

ENVIRONMENTAL IMPACT ASSESSMENT

FOR THE
PROPOSED MELODY SERVICE STATION IN OSHIGAMBO
VILLAGE IN ONIIPA CONSTITUENCY, OSHIKOTO REGION



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LIST OF ABBRECIATIONS

TERMS	DEFINITION
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
DEA	Department of Environmental Affairs
PPPPs	Projects, Plans, Programmes and Policies
ULP	Unleaded Petrol
SANS	South African National Standards
I&APs	Interested and Affected Parties

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1. INTRODUCTION

1.1. Project Overview

Melody Trading proposes to construct and operate a fuel retail facility outlet with the name (Melody Service Station) in Oshigambo village, in Oniipa Constituency in the Oshikoto Region. The retailer intends to supply fuel to the general public.

Therefore, Nghivelwa Planning Consultant has been appointed to conduct an Environmental Impact Assessment and Environmental Management Plan (EMP) for the proposed Melody Service Station at Oshigambo village along the M121 main road. The Environmental Impact Assessment has been conducted to meet the requisites of Namibia's Environmental Management Act (No. 7 of 2007) and Petroleum Products and Energy Act (Act No. 13 of 1990).

The Environmental Impact Assessment was conducted to meet the requisites of Namibia's Environmental Management Act (No. 7 of 2007) and Petroleum Products and Energy Act (Act No. 13 of 1990). An EIA may be defined as: a formal process to predict the environmental consequences of human development activities and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive effects.

EIA thus has three main functions:

- To predict problems,
- To find ways to avoid them, and
- To enhance positive effects.

1.2. Terms of Reference

The proposed project for the construction of the fuel retail facility (Melody Service Station) in Oshigambo village is a listed activity that cannot be undertaken without an Environmental Clearance Certificate. Therefore, as part of the commissioning process an Environmental Impact Assessment (EIA) is required. Thus Melody Trading appointed Nghivelwa Planning Consultant to provide consultancy services to undertake an environmental impact assessment compliant to Environmental Management Act (2007).

The Terms of Reference (ToR) for the consultants are, but not limited to the following:

- The collection of all possible data on the environmental, social and natural resource components and parameters of necessity;
- A description of the location of the proposed project including the physical area that may be affected by the project activities;
- Description of the design of the proposed project;
- Description of the activities that will be undertaken during the project construction, operation and decommissioning phases;
- Listing of the materials to be used, products and by products, including waste to be generated by the project and the methods of disposal;
- Identification of the potential environmental impacts of the proposed project and
- The mitigation measures to be taken during and after implementation of the project;
- Accidents during the project cycle;
- Establishment of a plan to ensure the health and safety of the workers and neighbouring communities;
- Identification of the economic and socio-cultural impacts of the proposed project
- Economic and social analysis of the project including project risk and measures to mitigate them.
- Establishment of an action plan for the prevention and management of possible (EMP).
- The consultant will prepare recommendation on the project for its future use.

1.3. Acknowledgement

The Nghivelwa Planning Consultant has prepared this EIA Report on behalf of the Melody Trading cc. The Project proponent the Melody Trading cc had been extremely positive in providing necessary information and documents and also in providing necessary guidance during undertaking of the study and preparation of the report. The Consultant (Nghivelwa Planning Consultant) gratefully acknowledges the help, advice and information provided by the Melody Trading cc, as well as the support and interest shown by all the identified stakeholders

1.4. Report Content

The outline of the report structure is given below:

1. Chapter 1: presents the introduction which will deal with the background, Terms of Reference, Report Content, and Acknowledgement
2. Chapter 2 presents the EIA Methodology
3. Chapter 3 covers Policy, and other Relevant Legislations applicable to developments of this type of project in Namibia. It describes briefly the Regulatory Framework such as, the Namibian Constitution, Environmental Assessment Policy (1994), Environmental Management Act of Namibia (2007), Environmental Management Act Regulations (2012), National Heritage Act No. 27 of 2004, Water Resource Management Act of Namibia (2004),
4. Chapter 4: presents Project Rationale
5. Chapter 5: Scope of the EIA
6. Chapter 6: covers the Overview of the proposed project which describes the project description, project details and the proposed project activities
7. Chapter 7 describes the Baseline Information. The following aspects are covered in this Chapter:

1. *Locality and Surrounding Land Use*
2. *Climate and Temperatures*
3. *Topography and drainage*
4. *Geology*
5. *Soil*
6. *Hydrology*
7. *Soils*
8. *vegetation*
8. Chapter 8: Socio-Economic Development
9. Chapter 9: covers Analysis of Alternatives
10. Chapter 10: presents Public Participation Process
11. Chapter 11: describes Environmental Assessment Methodology

2. EIA METHODOLOGY

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise from the undertaking of an activity and the findings used to inform the competent authority's decision whether the activity should be authorised, authorised subject to conditions that will reduce the impacts to within acceptable levels, or should be refused. In this sense impacts are defined as the changes in an environmental or social parameter that result from undertaking the proposed activity. The following general methodology was used in this EIA of the proposed Melody Service Station in Oshigambo village; to investigate the potential impacts on the social and natural environment due to the construction and operation of the fuel retail facility:

The key activities undertaken during the assessment included the following:

2.1. Establishment of the environmental baseline

This involved study and description of the receiving environment on which the proposed project is to be implemented. Thus, it involved a site visit, physical inspection of the study

of the area soil, biology, topography, animal species, water resources, climate and the local socio-economic environment.

2.2. Impact analysis

This involves the identification of impacts that are usually associated with the construction, operation or maintenance and decommissioning of the propose activity and are generally obvious and quantifiable. These impacts were analyzed and evaluated.

2.3. Impacts mitigation

This involves the identification of the impacts and once impacts have been identified and predicted for a particular activity, then an appropriate mitigation measures need to be established. Mitigation measures are the modification of certain activity in such a way as to reduce the impacts on the physical- and socio-economic environment. The objectives of mitigation are to:

- Find more environmentally sound ways of doing things;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimize or remedy negative impacts; and ensure that residual negative impacts are within acceptable levels.

