store.

The proposed service station will supply local and long-distance taxis, heavy vehicle drivers and private commuters with a safe and controlled area to stop, park and fill their tanks as well as employment opportunities to the inhabitants surrounding the proposed service station. Investing in a service station in an urban environment and on our highways is a lucrative trade but also an essential service for the surrounding communities as it helps them to get fuel and basic necessities at ease within their locations.

Part time employment will be created during construction of the development utilized low skilled employees from the surrounding community of Nkurenkuru town community and adding to skills development. The business will be operating 24 hours. Employment will be dependent on the success of the business going forward. The operations will contribute to more economic activities resulting in increased trade and industrial activity contributing to the economic development of Nkurenkuru and Namibia at large.

Globalisation/ increase in automobiles

Globalization and increase in petrol and diesel driven automobiles are major drivers of the development. Globalization pressure from developed to developing countries is also a cause for concern. Continuous flow of import automobiles in Namibia is increasing daily. Hence the need for well-maintained road infrastructure and service stations is essential for development.

Addressing the Challenges

Adding to a total number of two service stations will make Nkurenkuru a reliable refuelling stop. All automobiles from Katwitwi, Oshikango, and Tsumeb using Nkurenkuru to Rundu will get be served by the project development. More over this will dis allow monopolisation within the industry, thus ensuring flat prices for petrol, diesel and paraffin.

1.10. Review of Existing Evidence

The last site visit made on the 11th of March 2023 and reviewed the following:

1. A thinly vegetated land 9133 m²
2. No signs of development seen.

The picture below shows the existing status of the proposed development area as at the last visit by the consultant.

1.11. Project Location Alternative

Alternative 1: Without Project Scenario

Without the project DAPPS Enterprises cc has to look for another business to contribute to the Gross Domestic Product (GDP) of the country. The village town will remain under developed. Fuel will also be un-available for locals who gets fuel from Nkurenkuru. Increased illegal storage and retailing of dangerous goods in some other parts where small garages also re trade fuel in twenty-five litre containers will also be the order of the day.

There will be no possibilities of employment creation in the region affecting the economically active group. There will be no development and Mpungu will remain under developed.

There is no other alternative site allocated to DAPPS Enterprises than the site under study.

Alternative 2: With Project Scenario – establishment of a new fuel retail station at Mpungu

With the project scenario, the development will promote employment creation, increased GDP per capita income with business agglomeration and increased infrastructural development within Mpungu Vlei, Kavango west at large.

2.0 CHAPTER TWO: POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

This Chapter accomplishes the applicable or relevant policies governing the proposed establishment of a fuel retail facility at Mpungu Vlei. The project proponent and its contractors would be guided and observe without undermining some of them during the project life cycle.

2.1. Introduction

Combined, policy, legal and administrative frameworks, facilitates sustainable development. Mentioned below are acts and policies that have relevance to the establishment of a new service station and its convenient shop. These pieces of legislation include the environmental Management Act of 2007, Environmental Impact Assessment Policy, Water Act and many other Occupational Health, Safety and Environmental Management Statutory instruments and legislations.

The Environmental Management Act 7 of 2007 is the principal defender to the environment aiming to:

Promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment; to establish the Sustainable Development Advisory Council; to provide for the appointment of the Environmental Commissioner and environmental officers; 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 fruits of sustainable development are conducted by a comprehensive statutory framework which was used in this section. All the relevant legal instruments and prescribed procedures have been acknowledged.

- ✓ 2.2.1 Environmental Impact Assessment Regulations and Listed activities in terms of the Act No.7 of 2007.

2.2 Key Industry Standard Requirements

Below is the best environmental best practice, engineering design controls and standards that must be adhered to and required by Oil Companies and the Ministry of Mines and Energy (MME) in order to mitigate the risk that service stations pose;

- SANS 100131 (1977): The storage and Handling of Liquid Fuel. Part 1: Small Consumer Installations;
- SANS 100131 (1979): The storage and Handling of Liquid Fuel. Part 11: Larger Consumer Installations;
- SANS 10400 (1990): The application of the National Building Regulations

- SANS 10089-1 (1999): The petroleum industry Part 1: Storage and distribution of petroleum products in above-ground bulk installations;
- SABS 0131 (1999): The petroleum industry Part 3: The installation, modification, and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations;
- SANS 10089-2 (2002): The petroleum industry Part 2: Electrical installations in the distribution and marketing sector;
- SANS 1186-1 (2003): Symbolic safety signs Part 1: Standard Signs and General Requirements; SANS 10142-1 (2003): The wiring of the premises Part 1: Low-voltage installations; SANS 1535 (2003): Glass-reinforced polyester-coated steel tanks for the underground storage of hydrocarbons and oxygenated solvents and intended for burial horizontally.
- SANS 10131 2004, Above-ground storage tanks for petroleum products;
- SANS 10089-3 (2010): The petroleum industry Part 3: The installation, modification, and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations.
- SANS 1020 (2013): Power-operated dispensing devices for flammable liquid fuels

2.3. Relevant Legislation

The Namibian Constitution Act (1990), Environmental Assessment Policy (1994), Environmental Management Act of Namibia (2007), Environmental Management Act Regulations (2012), Water Resource Management Act of Namibia (2004), Pollution Control and Waste Management Bill (guideline only), were reviewed. Table 4 overleaf (pages 13 and 14) indicates laws and policies which relates to the project.