Furthermore, impacts associated with all the stages of the proposed project were identified and mitigated. An Environmental Management Plan has been made as framework for mitigation of impacts and environmental monitoring of the project.

2.4. Review of alternatives

This entailed a review of the alternatives to the proposed project. This was aimed at determining better ways of avoiding or minimizing environmental impacts while still realizing the project goals. The review of alternatives provided opportunities for environmental enhancement. The alternatives reviewed were alternative sites, alternative implementation technology, alternative designs, alternative fuel sources and the no project alternative.

2.5. Public Participation Process (PPP)

This process for the public participation was done by conducting relevant stakeholders and public consultations with the consultant and they were involved in the EIA. Advertisements for the public participation to participate and raise their concerns on the proposed project were placed in two (2) local newspapers the New Era newspaper of the 19 and 26 July 2017.

3. POLICY AND OTHER RELEVANT LEGISLATIONS

The following are the legal instruments that govern or advocate the construction and operation of a Service Station:

3.1. The Namibian Constitution

The Constitution of Namibia encourages wise and sustainable use its resources. According to Article 95 of Namibia's Constitution provides 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.

Article 95 of Namibia's constitution stipulates that:

“The State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at the following:

(l) management of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future; in particular the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian territory.”

This article recommends that a relatively high level of environmental protection is called for in respect of pollution control and waste management.

3.2. Environmental Assessment Policy (1994)

The environmental assessment policy details the principles of achieving and maintaining sustainable development that underpin all policies, programmes and projects undertaken in Namibia. This is related in particular, to the wise utilization of the country's natural resources, together with the responsible management of the biophysical environment, which is intended to benefit both present and future generation. The policy also provides guidance on undertaking the assessment procedures.

It further provides a guideline list of all activities requiring an impact assessment. The proposed development is listed as a project requiring an impact assessment as per the following points in the policy:

- Transportation of hazardous substances & radioactive waste.
- Storage facilities for chemical products.
- Industrial installation for bulk storage of fuels.

The policy provides a definition to the term "environment" - broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes and plans. Cumulative impacts associated with proposed developments must be included as well as public consultation. The policy further requires all major industries and mines to prepare waste management plans and present these to the local authorities for approval.

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

3.2.1. 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.

3.2.2. 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.

3.2.3. 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.

3.2.4. 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.

3.3. Environmental Management Act of Namibia (2007)

The Environmental Management Act, No.7 of 2007 specifies the environmental assessment procedures to be followed and the activities that require an EIA. The Act provides a procedure for environmental assessments as indicated under Part VII and Part VIII, which is set out to:

- better inform decision makers and promote accountability in decisions taken;
- strive for public participation and involvement of all sectors of the Namibian community in the environmental assessment process;
- take into account the environmental costs and benefits of proposed policies, programmes and projects;
- take into account the secondary and cumulative environmental impacts of policies, programmes and projects; and

- Promote sustainable development in Namibia, and especially ensure that a reasonable attempt is made to minimize the anticipated negative impacts and maximize the benefits associated with the development.

3.4. Environmental Management Act Regulations (2012)

The Environmental Management Act Regulations have been finalised (February 2012) and have been used as guidance in the compilation of this scoping report. Namibia's Environmental Assessment Policy was the first formal effort in the country to regulate the application of environmental impact assessment. The regulation set out the process to be followed during the compilation of EIA reports as well as the minimum requirements for such reports.

3.5. National Heritage Act No. 27 of 2004

The Heritage Act of 2004 makes provision for the developer to identify and assess any archaeological and historical sites of significance. The existence of any such sites should be reported to the Monuments Council as soon as possible. The Council may serve notice that prohibits any activities as prescribed within a specified distance of an identified heritage/archaeology site.

3.6. Water Resource Management Act on Namibia (2004)

The Water Resources Management Act, No.24 of 2004 provides for the management, development, protection, conservation, and use of water resources; to establish the Water advisory Council, the Water Regulatory Board and the Water Tribunal; and to provide for incidental matters.

Section 25 imposes an obligation on the Minister responsible for health to ensure that the water supply is healthy and safe.

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

To provide measures for the saving of petroleum products and an economy in the cost of the distribution thereof, and for the maintenance of a price therefore; for control of the furnishing of certain information regarding petroleum products; and for the rendering of services of a particular kind, or services of a particular standard, in connection with motor vehicles; for the establishment of the National Energy Fund and for the utilization thereof; for the establishment of the National Energy Council and the functions thereof; for the imposition of levies on fuel; and to provide for matters incidental thereto.

Regulated by the Ministry of Mines and Energy

3.8. Pollution Control and Waste Management Bill (guideline only)

The proposed development of the fuel retail facility (Melody Service Station) at Oshigambo village in reference to the above, only applies to Parts 2, 7 and 8 respectively.

Part 2 states 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. And also 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 stipulate 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.

The competent authority for the purposes of section 74 shall maintain a register of substances notified in accordance with that section and the register shall be maintained in accordance with the provisions.

Part 8 provides for emergency preparedness by the person handling hazardous substances, through emergency response strategies.

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

Part 2 of the Ordinance governs the control of noxious or offensive gases. The Ordinance prohibits anyone from carrying on a scheduled process without a registration certificate in a controlled area. The registration 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.

Regulated by the Ministry of Health and Social Services

3.9.1. 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.

Regulated by the Ministry of Health and Social Services

3.9.2. Public Health Act (Act 36 of 1919)

Section 111 makes provision that requires the local authorities to take measures for the prevention of water pollution. Section 119 provides that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.

Section 120 requires local authorities to take measures for maintaining their district at all times in a clean and sanitary condition and for preventing the occurrence therein of, or for remedying or causing to be remedied, any nuisance or condition liable to be injurious or dangerous to health.

Various forms of nuisances are set out in section 122. For present purposes the following are most relevant:

- a) any dwelling or premises which is or are of such construction or in such a state or so situated or so dirty or so verminous as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease;
- (e) any accumulation or deposit of refuse, offal, manure or other matter whatsoever which is offensive or which is injurious or dangerous to health;
- g) any public building which is so situated, constructed, used or kept as to be unsafe, or injurious or dangerous to health;
- (k) any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health;
- (l) any chimney (not being the chimney of a private dwelling) sending forth smoke in such quantity or in such manner as to be offensive or injurious or dangerous to health;
- (n) any other condition whatever which is offensive, injurious or dangerous to health.