Table 3: Relevant legislation and policies which are instrumental to the project

YEAR	NAME	NATURAL RESOURCE USE (ENERGY AND WATER)	EMISSIONS TO AIR	EMISSIONS TO LAND	EMISSIONS TO WATER	IMPACT ON BIODIVERSITY	IMPACT ON LAND USE	NOISE	VISUAL	EMERGENCY	SOCIO- ECONOMIC	SAFETY & HEALTH	OTHER
1990	The Constitution of the Republic of Namibia of 1990	X	X	X	X	X	x	x		x	X	x	
2007	Environmental Management, Act 7 of 2007	X	X	X	X	X	x	x			X	x	
2012	Environmental Management Act Regulations (2012)	X	X	X	X	X	x				X		
1994	Namibia's Environmental Assessment Policy	X	X	X	X	X	x	x	x	x		x	
1992	Waste Management Regulation			X					x			x	

YEAR	NAME	NATURAL RESOURCE USE (ENERGY AND WATER)	EMISSIONS TO AIR	EMISSIONS TO LAND	EMISSIONS TO WATER	IMPACT ON BIODIVERSITY	IMPACT ON LAND USE	NOISE	VISUAL	EMERGENCY	SOCIO- ECONOMIC	& SAFETY HEALTH	OTHER
2013	Water Resources Management Act 11 of 2013	X			X						x		
2001	Petroleum Products & Energy Act (1990)	X											
1974	Hazardous Substance Ordinance, No. 14 of 1974			X		X						X	X
1919	Public Health Act		X	X	X		X	X				x	
2007	Labor Act										X	x	
2004	National Heritage Act												x
2001	Forest Act 12 of 2001	X	X			X	X		X		X		X
1972	Road Ordinance 1972 (Ordinance 17 Of 1972)	X		X								x	x

2.2.1. The Environmental Management Act 2007 (Act No 7 of 2007)

Relevant provisions

Section 56 of the Environmental Management Act, 2007 (Act No.7 of 2007), the Minister has made the protocols for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012). These protocols necessitate that all developments/projects that have a detrimental effect on the environment must be accompanied by an EIA Under section 27 of the Environmental Management Act, 2007 (Act No. 7 of 2007), and after following the consultative process referred to in section 44 of that Act, the Minister lists in the Annexure to the above-mentioned Schedule, activities that may not be undertaken without an environmental clearance certificate. In both the Environmental Management Act and its guidelines, all activities that may not be undertaken without an environmental clearance are listed. The proposed project entails the following listed activities:

- ✓ *land use transformation, any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976,*
- ✓ *the manufacturing, storage, handling or processing of Hazardous Substance (HS) defined in the HS Ordinance 1974, the storage and handling of a dangerous good including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at one location and*
- ✓ *Construction of filling stations or any other facility for the underground and above ground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin.*

These regulations are very important in the implementation of the Project because this project fall under prescribed projects that has to have an Environmental Impact Assessment undertaken before the project is given a green light for implementation. This Act and its regulations should enlighten and guide this EIA process. Cost and benefits analysis of the project are weighed systematically to find suitability of the project in terms of economic, social and bio-physical environmental.

These regulations also make it possible that both negative and positive environmental impacts are identified and weighed in their significance and relentlessness to determine whether the project will be given a permission to be carried out. This is attained through the appointment of a qualified and experienced EAP whom the project proponent chooses to do the preliminary Environmental Assessment and compilation of scoping report submitted accordance to the regulations. It mandates the Assessment process to be done in accordance with the EMA Act and its regulations.

In summation, this policy makes all other polices, legal and administrative framework to be considered before the project can be allowed to be implemented. The Environmental Impact Assessment (EIA) regulatory framework was published on the 18th of January 2012.

Relevance to the project

This Act and its regulations should enlighten and guide this EIA process.

2.2.2. Legislative process

The proposed development and construction activity require compliance with the EIA Regulations of 6 February 2012 Government Notice No 28, 29 and 30, promulgated in terms of the EMA, Act no. 7 of 2007.

The proposed activity requires an EMA EIA Scoping Process in terms of the activities below. GN no. R4878 Activity no.:

- ✓ 9.1 The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.
- ✓ 9.4 The storage and handling of 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 location.
- ✓ 9.5 Construction of service stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin.

2.2.3. United Nations Framework Convention on Climate Change

Relevant provisions

It is also vital to note that there are international conventions which aim to protect the environment. Namibia is a signatory to some of the conventions for example the 1992 United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was adopted to regulate levels of greenhouse gas concentration in the atmosphere, so as to avoid the occurrence of climate change on a level that would impede sustainable economic development, or compromise initiatives in food production. The Parties are to protect the climate system for present and future generations. The developed country Parties (and International Environmental Law from a Namibian Perspective 54 other Parties listed in annex I) commit themselves to take special measures to limit their anthropogenic emissions of greenhouse gases (GHGs), and to enhance the capacity of their sinks and reservoirs for the stabilization of such gases.

Relevance to the proposed project

All anthropogenic emissions of GHGs to be used during all phases will be strictly very limited.

2.2.4. National Heritage Act 27 of 2004

Relevant provisions

Section 48(1) states that "A person may apply to the Namibian Heritage Council (NHC) for a permit to practice any activities which might directly or indirectly disturb protected areas or National heritage

Relevance to the proposed project

In respect to the proposed project development site, there are no National Heritage values on the project area and its nearby environs.

2.2.5. Soil Conservation Act 76 of 1969

Relevant provisions

The soil Conservation Act makes provision for the prevention of soil erosion. It promotes the protection and up keeping the soil structure and vegetation and all-natural resources in the soil of the Republic of Namibia

Relevance to the proposed project

Tar and concrete paving would be done to avoid further disturbance. However, the landscaping will be done to make sure the drained water will join other municipal designed waterways. Reforestation, planting of lawns and flowers will also conserve the soil structure if done on open spaces.

2.2.6. Water Act 54 of 1956

Relevant provisions

Certification in terms of Sections 21(1) and 21(2) of the Water Act is required for the disposal of industrial or domestic wastewater and effluent. Prohibits the pollution of underground and surface water bodies (S23) (1) and Accountability for costs to be met in remedying the environment as soon as project abandonment (S23 (2)).

Relevance to the proposed project

The protection of ground and surface water resources should guide the project construction phase. No Hazardous substances should be disposed in any case for example spillages.

2.2.7. Labor Act (No 11 of 2007) in concurrence with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at a working place'.

Relevant provisions:

The section 135 (f) of the Ministry of Labor and social Welfare specifies that "the steps to be taken by the owners of premises used or intended for use as factories or places where machinery is used, or by occupiers of such premises or by users of machinery about the structure of such buildings of otherwise to prevent or extinguish fires, and to ensure the safety in the event of fire, of persons in such building.

This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labor practices.

Relevance to the proposed project

The project will offer a number of jobs to both semi-skilled and skilled locals and it will be the proponent or the contracted company's responsibility to ensure that the workplace is safe from Hazards. Occupational Safety and health practitioners should be hired to provide adequate safety and health trainings to key personnel. This will comprise put on suitable hazard management plans.

2.2.8. Public Health Act, 36 Of 1919

The Public Health Act makes provision for the control of activities and situations that have potential to affect public health. It establishes powers of health officials, local authorities and has several regulations made subservient to it, including the following regulation below. Part 4 of the Public Health Act (section 82) states that no person shall cause a nuisance or other condition liable to be injurious or dangerous to health. It shall be the duty of the general manager the local authorities, workers to make sure the place is kept tidy and clean and prevent nuisance. If satisfied of the existence of a nuisance the local authority shall serve a notice on the author of the nuisance to remove it within the time specified. If the author of a nuisance fails to comply with any of the requirements thereof within the specified time the court may by such order impose a fine on the person as per the provisions of subsection (3) of section 87.

Relevance to the project:

All waste generated subsequently form every operation of the project shall be disposed safely and no activities that can cause nuisance to be tolerated on site. The owner should engage into reducing recycling and reusing activities which promotes a prolonged life cycle of PET packaging, reusing of metal containers and other cordial technologies of the environment to be engaged. All waste to be collected in accordance to town council waste collection procedures and disposed at the municipal dumping sites.

2.2.9. Pollution and Waste Management Bill (draft)

Relevant provisions

The draft of Pollution and waste management bill clearly defines different types of pollution. It also notifies on how the Government intends to control different types of pollution to uphold a clean and safe environment for all.

The bill expresses the mandatory for everyone to comply with waste management to reduce pollution in any form. The failure to comply with the obligatory is considered as an offense which is punishable.

Relevance to the proposed project

The operations of the project should be done in accord with the pollution and waste management bill to reduce all types of pollution within the vicinity of the project site during

construction and operation phases. Existence of a fenced dumpsite will ensure adequate solid waste management if correctly used.

During operation phase of the proposed development activities, the municipality will be entitled to under taking refuse collections and provisions for solid waste receptacles to be put in place.

2.2.10. Waste Management Regulations: Local Authorities ACT (1992)

Relevant provisions

Waste Management Regulation: Local Authorities of 1992 provides guidelines on waste management, it mandates the occupier of properties must provide a secure, hygienic, adequate and readily accessible waste storage place or area on the premises.

Relevance to the project

The waste management on site will be executed in an environmentally sound manner through the use of a registered existing dumping area. All solid waste generated during construction and operational phase will be handled and disposed using recommended skip plastic bins, bin liners and to make sure right procedural disposing methods. Alternatively, a sustainable approach can be done, refer to the list of **Appendices** (EMP) for recommendations.

2.2.11. The Namibian Constitution Act, (1990)

Relevant provisions

The Constitution of Namibia encourages wise and sustainable use of resources. According to Article 95 of Namibia's Constitution it states that, the State shall actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources in a sustainable way for the benefit of all Namibians, both present and future. This article recommends that a relatively high level of environmental protection is called for in respect of pollution control and waste management.

Relevance to the proposed project:

The project will enable the full execution of right to practice any profession, or carry on any occupation, trade or business by availing necessary provisions such as practicing any profession, or carry on any occupation, trade or business in the country.

Through implementation of the environmental management plan will ensure conformity to the constitution in terms of environmental management and sustainability.

2.2.12. Petroleum products and energy Act of Namibia (ACT NO. 13 of 1990)

The act describes the accountability of operators in the field of petroleum assessment and exploitation for health, safety and welfare of persons employed, and for protection of other persons, property, the environment and natural resources, in or in respect of any area where

petroleum activities are carried out. **Part XII** contains provisions relating to emergency preparedness. Each operator shall prepare an emergency preparedness plan.

Furthermore, the Petroleum Laws Amendment Act 1998 sets out provisions regulating the decommissioning of facilities used in petroleum exploration and production operations in Namibia. These provisions, inter alia, provide that the holder of a production license is under an obligation to establish a trust fund after 50% of the estimated recoverable reserves of the relevant production area has been produced.

Relevance to the project:

The proposed project will in all phases observe the safety and health of workers, visitors and nearby communities. Emergency preparedness will be mandatory during the operating phase whereby the transportation, offloading and storage of hazardous and highly flammable substances. Sand buckets, fire extinguishers, fire training workshops, clearly labeled stickers and a shade will be set to ensure efficient hazard preparedness. During the decommissioning phase the owner of the property should make sure all the procedures are done to meet all aspects addressed in the Petroleum products and energy Act of Namibia (ACT NO. 13 of 1990)

2.2.13 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.

Relevance to the project:

The project will also engage the sale and storage of Hazardous substances i.e. petrol, diesel, oil, paraffin and Afrox gas. The transportation, storage and sale will be done using certified recommended cylinders and containers.

2.3. Conclusion

These pieces of regulations should be observed throughout the project's life cycle. Any deviations from these policies, regulations and administrative frameworks may have catastrophic results to the environment (including man power) and the working environment. These laws bring about rational work ethics that support the protection of the environment. Strict monitoring by relevant authorities will bring about sound environmental practices. DAPPS Enterprises cc shall enforce these regulations on its area of jurisdiction and constant monitoring will be done in form of inspections and audits.