The local authority may serve a notice on the author of the nuisance. Should the author refuse or fail to comply the local authority must approach a magistrate to lodge a complaint where upon the latter is required to issue a summons on the author to appear before court.

4. PROJECT RATIONALE

The aim of this development is to become a service provider in the oil industry. This will be achieved through provision of convenient refuelling for small vehicles, creation of employment and contribution to Government `revenues. Since the Namibia's population is growing rapidly, it resulted in the increase of the cars frequenting the M121 road to Ondangwa to Eenhana and that has resulted to the need for an additional new fuel service station along the M121 road. The Northern part of Namibia has a high raising demand for fuel especially during the festive seasons since there are always motorists frequenting

the northern part of the country. Although development aims to bring about positive change in the area, it also brings changes in the Economic, Social and Environmental aspects that can lead to conflicts.

The Environmental Impact Assessment was conducted to meet the requisites of Namibia's Environmental Management Act (No. 7 of 2007) and Petroleum Products and Energy Act (Act No. 13 of 1990). An EIA may be defined as: a formal process to predict the environmental consequences of human development activities and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive effects.

The proponent proposes to develop a service station with components that include:-

- Two pump islands
- Two underground petroleum storage tanks (UPSTs)
- A heavy duty covered man hole for each of the UPSTs
- Oil and water separators
- Air and water point
- An office section
- Sanitary facilities
- A soak pit
- Associated piping work
- Compressor Generator Room

The purpose of the EIA is to incorporate the potential environmental (physical, ecological and cultural/socio-economic) concerns and address them adequately at the inception (design) and construction stages in order to guarantee sustainability in the operational phase of the station. The project is expected to raise both the potentially positive and negative impacts likely to emanate from the proposed project. Integrating Sustainable Environmental Management principles in the planning and implementation processes of any proposed projects is a milestone in reducing/mitigating conflicts as well as enhancing control and revitalization of the much degraded environment.

5. SCOPE OF THE EIA

The objectives of the scope of the EIA were to ascertain key issues of the environmental impacts that are likely to be more important during all the phases of the Project. Relevant environmental data have been compiled by making use of primary data which is the site assessment done on the 03 August 2017 and secondary data. Potential environmental impacts and associated social impacts was identified and addressed in this report.

The construction and operation of the proposed service station will involve;

- Preparation of the site, including excavations.
- The installation of new fuel storage facilities.
- Installation of fuelling network pipelines and associated pumps.
- Transport of fuel supply with road transport tanker trucks.
- Off-loading of fuel into underground petroleum storage tanks
- The dispensing of fuel into vehicles.
- Erection of a building (including a convenience store, an office and sufficient parking facilities).

The Environmental Impact Assessment study report includes an impact assessment and their mitigation measures of all the three phases of the proposed project following:

- The field investigations (site assessment) ,
- Identifying and involving all stakeholders in the Environmental Impact Assessment process by expressing their views and concerns on the proposed project;
- Identify all potential significant adverse environmental and social impacts of the project and recommend mitigation measures to be well described in the Environmental Monitoring Plan (EMP);
- Coordination with the proponent, regarding the requirements of law of Namibia's Environmental Management Act (No. 7 of 2007) and Petroleum Products and Energy Act (Act No. 13 of 1990);
- To define the Terms of Reference for the Environmental Impact Assessment study.
- A review of the policy, and relevant legislations

- To provide overall assessment information of the social and biophysical environments of the affected areas by the proposed new Service Station.

6. DESCRIPTION OF THE PROPOSED ACTIVITY

6.1. Proposed location and land ownership

The proposed activity involves the construction of a Service Station on a semi-developed land, in Oshigambo village 10km from Oniipa Town and 47km from Eenhana Town along the M121 main road in Oniipa Constituency, Oshikoto Region. The proposed new service station will be part of the Melody Trading cc Complex proposed to be constructed on the site. The proposed site covers the area of 3.4 ha. The GPS coordinates of the location of the proposed project site are (17°47'11.31" S; 16°5'11.61" E).



Figure 1: Site Location Map

6.2. Description of the filling station

There are no specific details of the exact design and layout of the filling station at present, due to the fact that the entire project is still in the design phase.

The proposed filling station is a typical filling station. Therefore, in accordance with the relevant SANS standards, the facility will have a canopied forecourt with three or four dispensing islands on which pumps for the dispensing of fuel from the underground storage tanks will be located. Furthermore, the suitable dispensing pumps and fuel network pipelines will also be constructed according to the Ministry of Mines and Energy specified standards for fuel retail facility.

The proposed fuel retail facility will consist of two underground storage tanks (fibre-reinforced resin coated steel tanks):-

- a) (i) One 46,000-litre capacity underground fuel storage tanks for unleaded petrol
- b) (ii) One 46,000-litre capacity underground fuel storage tank for 500ppm diesel
- c) Two pump islands
- d) Fire protection equipment as per project drawing plans
- e) Necessary fittings and other works as per the project drawing plans
- f) Canopied forecourt with dispensing pumps;
- g) In addition, current practice is to include facilities such as a convenience store and car wash in the overall filling station design.

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

The installation of the fuel tanks and pipelines at the filling station will be in line with SABS Standards (SANS 10089: Parts 1-3). Furthermore, this project will fulfil the requirements of the Water Act and SABS 089:1999 that, all storm water that may potentially be contaminated by fuel or oil spills will be directed to a separator unit prior to exiting the site. In addition, waste water from the carwash facility will drain through a separator before discharge to main sewer.

6.3. Description of the Proposed Construction of the Project

The project involves the construction of a filling station with:

- The two underground fuel tanks, each of 46 000 litre (46 cubic metre) capacity;
- Canopied forecourt with dispensing pumps;
- Convenience store with bakery section;
- Branded take away; and Car wash facility.

In addition to the above-mentioned facilities, tourists are not left out, therefore the project also proposed to construct the following tourism related facilities as part of the development:

- Tourism Information Centre;
- Outlet and display for crafters;
- Parking space for cars and tour buses;
- Additional Shops; and
- Garden & play area.