3.0 CHAPTER THREE: RECEIVING ENVIRONMENT

3.1 Introduction

The conclusion in this chapter are grounded on baseline surveys, public consultation and desk reviews undertaken by the EIA team. The findings relate mainly to aspects of ecology, ambient air, soil, water and noise levels for the entire operation. Correspondingly, the economic and social environment was considered for this study. This Chapter outlines relevant environmental and social setup which was instrumental to compile this report from desktop researches, local authorities' consultations and own observations.

3.2 Socio-Economic Status

Mpungu is a settlement and a former mission station of the Finnish Missionary Society in the Mpungu Constituency in the Kavango West Region in Northern Namibia, ([Wikipedia](#)). The entire Kavango west region (including Mpungu Village) ranks amongst the poorest regions in the country with a prevailing high unemployment rate. Mpungu Vlei forms part of Mpungu constituency which is dominated by Ukwangali people. The other tribes include Ovakwanyama and Ovandonga people. Mpungu is a constituency in the Kavango West region of Namibia and it has an estimate population of around 18,332. There is one town in this constituency, Nkurenkuru. Mpungu is a constituency in the Kavango West region of Namibia. It had a population of 20,787 in 2011, up from 18,660 in 2001, (NSA).

The villagers speak Ukwangali as the main their RuKavango language. The main sources of income in the region include agriculture, forestry and fishing with agriculture as the dominant income source and livelihood generating sector. Main agriculture activities are small scale crop farming (53%)-growing Mahangu, livestock (23%) –farming goats and cattle, and poultry farming (8%) (Enviro Dynamic 2014). These farming systems provide a degree of food self-sufficiency with a few provisions of economic development.

Mendelsohn and Obeid 2003 argued that land resources available to subsistence, small-scale farmers have declined due to the following three factors: First, the growing population has simply used more and more land for crop cultivation, livestock pastures and other natural resources.

Goats and cattle mark the majority of livestock which are kept by the locals and are normally exchanged with goods and cash.

3.3 Climate

Mpungu is subjected to a semi-arid climate, with hot summers and mild winters. During the austral winter, the days are warm and nights cool to cold. Rainfall is related to the southward movement of the Inter Tropical Convergence Zone (ITCZ) during the summer months. Rainfall falls as high intensity localized thunder storms, though over recent years. The annual rainfall ranges between 500 to 550mm with June normally reporting the lowest and January the highest

(Mendelsohn et al., 2002). During the high rainy season, the area regularly becomes flooded which renders the land around the project site inaccessible for a period of two to four months January through March; very limited tourist’s movement in the region during this time. Daytime temperatures exceed 30°C throughout the year, except during May, June and July. Average maximum temperatures fluctuate between 32°C and 34°C and average minimum temperatures between 8°C and 10°C. The average level of humidity ranges from 10 to 20% during winter with the highest humidity normally recorded in March (70-80%).

3.4 Biological Environment

3.4.1 Flora

Mpungu Vlei is located in Kavango West Region characterised by a high to very high vegetation density of considerable diversity. However, because of grazing it has been reduced extensively. However, the project site doesn’t have much vegetation since the area was degraded during road construction, see plate 3.1 for illustration.

Plant species in the area form part of the extensive Kalahari sand basin which is characterized by grassland and encompassing plant species such as *Vossia Cuspidata*, *Cynodon Dactylon* and *Setaria Sphacelata* (Burke, 2002 – see figure 2 hereunder). Surrounding the site there are species such as *Baikiaca Plurjuga*, *Acacia Erioloba*, *Peltophorum africanum*, *Acacia Erioloba* and *Colophospermum mopane*. as summarised in the table 2 below. Amongst these species, one is amongst the main protected species that is *Peltophorum africanum*. The plant species found in this area bear significant economic value especially those desirably for timber. (Mendelsohn & el Obeid, 2006).

Table 4: Common Plant Species existing in the nearby environs of the project area

Specie	Local name	Status
<i>Baikiaca Plurjuga</i>	Uhaha	Protected
<i>Acacia Erioloba</i>	Not Known	Protected
<i>Colophospermum mopane</i>	Not Known	Protected
<i>Terminalia prunioides</i>	Not Known	Protected
<i>Peltophorum africanum</i>	Muparara	Protected
<i>Terminalia sericea</i>	Not Known	Not Known
<i>Bauhinia petersiana</i>	Not Known	Not Known



Figure 3: Flora on project site

3.4.2 Fauna

The wildlife around the site comprises birds, reptiles and amphibians with a limited number of mammals. Reduced vegetation around the project site and surrounding environs has resulted in habitat loss for most mammals that used to habit the area. Human nature conflict or encroachment into wildlife habitats has also contributed to forced animal movement to the nearby pristine environments along the Okavango river banks where there are limited number human

developments and activities going on. Okavango River is more than 50 kilo meters away from the site.

It is important to note that the development is being done on an area that was previously disturbed through extraction of gravel during road construction hence is a necessary development to carryout rehabilitation of the area, although the gully was naturally sustaining itself. Plate 3.2 is an image of the gully which covers $\frac{3}{4}$ of the project site allocated space. It's not a habitat of any fauna in the area except micro-organisms.



Figure 4: Existing gully which is in the process of healing naturally on the project site to be rehabilitated by the project development

3.4.3 Mammals

The following list of occupant mammals in the area was derived from existing literature and personal observation. The list of mammals in the table below was then recognised as occurring in the region (MET, 2008) but not limited to the project site.