6.4. Proposed Project Activities

The project will consist of three (3) phases, namely the construction, operational and possible decommissioning phase.

6.4.1. Activities during the Construction Phase

a) *Site Office*

The contractor shall construct a temporary site office to run and manage all activities at this phase.

b) *Site clearance and fencing*

This will involve clearance of the little vegetation that is currently found at the proposed site. The site will then be isolated for public safety and for the security of construction material and equipment.

c) *Excavation*

This will involve excavation of the ground for installation of the tanks and other substructures as per the engineering drawings. This will use appropriate excavation equipment. This process will generate waste in form of spoil soil and rock particles.

d) *Installation of tanks, erection of pumps and backfilling*

The underground fuel storage tanks and fuel pumps will then be installed as per the project design. The pits will then be backfilled with hard core and compacted soil.

e) *Construction of superstructures*

This will entail construction of superstructures including the convenient store which will comprise of toilets, a mini shop, display shop, office and other proposed elements.

f) *Plumbing*

Necessary plumbing for connection of fuel tanks and dispensers and for water supply to the project site will be done.

g) *Installation of fire protection equipment*

The appropriate firefighting equipment (carbon dioxide, dry powder, foam and bucket of sand) will then be installed.

h) *Other fittings (builder's works)*

These will include reinforced concrete beams, fuel dispenser shed, site lighting and other necessary fittings.

6.4.2. Activities during the operation and maintenance phase

- Filling of the tanks from road transport tankers.
- Dispensing of fuel into vehicle tanks and other containers.
- Maintenance activities will include facility cleaning, underground tanks and dispensers routine checks and other necessary repairs

6.4.3. Activities at the decommissioning phase

- Careful removal of the fuel dispensers,
- Careful excavation and removal of the underground fuel storage tanks after emptying the fuel therein, appropriate treatment of any contaminated soil as necessary, backfilling of the excavations with suitable material such as pebbles or construction dug out soil, proper disposal of decommissioned facilities and other wastes using a licensed waste collector
- And landscaping at the project site – planting of grass and trees (or shrubs). The major emphasis here will be restoration of the affected environment,
- Proper disposal of dismantled material and protection of public health and safety.

In this development, it is agreed that there will be employment opportunities in all the phases of the project. Therefore, it is estimated that there will be 70 possible direct job opportunities associated with construction phase with 15-20 indirect jobs that could be generated during this phase of the development. Furthermore, there will be the creation of between 20 and 25 permanent jobs associated directly with the operation of the various development components. A further 10 to 15 indirect job opportunities are likely to be generated in other sectors such as servicing the development. However, it is to be expected that some of these indirect opportunities will take other people outside Oniipa/Oshigambo.

It is anticipated that besides the 70 possible direct employment opportunities associated with construction a further 15 to 25 indirect jobs could be generated during this phase of the development.

6.5. Need and Desirability of the Proposed Project

Apart from developer's making profit, the need of this project is the promotion of the tourism which is at the forefront of any development, as a priority sector for local economic development of which Oshigambo village which is a village along the M121 main road needs to come up with new developments which will attract tourists. Furthermore, by focusing more on tourism, it is because the packaging of this development is logical in that all components provide services to tourists and passing travellers. Further the provision of facilities for the parking, loading and unloading of long distance buses at this proposed development will also go some way to improve the current situation associated with these activities experienced in the nearby town which is Oniipa Town and Eenhana Town.

6.6. Timing of the activity

In reality, the development process for this project, including permitting, detailed planning design and construction is likely to take in the order of two to three years. Simply because the development of the filling station without the rest of the project elements mentioned-above, would not achieve the overall desired aim of raising the profile of Oshigambo village as an access hub to the Oniipa Town for tourism from Eenhana town.

7. BASELINE DATA

This section lists the most important environmental characteristics of the study area and provides a statement on the potential environmental impacts on each. The SANS 10089-3 (2010) standards for the Petroleum Industry are used for the baseline assessment (reported on in this section) and subsequent impact assessment (reported on in Section 8) to incorporate all required and related issues in the investigation.

7.1. Locality and Surrounding Land Use

The proposed fuel retail facility will be situated at Oshigambo village approximately 10km from Oniipa Town in Oshikoto Region and 47km from Eenhana Town in the Ohangwena

Region. See Figure 1(Site Location). Directly north of the site is the M121 main road from Eenhana to Ondangwa. The project is in a semi-developed land developed with four corrugated iron shelters. The land is covered by camelthorn bushes and three palm trees as well as one *Diospyros mespiliformis* Hochst. ex A.DC. (Omwandi tree) that needs to be protected and made part of the development. Furthermore, and there are no nearby occupied sites on the surrounding area of the proposed site. Over the road, there is a traditional house with a mahangu field and some few Cuca shops next to the field along the gravel road to Ondobe. See Figure 1 (Site Location map).

7.2. Climate and Temperatures

The table 1 below briefly describe the general climatic conditions experienced within the Oshikoto Region including the Oshigambo area, as deduced from the Atlas of Namibia, by Mendelsohn et al 2003. The rainy season is limited between the months of November and April whereby an average of 350-400 mm of rainfall is estimated per annum. In addition, the Cuvelai has inconsistencies in rainfall timings which lead to great variation in the annual rainfall between 30-40 percent .Furthermore; Temperatures vary little across the Basin where the average is greater than 19°C in most areas, especially during the summer months. The annual evaporation of the Basin is known to depend on the temperature, humidity, cloud cover, wind and solar radiation. The predominant wind in the area is expected to be in the easterly direction.

Table 1: Summary of general Climate Data

Average rainfall:	Rainfall in the area is averaged to be less than 350 mm-400 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 2800-3000 mm per year.
Precipitation:	The highest summer rains are experienced from October to April.
Water Deficit:	Water deficit in the area is averaged to be between 1501-1700mm per year.

Temperatures: Temperatures in the area are averaged to be more than 19-20 °C per year.

Wind direction: Wind directions in the area are predominantly easterly winds.
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7.3. Geology, Topography and drainage

The Kalahari sand plateau in the north-east was originally deposited as longitudinal dunes in an east-westerly direction. These longitudinal dunes, with associated omuramba's, form the agro-ecological zone KAL 8 (de Pauw et al. 1998/99). The drainage to the north of the Mangetti (north-east of Oshivello) is still in an east-westerly direction (the "Akadhulu" or "Akazulu"). These fossil dunes do not show a great difference in relief (compared to southern Kavango and north-eastern Grootfontein districts), probably because of erosion and thus a general flattening of the topography.

As these remnant dunes flatten out completely, the rivers "Akadhulu" and "Niipele" turn south towards the Etosha pan. Roughly 80 % of the study area, to the east of Onankali - Okankolo, falls within these fairly flat sand plains, as part of the KAL 3-3 (de Pauw et al. 1998/99). It consists of a sand drift plain with a general slope range of 0-2 % (i.e. flat), very low relative relief (< 10 m), with no preferred drainage orientation.

Drainage in the sand plateau is mainly vertical (downwards). This has resulted in the formation of numerous pans in the north-western parts of the country, spreading out up to Eenhana in the north (the KAL4 according to de Pauw et al. 1998/99). The vertical movement of water leads to increased mineralisation of the sands, thus forming finer textured, more fertile soils in these pans. Both the more fertile soils and the shallow ground water in these pans has resulted in the settling of people along these pans in the Oshikoto Region.

In Oshigambo, there is an ephemeral river namely Oshigambo River 1km south of the proposed project site flowing into the Etosha pan. This river hardly carries surface water

but in 2006 when Oshigambo received a heavy rain, it flowed and broke its banks flooding the Oshigambo village. In 2011, it also flowed and flooded the village and affected students and claims several lives.

The literature review shows the results of the soil profile done at one of the above-mentioned pans, that a mini soil profile pit was dug at relevé 87138. The soil profile looked as follows:

- Top: 1-2 cm bleached white sand (could be the deposit of erosion from further up).
- A-Horizon: 30 cm deep, dark grey loamy sand.
- B-Horizon: below 30 cm, yellow grey sandy loam, very sticky to the touch. (Strohbach 1999).

The broad-leafed savanna falls within growing period zone 3 (de Pauw et al. 1998/99).

7.4. Vegetation

This vegetation type is typical of the “Forest savanna and woodland (northern Kalahari)” (Giess 1971). This is described as a species-rich vegetation dominated by deciduous trees like *Burkea africana*, *Terminalia sericea*, *Lonchocarpus nelsii*, *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Ochna pulchra*, *Combretum* species and *Grewia* species.

Typical trees are *Terminalia sericea*, *Combretum collinum*, *Lonchocarpus nelsii*, *Burkea africana* and *Acacia fleckii* and the shrubs *Combretum engleri*, *Acacia ataxacantha*, *Bauhinia petersiana*, *Ozoroa schinzii*, *Grewia flava*, *G. flavescens* and *G. bicolor* as well as *Commiphora angolensis*, *C. africana* and *C. glandulosa*. In KAL 8 (Omuramba-Dune association) north of King Kauluma school some *Baikiaea plurijuga* were encountered on a dune. Although this popular timber species had only a DBH of 20 cm (thus far from exploitable), some of these trees were found chopped down in this remote area.

The vegetation in this area is described as woodland dominated mainly by camelthorn shrubs. The vegetation on site consists of short grass moderately scattered around the site. The project site is currently semi-developed but clearly shows; disturbances by animals and human activities, no much clearing of vegetation will occur. There are no protected species onsite that needs to be preserved and be made part of the development

except three *Hyphaene petersiana* Klotzsch ex Mart (Palm tree) one big *Diospyros mespiliformis* Hochst. ex A.DC. (Omwandi tree). No other endangered species were observed present on site; therefore no threat to vegetation was identified. No wildlife was observed in the vicinity of the study area, only domestic animals mainly cattle, goats and donkey are present in the vicinity of the proposed project site.

7.5. Soils

The dominant soils in the Oshikoto Region are haplic Arenosols associated with ferralic Arenosols (sandy soils with a very poor nutrient-retaining capability). Strohbach

(1999) describes a mini soil profile pit at relevé 87126 as follows:

- Top 5 cm: Humus enriched, bleached yellow-grey sand
- Below 5 cm: Undifferentiated pure red sand

8. SOCIO-ECONOMIC ENVIRONMENT

8.1. Demographics

The region has a population of 181 973, of which the vast majority (87 percent) lives in rural areas and thirteen percent (13%) live in urban areas. The Namibia 2011 Population and Housing Census estimated that in Oshikoto region, there are 94,907 females and 87,066 males. The population density is 4.7 persons per km² and the Human Poverty index (HPI) is 29.9% compared to National HPI of 24.7. Life expectancy is 49.8 years for females and 50 years in males, resulting in most houses being head by males at 49% and the remainder by females at 51%. The population was divided into 37400, with an average size of 4.8 persons. Most eighty-six (86%) of the households residing within the Oshikoto Region, speak Oshiwambo.

8.2. Economic activities

There has been immense commercial and industrial growth in Oshikoto Region. Various shopping malls, schools and other businesses have opened in the area and have improved both the economic and social stance of the Region. Much of the economy of the Oshikoto region is based on cross border trade at all the borders of Namibia.

8.3. Education Profile

The Oshikoto Region is well placed with regards to academic rates in the whole of Namibia. According to (EMIS, 2012) there are 117 Primary schools, 66 Combines school and 17 Secondary schools in total. The percentage literacy rates for persons older than 15 years in the Oshikoto Region is 88% compared with that of Namibia which is 89%. There are 200 schools altogether, where 192 are state owned and 8 privately owned. From the 60,439 learners 57,285 are enrolled in public schools while the remaining 3154 attend private schools. Only 126 of all 2,407 teachers in the Oshikoto Region are without training.

8.4. Employment Opportunities

By the year 2011, sixty percent (60%) of the population older than 15 years, were employed and forty percent (40%) unemployed. The population outside the labour force comprised of students, homemakers and retired or old age persons.