Table 5: List of mammals occurring in and endemic to the region

SPECIES (COMMON NAME)	CONSERVATION STATUS
<i>African Buffalo</i>	None
<i>Hippopotamus</i>	Endangered
<i>Tsessebe</i>	Not known
<i>Blue Wildebeest</i>	Not known
<i>Sitatunga</i>	Not known
<i>Common Reedbuck</i>	Not known
<i>Elephant</i>	Endangered
<i>Giraffe</i>	Not known
<i>Spotted Hyena</i>	Endangered
<i>Kudu</i>	Not known
<i>Sable Antelope</i>	Not known
<i>Roan Antelope</i>	Not known
<i>Red Lechwe</i>	Not known
<i>Chapman`s Zebra</i>	Endangered
<i>African Leopard</i>	Endangered
<i>South African Cheetah</i>	Endangered

3.4.4 Birds

Table 6 List of bird species occurring in the area

SPECIE (SCIENTIFIC NAME)	COMMON NAME	CONSERVATION STATUS
<i>Rhynchope Flavirostris</i>	African Skimmer	Endangered
<i>Glareola nordmanni</i>	Black-winged Pratincole	Endangered
<i>Egretta vinaceigula</i>	Slaty Egret	Endangered
<i>Buggeranus carunculatus</i>	Wattled Crane	Endangered
<i>Nettapus auritus</i>	African Pygmy Goose	Endangered
<i>Centropus cupreicaudus</i>	Coppery-tailed coucal	Endangered
<i>Gorsachius leuconotus</i>	White Banked Night Heron	Endangered
<i>Ardeola rufiventris</i>	Rufous-bellied Heron	Endangered
<i>Porphyrio alleni</i>	Allen`s Gallinule	Endangered
<i>Falco dickisoni</i>	Dicksino`s Kestrel	Endangered
<i>Turdoides melanops</i>	Black-faced Babbler	Endangered
<i>Laniarius bicolor</i>	Swamp Boubou	Endangered
<i>Cichladusa arquata</i>	Collared Palm Thrush	Endangered
<i>Lamprotornis mevesii</i>	Meves`s Glossy Starling	Endangered
<i>Burcorvus leadbeateri</i>	Southern Ground Hornbill	Endangered
<i>Glaucidium cuculoides</i>	Asian Barred Owlet	Endangered
<i>Campethera bennettii</i>	Bennett`s Woodpecker	Endangered
<i>Phylloscopus sibilatrix</i>	Wood Warbler	Endangered
<i>Phyllocuspus bonelli</i>	Leaf Warbler	Endangered
<i>Cisticolidae juncidis</i>	Cisticola	Endangered

3.4.5 Amphibians, Reptiles and Invertebrates

The area has a high occurrence of reptiles, snakes. This includes cobras; puff adders (inhabit grasslands and bush ecosystems). The area is a habitat of a wide number of lizard species and tortoises. The baseline study further discovered existence of snails, centipedes, spiders and scorpions.

3.4.6 Geology and Soil

The areas covering Mpungu Vlei consists mostly of unconsolidated windblown sand and sand deposited under fluvial conditions. The basal layer is as yet poorly understood and consists of conglomeratic, red clayey sand with carbonate cement. The surrounding place within the project area is characterized by thin aeolian sands and loamy, calcareous soil with crusts of ferricrete and calcrete.

According to the Argo-Ecological Zoning Programme (AEZ) of the Ministry of Agriculture, Water and Forestry and the World Reference Base for Soil Resources (FAO, 1998), aeolian sands which contain sandy soil with poor retained nutrient capacity. The sand further is slightly acidic which also results in nutrient deficiency. Generally, soils are deep and purely sandy with average soil fertility. Heavier textured soils have formed in the so-called omuramba (wide, flat watercourses with-out visible gradient). A number of these omuramba cross the area are in eastern direction from the project area. The omuramba, because of nutrient-rich soils, are sought-after for fields of agricultural vegetation by the local population. They also promote the growth of thick vegetation especial the *Baikiaca Plurjuga* which are in abundance in the nearby environment. These trees are not going to be disturbed in any way during the project development and operations

3.4.7 Hydrology (Surface & Ground Water)

Hydro geologically, two aquifer types are present in the whole entire Kavango West region. Firstly, the primary porosity aquifers present in the Kalahari Group sediments, which occur throughout the region. Secondly, the secondary permeability aquifers (fractures/ faults) of the Damaran meta-sediments and the Karoo basalts. The Kalahari Group sediments constitute the most important aquifers being utilized for bulk water supply, in particular paleo-channels of the Okavango River and rural settlements (domestic & livestock). the part of the Kavango region demarketing the western side of the region has water level depths between 50 and 130 m below surface.

Mpungu Vlei marks one of the two most places draining to Kavango River. The catchment includes Mpungu River and other smaller tributaries which depend with porous aquifers. The water quality of the aquifers in the Kavango Region is generally very good with TDS (Total Dissolved Solids) being below 1000mg/l, with all major ions being within Namibian water quality standards. However, areas of elevated TDS (>1500mg/l) occur in isolated areas

throughout the region. Very high TDS (>4000mg/l) is noted along the Okavango River which is approximately Over 50 kilometers away from the project site.

The quality of the groundwater in the Kavango region is generally good and suitable for human consumption. Groundwater with elevated salinity was observed only locally along the Okavango River, along the Omuramba Mpungu, northwest Of Kavango west Region. The higher salinity of the groundwater along the Omuramba Mpungu is most probably fault controlled.

3.4.8. Topography and Elevation

The area around the proposed project has an overall flat topography. It is characterized by swelling plains here and there because of the previous disturbances during road construction. Mpungu is in has an elevation of 1131 metres above sea level. The depth of the sand cover is estimated at between 20 and 40 m, and the overall Kalahari sequence of the area is up to 150 m deep.

4.0 CHAPTER FOUR: PUBLIC AND STAKEHOLDER CONSULTATION

4.1 Introduction

Public participation procedures were conducted in accordance with regulations 21 to 24 (EMA 2007, Regulations 2012). It was instigated by way of personal notification given to all Potential Interested and Affected parties (I&APs), as well as newspaper advertisement in the Newspapers. The Background Information Document (BID) containing all relevant facts in respect of the project was made available to I & Aps potential interested and affected parties registered or who attended the public meeting.