8.5. Incomes

Subsistence farming (33%) and labour migration are considered the primary livelihood sources of many households. The majority of the employed population are employed in the formal sector making Wages and Salaries 30% the second main source of income in the region. Pensions 19%, Non-farming business 10%, Cash Remittance 5% is the means of survival for the rest of the population.

8.6. Health Profile

In Namibia, the HIV prevalence rate in pregnant women age group 15 to 49 is estimated at 21.3% (UNDP, 2005). While the HIV prevalence rate in the Oshikoto Region stands at 15.9%. Seventy percent of the population in the region have access to safe drinking water 69 % have poor or no access to toilet facilities. Women in the Oshikoto Region could expect to live 49 years on average and men 51 years (NPC, 2011).

8.7. Immigration

The proposed facility will attract many immigrants to the town of Oshigambo, employment and business opportunities will be the main reason thereof. This might cause discomfort to the local community currently residing in the area as food prices might increase, cuca-shops will have more customers leading to increased stress and conflict over time and lack of housing may become an issue.

8.8. Acquisition

Jobs emanating from the construction and operation of the proposed facility will be outsourced to small medium enterprises in the area.

8.9. Tourism

Oshikoto region is home to Etosha National Park, which is one of the major tourist attractions in Namibia and Southern Africa. Therefore, many tourists and business people travel through the National Park when travelling to northern Kunene, and Angola. There are various cultural, historical and craft-based enterprises in the communities, conservancies and community forests/ community gardens. Furthermore, most tourists and business people travelling through the Oshikoto Region to Ohangwena Region (Oniipa, Oshigambo and Ondobe and Eenhana) and to Oshikango and Angola etc. find

a resting place in the upmarket lodges, hotels and motels located in the urban centres of the towns mentioned above.

8.10. Amenities

A number of amenities are offered to the residents of the Oshikoto Region more especially at Oniipa Constituency. Oshigambo is in Oniipa Constituency which is more close to Oniipa town with 10km, there is Onandjokwe Lutheran Hospital which is one of the health care facilities in the Oniipa town, plus schools, different denomination churches such as the ELCIN, Roman Catholic Church, Anglican Church and many more. There is a Nampost opposite the Onandjokwe Hospital and two FNB Auto Teller Machines (ATMs) in the Town of Oniipa.

9. ANALYSIS OF ALTERNATIVES

In terms of environmental impact assessment best practice, assessment of potential impacts from a proposed activity must include the assessment of alternatives. Assessment of alternatives is undertaken to identify the option that will minimise harm to the environment and may include site, technology and other alternatives, but must always include the option of not implementing the activity, known as the “no-go” alternative.

9.1. Locations

The proponent has the option of undertaking the proposed development in a different location other than the chosen site. This could also entail acquiring land elsewhere to carry out the development. The following reasons justify the use of the proposed site for the development:

- The land is allocated to Melody Trading cc.
- The site is suitable for development of a petrol service station. This is simply because the land is a semi-developed with four corrugated iron shelters and

dominated by short grasses and camelthorn bushes as well as three *Hyphaene petersiana* Klotzsch ex Mart (palm) trees and one *Diospyros mespiliformis* Hochst. ex A.DC. (Omwandi tree) in the area along the M121 main road therefore it will greatly benefit all motorists travelling on the M121 road to Ondangwa from Ondobe and Eenhana as well as benefiting residents of Oshigambo and people from nearby villages.

- There is adequate space for the proposed development on the land.
- The proposed site will be located at a very suitable location that will avoid problems associated with traffic system.

9.2. The “No Project” Alternative

The No-Go Option is the option not to proceed with the activity, implying a continuation of the current situation/ status quo. That means no development is undertaken on the land and thus retains the original environment. Without the project the land would not be put into optimum use. In the socio-economic point of view, the no project option is the least preferred option due to the following factors:

- The need for a more modern fuel retail facility in the area will be lacking.
- Increasing number of motorists frequenting the area and the surrounding area will decrease due to the lack of fuel supply to motorists in the area.
- The fuel shortage problem in the area will not be solved.
- The local skills would remain underutilized.
- Reduced technology advancement at the village and interaction both at local, national and international levels.
- No employment opportunities will be created for the locals who would work on the project.
- Poverty will not be eradicated.

10. PUBLIC PARTICIPATION PROCESS (PPP)

This section of the report provides details of Public Participation Process (PPP) undertaken in the compilation of the EIA final report. Therefore, in terms of Section 26(1) (h) of the Namibian Environmental Assessment Regulations (2012), it is a requirement to provide details of the public participation process conducted in accordance with Section 32 of the Environmental Assessment Regulations. Furthermore, the Public Participation forms an important component of this EIA. It has been defined by the Ministry of Environment and Tourism that an Environmental Assessment Regulations (2012) of the Environmental Management Act (2007), as a process in which potential interested and affected parties such as neighbouring landowners, local authorities, environmental groups, village councils and communities, to comment on the potential environmental impacts associated with the proposed project (Melody Service Station) are given an opportunity to comment on, or raise issues relevant to the proposed project and its benefits to the nation and to Namibia's economy. Besides these legal requirements, it was also endeavoured to consult the public and other relevant stakeholders to ensure that their voices are heard and taken into account during the decision-making process.

10.1. Aim for Public Participation Process (PPP)

The aims for the Public Participation Process are but not limited to;-

- Informing Interested and Affected Parties (I&APs) of the proposed project;
- Identifying issues, comments and concerns as raised by I&APs;
- Promoting transparency and an understanding of the project and its consequences;
- Serving as a structure for liaison and communication with I&APs; and
- Providing local knowledge and input in identifying potential environmental (biophysical and social) impacts and “hotspots” associated with the proposed development.