4.2 Public Participation Process Notification

The first site visit took place on the 24th of November 2017 and the proponent introduced the EIA team to the village headman and his four (4) other senior residents consisting of the top officials. During the visit, the proponent explained the intended activities clearly mapping out the locality of the proposed project. Boundaries were clearly noted. The EIA conducted a Baseline survey establishing the current environmental status to determine its status in terms of vegetation, biodiversity, social aspects and wildlife. The EIA team plugged in some Invitations for public participation on site, and notices on site and all the places surrounding Mpungu as far as Katwitwi and Nkurenkuru were invited to participate. A call for public participation was done through the national newspapers i.e. the Villager and Windhoek Observer (refer to appendix IV) The I&Aps concerns which arose were noise and dust to be caused by the project development during construction.

4.3 Background Information Document

A background information document (BID) was prepared. This document provides a short summary of the project and the EIA process and it was distributed to the Interested and Affected Parties during the survey. The main aim of distributing the BID to Interested and Affected Parties is to bring awareness and clarity about the project to be developed in their area. A copy of the BID is provided in **Appendix A**.

4.4 Consultation with I & A Ps

A door to door visit was conducted on the surrounding homesteads and consultation with the headman. The nearby homesteads (4 homesteads) did not oppose the project, but rather emphasize on the speedy establishment of the proposed facility. A call for interested and affected parties' comments was placed in the newspapers (attached), but only one interested party made a telephone call trying to confirm with the dates of the public meeting. A call for public participation invitation was put on all the surrounding places where notice boards are normally put for the public for occurrence Katwitwi boarder, Mpungu clinic, Agric extension office and on site. These notices were placed three weeks before the date set for public meeting. Figure 5 overleaf shows the public notices.

This consultation process also provided stakeholders opportunity to express their views and concerns about the project which assisted in determining the scope of work for the EIA. Therefore, this process enabled all stakeholders to provide crucial information regarding environmental, social and economic impacts and identified instrumental mitigation measures for the minimising adverse impacts.



Figure 5: Public notices

4.5 Concerns, Comments and other issues

In general, the proposed project development idea was well received by the community and their concerns were mainly related to employment opportunities, environment and the pre-conditions agreed upon by the project proponent and Ukwangwali traditional Authority. Below is the summary of the issues, concerns and comments that rose during public consultation process.

Table 7: Public participation environmental related inputs register

STAKEHOLDER'S NAME AND POSITION HELD	COMMENTS OR CONCERN
Malengi M Stephanus (affected member)	He is even happy to have such a development at the door step
Muhera Andreas Siranda (vice head)	He is happy since the project will bring forth employment opportunities and plead for employment of local residents where possible
Muronga Calistos S (Ministry of Health)	The construction phase should be noise free and avoid working during the night when people are sleeping
Hausiku Tabitha S (Kavango West Regional Council)	The project implementation will provide convenient access to fuel for the public

4.6 Site Boundary and accessibility

The proponent was encouraged to respect the community decisions through the traditional leadership, furthermore the community also urged the proponent to respect people's property such as lost cattle, goats and sheep into his boundary because they will be grazing and they are a source of survival for the villagers hence there is no need for poisoning or shooting stray animals.

4.7 Employment

The local residents urged that where possible and necessary the proponent should employ locals particularly for manual work and prioritize qualified locals for skilled jobs too. Gender balanced recruitment was also one of the concerns by female attendants.

4.8 Culture and conflict resolution

Village elders and village leadership expressed the need to solve and co-operate cordially any time differences arose between the personnel on site, visitors and the villagers in Mpungu Village. Therefore, he stressed that the proponent should consult the leadership whenever he encounters challenges. Also, if any conflict arises between him and the villagers, both parties should dialogue to manage and solve the conflict.

4.9 Project implementation and support

The community expressed that they support the project implementation and recommend that the project should carry on. They even expressed their ambitiousness to see the project running with the shortest time possible. The community will expect new developments, new businesses and tourism in the area. They all concurred to support in one way or another.

4.10 Conclusion

Basing on experience of the EIA team, the public consultation and local community involvement in gathering information and views of interested and affected parties, this application was done concurring to the manner prescribed in the EMA Act of 2007: Part (ii) Sub section 2 (c). The public inputs were used for EMP drafting as well.

5.0. CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1. Overview

The proponent will implement an Environmental Management Plan (EMP) in order to prevent, minimise and mitigate negative impacts. The environmental management plan is being developed by EnviroPlan Consulting cc so as to ensure sustainability from negative impacts, the plan will be monitored and updated on a continuous basis with aim for continuous improvement to addressing impacts.

5.2. Impact Assessment Methodology

An impact assessment matrix was used to assess all possible impacts of the project on the environment. In line with Namibia Environmental Management Act No. 7 of 2007 and the Environmental Impacts Regulations (GN 30 in GG 4878 of 6 February 2012) with the direction on impacts analysis the following impact assessment criteria was identified by the team and deemed suitable.

Table 8: Impact Screening Criteria

Aspect	Description
Nature	Focuses on the type of effect that the service station establishment will have on environmental components. Addresses questions related to “what will be affected and how?”
Extent	Spatial extend of the project and anticipated spatial extend of impacts indicating whether the impact will be within a limited area (on site where construction is to take place); local (limited to within 15km of the area); regional (limited to ~100km radius); national (extending beyond Namibia’s borders).
Duration	This looks at the temporal issues pertaining to time frames e.g. whether the impact will be temporary (during construction only), short term (1-5 years), medium term (5-10 years), long term (longer than 10 years, but will cease after operation) or permanent.
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether it exceeds set standards, and is described as none (no impact); low (where natural/ social environmental functions and processes are negligibly affected); medium (where the environment continues to function but in a noticeably modified manner); or high (where environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as uncertain, improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of prevention measures).

Significance	Significance is given before and after mitigation. Low if the impact will not have an influence on the decision or require to be significantly accommodated in the project design, Medium if the impact could have an influence on the environment which will require modification of the project design or alternative mitigation (the route can be used, but with deviations or mitigation) High where it could have a “no-go” implication regardless of any possible mitigation (an alternative route should be used).
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The application of the above criteria will be used to determine the significance of potential impacts using a combination of duration, extent, and intensity/magnitude, augmented by probability, cumulative effects, and confidence. Significance is described as follows:

Table 9: Impact Rating Criteria

Significance Rating	Criteria
Low	Where the impact will have a negligible influence on the environment and no modifications or mitigations are necessary for the given development description. This would be allocated to impacts of any severity/ magnitude, if at a local scale/ extent and of temporary duration/time.
Medium	Where the impact could have an influence on the environment, which will require modification of the development design and/or alternative mitigation. This would be allocated to impacts of moderate severity/magnitude, locally to regionally, and in the short term.
High	Where the impact could have a significant influence on the environment and, in the event of a negative impact the activity (i.e.) causing it, should not be permitted (i.e. there could be a ‘no-go’ implication for the development, regardless of any possible mitigation). This would be allocated to impacts of high magnitude, locally for longer than a month, and/or of high magnitude regionally and beyond.

5.3. Impact Assessment

By subjecting each of the potential impacts to the matrix above, the EIA team established the significance of each impact prior to implementing mitigation measures and then after mitigation measures have been implemented. Some of the mitigation measures are mentioned but detailed descriptions of management actions are contained in the accompanying EMP.

Another method that was used to identify the potential environmental impacts for the proposed development (Fuel retail station, truck port and convenience shop) project was the Avoidance of Impact Chart (Figure 6). The chart helps in the identification of potential negative environmental effects and it advocates for the avoidance, minimization and compensation of negative impacts during the project phases (clearing, construction and operation).

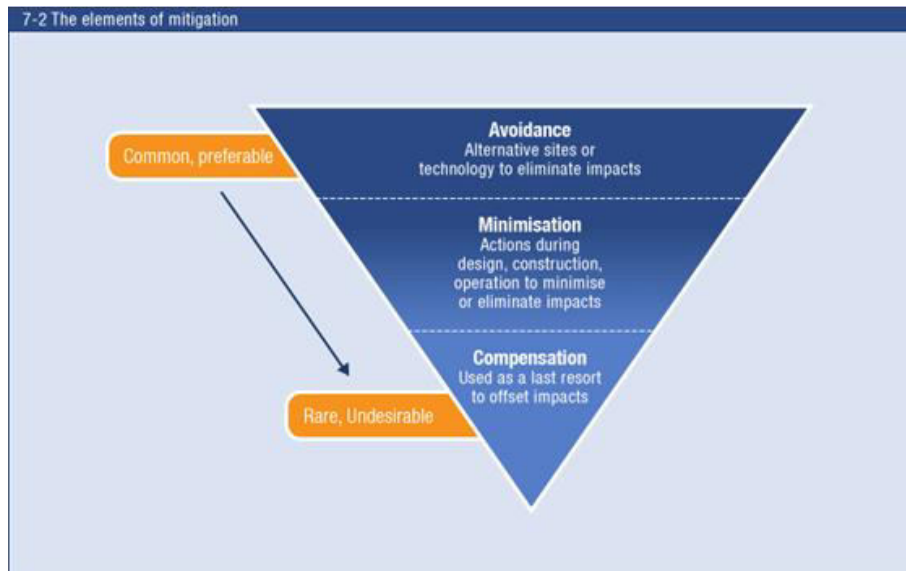


Figure 6: Impact Avoidance chart

The negative impacts are either avoided, minimized or compensated and in this case, the Environmental Management Plan has clearly proposed actions that will deal with all the identified negative impacts on the soil, water (surface and underground), ambient environment and on the society. Not all negative impacts can be avoided but some can be minimized and some can be compensated. Examples include vegetation clearance and loss of aesthetic value. These cannot be avoided but they can be minimized depending on the size of the area needed for construction and in this case the proposed number of structures to be erected.

Table 10: Environmental Impact Assessment Matrix for DAAPS Enterprises service station and convenience truck port establishment