10.2. Compilation of stakeholder database

The first step in the Public Participation Process (PPP) is to identify key stakeholders. A stakeholder database was compiled and the target groups for this project were invited to the public meeting, these were and not limited to:

- Headman of the Oshigambo village,
- Neighbouring communities and landowners
- Namibian Government Authorities such as Road Authority;
- Oshikoto Regional Council;
- Ondonga Traditional Authority;
- Business stakeholders, such as NamWater, NamPower, Nored and
- General public

10.3. Background Information Document

This document provides a short summary of the project and the EIA process. Therefore, a background information document (BID) was prepared and was ready to be distributed to Interested & Affected Parties. However, no body requested for it since people did not show up for the meeting. See a copy of the BID in Appendix A

10.4. Notification of I&APs

The requirements for the notification of potentially interested and affected parties of this application are set out in detail in section 32(2) (b) of the EA regulation. These requirements have been addressed and include;-

- Forwarding letters to government authorities and other identified relevant stakeholders;
- Fixing a notice board at a place conspicuous to the public in Oshiwambo & English;
- Announcement of the public meeting through Oshiwambo National Radio Station

- A word of mouth invitation by the Headmen and representatives of the nearby villages.
- Placing advertisements twice in at least one local newspaper.

10.5. Advertisement

The advertisement of the public participation and public meeting for the proposed project were placed in the national newspaper, the New Era (dated: 19 and 26 July 2017). Proofs of advertisements are presented in Appendix B.

10.6. Public Meeting held at Oshigambo village

In compliance with the EIA Regulations (2012), public (I&AP) and all stakeholders were notified as a requirement for EIA process. Therefore, to incorporate the varying needs of stakeholders and I&APs, as well as to ensure the relevant interactions between stakeholders and the EIA specialist team, the public was invited to the public meeting at Oshigambo village – as per the itinerary below.

Venue	Date	Time
Oshigambo Village on the site	03 August 2017	11:00AM - 17:00PM

Despite advertising the public meeting on two newspapers, only four (4) members of the community including the proponent (Melody Trading) attended the meeting see attendance register in Appendix C. The public interest on this project is minimal. Letters

for comments were sent to the identified key stakeholders for comments see a copy of the letter for comments in Appendix D

10.7. Issues raised by interested and affected parties

No comments received on the project from interested and affected parties (stakeholders), although they were notified about the project.

11. ENVIRONMENTAL ASSESSMENT METHODOLOGY

An appraisal of the type of effect the proposed fuel retail facility would have on the affected environment; rate as either positive (beneficial on the environment), neutral (no impact on the environment), or negative (adverse impact on at a cost to the environment).

Table 2: Assessment and Rating of Severity

Rating	Description
1	Negligible / non-harmful / minimal deterioration (0 – 20%)
2	Minor / potentially harmful / measurable deterioration (20 – 40%)
3	Moderate / harmful / moderate deterioration (40 – 60%)
4	Significant / very harmful / substantial deterioration (60 – 80%)
5	Irreversible / permanent / death (80 – 100%)

Table 3: Assessment and Rating of Duration

Rating	Description
1	Less than 1 month / quickly reversible
2	Less than 1 year / quickly reversible

3	More than 1 year / reversible over time
4	More than 10 years/ reversible over time/ life of project or facility
5	Beyond life of project or facility/ permanent

Table 4: Assessment and Rating of Extent

Rating	Description
1	Within immediate area of the activity
2	Surrounding area within project boundary
3	Beyond project boundary
4	Regional/ Provincial
5	National/ International

Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact.

Table 5: Determination of Consequence

Determination of Consequence (C)	(Severity + Duration + Extent) / 3
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Table 6: Assessment and Rating of Frequency

Rating	Description
1	Less than once a year
2	Once in a year
3	Quarterly
4	Weekly
5	Daily

Table 7: Assessment and Rating of Probability

Rating	Description
1	Almost impossible
2	Unlikely
3	Probable
4	Highly likely
5	Definite

Likelihood

Likelihood considers the frequency of the activity together with the probability of the environmental impact associated with that activity occurring.

Table 8: Determination of Likelihood

Determination of Likelihood (L) =	(Frequency + Probability) / 2
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Environmental Significance

Environmental significance is the product of the consequence and likelihood values.

Table 9: Determination of Environmental Significance

Rating	Description
L (1 - 4.9)	Low environmental significance
LM (5 - 9.9)	Low to medium environmental significance
M (10 - 14.99)	Medium environmental significance
MH (15 - 19.9)	Medium to high environmental significance
H (20 - 25)	High environmental significance. Likely to be a fatal flaw

11.1. Impacts Associated with Construction Phase

Potential effects on the environment and their mitigation measures during construction are:

Dust Pollution – These are expected to be site specific, short-termed and will most probably pose a negligible nuisance and health threat to those residing nearby. The construction of the proposed facility will have impact on the surrounding air quality as construction vehicle will be frequenting the site and surrounding.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	2	3	2.33	5	3	4	Negative	6.33 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - Dust may be generated during the construction/decommissioning phase and might be aggravated when strong winds occur therefore; dust suppression during the construction process is advised if dust becomes an issue. - Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. 									
Mitigated	1	2	2	1.66	5	2	3.5	Negative	5.16(LM)

Noise Impact – Noise pollution will be produced due to construction equipment and heavy machinery on site. Earthmoving equipment will be utilised during the construction phase and noise may thus be generated. Village properties nearby (<150m) the site may be impacted. During construction, noise can interfere with student’s learning and studying, might degrade social interactions, disrupt speech communication, can also lead to emotional distress or annoyance, or lead to physical health problems such as permanent loss of memory or a psychiatric disorder if in excessive noise pollution.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	2	3	2.33	5	3	4	Negative	9.32 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - Provide ear plugs and ear muffs to staff undertaking the noisy activity or working within close proximity thereof or alternatively, all construction workers should be equipped with ear protection equipment. - Construction should be limited to working hours only (07H00- 19H00). - Noise pollution should be addressed and mitigated at an early stage of construction phase. 									
Mitigated	1	2	1	1.33	5	3	4	Negative	5.32 (LM)

Safety and Security – During the construction and decommissioning phase, earthmoving equipment will be used on site. This increases the possibility of injuries. Presence of equipment may encourage criminal activities (theft). In terms of safety, crimes and prostitutions are the key factors needs to be looked at. This is simply because, whenever there is a new development especially constructions, many people migrates from their settlements looking for jobs as construction workers and after construction, most of them they hardly go back to their settlements where they came from therefore, they end up committing crimes or leads to the high rates of prostitutions in the area.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	3	3	3	5	2	3.5	Negative	6.5 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. - 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. - Relevant safety signs should be clearly displayed. - The contractor must ensure that there are sufficient emergency facilities such as first aid kits on the site, in order to help employees to save others in case of emergency or injuries; - The proponent must appoint the Health Officer to train and brief all employees about the potential risks of injuries on site so that they will have the knowledge of helping themselves or others in case of injuries. - For safety reasons children should also be kept from making the site a playground and their access should be prevented. - The contractor is further advised to ensure that adequate emergency facilities, including first aid kits, are available on site. 									
Mitigated	1	2	0	1	1	1	1	Negative	2 L