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Construction Phase								
-physical disturbance of soil during transport and construction activities	-Erosion -Proliferation of tracks -Negative excavation methods such as blasting.	Local	Short	Medium	Definite	High	-Restrict construction activities to defined areas. Excavated material must be covered in stockpiles until reuse. -Restrict movement to defined areas. Use existing roads until access require limited new roads. -Use surface anchored foundations with very limited rock breaking.	Low
Urbanization/ urban growth	Physical expansion of the village town	Regional	Long	Medium	Definite	Low	All built structures should be constructed according to the local Authority bylaws to guarantee strength and longevity of structures built.	Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Noise from Construction vehicles and equipment	Nuisance and disturbance. Noise and vibrations will also have an impact on animals such as birds and reptiles. Birds are known to abandon their nests if subjected to continuous noise.	Local	Short	Medium	Definite	High	<ul style="list-style-type: none"> - All workers on site must be equipped with ear plugs to be used when the noise becomes unbearable. - Switch off machines that are not used. 	Low
-Physical destruction of vegetation by construction activities and new roads	-may result in removal and destruction of trees on site.	Local	Long Term	High	Definite	High	<ul style="list-style-type: none"> -Limit activity footprint and limit movement to designated areas only. Implement and monitor the Vegetation Management Plan -Preserve some plants in the yards of erven. Only remove plants that are in the path were services will be constructed. - A permit must be obtained from the Directorate of Forestry before any protected species is removed. 	Medium/ Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Habitat loss, including foraging, roosting and breeding habitat of the area occupied by the proposed project site	Negative impact on local habitats and vegetative species	Local	Permanent	High	Definite	High	-Preserve some plants in the yards of erven. -Only remove plants that are in the path where services will be constructed. -A permit must be obtained from the Directorate of Forestry before any protected species is removed	Low
Upgrading of existing access roads	Negative effects of construction operations on site	Local	Permanent	Medium	Definite	Medium	-Ensuring Access road construction does not affect vegetation and animals not within the road marked area.	Low
Archaeological Landscape	Visual degradation	Local	Long term	Medium	Improbable	Medium	Demarcate, protect and avoid development near sites. If removal is inevitable, apply at Heritage Council via an archaeologist	Low
Employment creation	Temporary and permanent employment prospects in the area	Local	Temporary and Long term	Medium	Probable	Low	-employ local residents for all non-skilled activities - Employ women and economically disadvantaged on skilled and non-skilled tasks	Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Change in topography/ landscape character	Use of caterpillars for road construction and paving on site	Local	Long term	Medium	Probable	High	-Ensure that there are no pits are left on site and creating a new paved landscape (use of cement interlocks)	Low
Dust	Respiratory sicknesses can result from prolonged exposure to dust Dust can negative affect the ecosystem in general and the nearby residents	Local	Temporary	High	Probable	Medium	-Equip all the workers exposed to dust with dust masks -Spray the areas that are most affected to minimize dust. - Minimize activities that can generate dust during windy days. -- Limit the speed within the whole construction area to a maximum of 40 km/h - Dust will significantly be reduced if excavation and land clearing is carried out after it has rained and the soil is wet or dust suppression can be done	-Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Environmental contamination by hydrocarbons release into the environment (grease, oils, fuel spills and leakages from machinery and fugitive wastes.)	There will be no storage of oils and fuel on site according to the engaged contractors, however there is risk of spillage of hydrocarbons from vehicles and machinery operations, maintenance through leakages and spillages which may result in	Local	Short Term	Medium	Probable	Medium	-Implement a maintenance programme to ensure all vehicles, machinery and equipment are and remain in proper working order. -Vehicle maintenance should be Conducted in designated areas only, preferably off-site. If maintenance is to be conducted on site, these areas should be designed to contain spillages i.e. maintenance site must be bounded and paved and the use of chemicals must be controlled. - Spillages are to be removed From site by a specialist waste removal contractor such a rent a drum.	Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
The spread of HIV/AIDS throughout the construction phase of the project.	The inflow of employees can result in the spread of HIV/AIDS	Local	Long term	Medium	Highly probable	Low	-Awareness at workplace and provision of condoms	Low
Solid waste	Failure to manage solid waste properly will result in pollution and this might have a detrimental impact on the people's well-being and the quality of the environment	Local	Long term	Low	Highly probable	Medium	-All solid waste generated to be disposed in an approved manner	Low

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Operational Phase								
Effluent waste	Failure to manage effluent waste properly will result in pollution and this might have a detrimental impact on the people's well-being and the quality of the environment	Local	Long term	Low	Highly probable	Medium	-The development to be well serviced and connected to septic tank effluent treatment system.	Low
Solid waste	Failure to manage solid waste properly will result in pollution and this might have a detrimental impact on the people's well-being and the quality of the environment	Local	Long term	Low	Highly probable	Medium	-All solid waste generated to be disposed in an approved manner	Low
Population influx	-Results in social tensions and an increase infection of sexually transmitted diseases particularly HIV and AIDS, and other STIs	-Local	-long term	Medium	Definite	High	-Educate employees on social integration and sexual behaviour	Medium

Impact	Status/nature	Extent	Duration	Intensity	Probability	Significance		
						Before Mitigation	Mitigation applied	Post Mitigation
Social integration	Potential for conflict between people of different backgrounds and cultural beliefs.	Local	Short Term	Medium	Probable	Medium	-Public relations should adequately address the integrated societal values and morals	Low
Community development	Employment creation	Regional	Long term	High	Definite	High	-Promote local businesses and employ locals	High

5.3 Impacts Associated with Decommissioning Phase

The decommissioning phase of the service station project is difficult to visualize at this point in time. However, impacts associated with this phase will be similar to that of the construction phase. The possibility of noise happening during this stage is high as bulldozers will be used to remove the structures. Dust might also be generated during the destructions. Moreover, during the decommissioning phase, precaution must be greatly taken to avoid employees from being injured. Waste generated should also be disposed at an approved waste facility and not dumped in the surrounding areas. Furthermore, the site should be rehabilitated (planting of grass and trees on the site). An Environmental Impact Assessment should also be made.

6.0: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Arising from the analysis by the consultants, the proposed project is going to create permanent land cover/use change on the proposed project site. Sustainable development must be promoted in all aspects relating to the environment. The EMA Act 2007 is flexible to opt out that developmental projects which can provide the most benefit or causes the least damage to the Environment as a whole, at a cost acceptable to society, in the long term as well as in the short term must be adopted to reduce the generation of waste and polluting substances at source; the project implementation will be one of the prospering Fuel service stations.

The reduction, re-use and recycling of waste must be promoted; since generation of waste during all the phases will be the order of the day.

The proponent should therefore avoid unnecessary vegetation clearing on the surrounding places especially during construction phase, which may lead to loss of habitat for mostly birds. It is important that the proponent observe and maintain accountability to both socio-economically and environmentally sensitive activities from the project, such that the project is harmonized with policy, regulations, administrative frameworks and social interface with the public as proposed in the environmental management plan. Failure to observe these measures will significantly affect the local environment and lead to non-compliance. Therefore, implementation environmental protection measures should be executed in consultation with the Key stakeholders.

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APPENDIX I: ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX II: BACKGROUND INFORMATION DOCUMENT

APPENDIX III: LAYOUT PLAN AND MAPS

APPENDIX IV: STAKEHOLDER AND PUBLIC CONSULTATIONS

APPENDIX V: CONSULTANT RESUME