Impacts on Traffic – The site is adjacent of the M121 main road from Eenhana to Ondangwa. Construction related activities are expected to have a minimal impact on the movement of traffic along the road. Accidents might occur if no qualified drivers employed to drive vehicles for the project.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	2	3	2.66	5	5	5	Negative	7.66 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - No diversion of traffic or closure of the road is expected. - The responsible contractor must ensure that all drivers employed have valid driver's licenses of vehicle types they employed for, and that they have experience in driving those vehicles. - The contractor must ensure that there is always a supervisor on site to ensure that no driver under the influence of alcohol or narcotics to be authorized to drive company's vehicles. 									
Mitigated	1	2	2	1.66	5	3	4	Negative	5.66 (LM)

Generation of Waste- during this phase, construction waste is expected to be lying around if not properly handled or managed. This can be in a form of contaminated soil and building rubble.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	4	3	2	3	5	5	5	Negative	8(LM)
Mitigation measures:									
<ul style="list-style-type: none"> - Ensure that no excavated soil, refuse or building rubble generated on site are placed or dumped on surrounding properties or land. - Contaminated wastes in the form of soil, litter, building rubble and other material must be disposed off at an appropriate disposal site. - Waste must be disposed of at an appropriately classified waste disposal site. - Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts; - Waste handling procedures must be cleared with the nearby Settlement office and the construction contractor should be informed about this. - To avoid contaminating the soil and underground ecosystem, no wastewater should be disposed on soil. 									
Mitigated	1	5	1	2.33	5	2	3.5	Negative	5.83 (LM)

Groundwater Contamination – Leakages from equipment and machinery might occur during the construction phase that will lead to the contamination of the groundwater on the ephemeral river in Oshigambo namely Oshigambo River/ Ekuma River which is approximately 1km south of the proposed project site.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	2	1	2	5	3	4	Negative	8 (M)
Mitigation measures:									
<ul style="list-style-type: none"> - Chemicals used during construction e.g. paint and paint remover is also posing a risk. Care must be taken to avoid contamination of soil and groundwater. - Proper toilet facilities should be installed at the construction site and at the camping site or alternative arrangements made. - The contractor shall ensure that there is no spillage when the toilets are cleaned or during normal operation and that the contents are properly removed from site. - Fuel (diesel and petrol) and oil containers shall be in good condition and placed in a bunded area or on plastic sheeting covered with sand (temporary bunding). 									
Mitigated	1	2	1	1.33	5	3	4	Negative	5.32 (LM)

Health and Safety – Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. is very important and should be adhered to. During construction phase, there is a possibility of injuries to occur if no measures are taken into consideration.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	2	1	2.66	5	3	4	Negative	6.66 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - During construction, earthmoving equipment will be used on site. This increases the possibility of injuries and the responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. - The contractor is further advised to ensure that adequate emergency facilities are available on site. - All Health and Safety standards specified in the Labour Act should be complied with. 									
Mitigated	1	1	1	1	2	1	1.5	Negative	2.5 (L)

Ecological Impacts

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	1	1	1	1	Negative	1 (L)
Mitigation measures: <ul style="list-style-type: none"> - No known conservation worthy vegetation are located on the proposed facility, except trees with stem diameter > 20mm.that is recommended to be conserved and be made part of the development i.e. a Hyphaene petersiana Klotzsch ex Mart (palm tree) and Diospyros mespiliformis Hochst. ex A.DC. (Omwandi tree) 									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

Increased Informal Settlement and Associated Problems

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	3	3	2.33	1	5	3	Negative	5.33 (LM)
Mitigation measures: <ul style="list-style-type: none"> - Lack of proper housing may encourage informal settlements in Oshigambo. Unskilled migrant workers are expected to choose cheaper housing options and thus opt for informal housing options. This can be mitigated by giving employment preference to locals that can proof normal residence in the area. 									
Mitigated	1	2	2	1.66	1	1	1	Negative	2.66 (L)

Increased Spread of HIV/ AIDS- migrant workers with HIV/AIDS may affect local people leading to a high rate of HIV/AIDS in Oshigambo.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	5	5	5	5	5	Negative	10(M)
Mitigation measures:									
<ul style="list-style-type: none"> - The spending power of locals and expatriates working for the developer and/or its contractors 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. A key initiative should be to educate workers. <i>See section 9 (Socio-economic Environment) for details on region statistics.</i> 									
Mitigated	1	2	3	2	0	2	1	Negative	3 (L)

Increased Influx to Oshigambo village

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	3	2	2	5	3	4	POS/NEG	6(LM)
Mitigation measures:									
<ul style="list-style-type: none"> - More job opportunities may attract more non-local job seekers. This may lead to an increase housing demand with potential stimulation of property values and economic activities through increased spending in area. This impact can be seen as both positive and negative. It is still advised to give employment preference to locals that can proof normal residence in the area. 									
Mitigated	1	2	3	2	5	3	4	POS/NEG	6.64 (LM)

Heritage Impacts – There are no known heritage areas or artefacts deemed to be impacted by the construction.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	1	1	1	1	Negative	1 (L)
Mitigation measures:									
<ul style="list-style-type: none"> - During construction, the contractor might come across archaeological features or objects that possess cultural values. If archaeological remains or objects with cultural values (e.g. Pottery, bones, shells, ancient clothing or weapons, ancient cutlery, graves etc) are uncovered at the exploration camp or surrounding, it should be barricaded off and the relevant authorities should be contacted immediately. 									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

Stimulation of Skills Transfer (Positive Impact)

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	2	1	1.33	5	3	4	Positive	5.32 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - 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. 									
Mitigated	1	2	1	1.33	5	3	4	Positive	5.32 (LM)

Employment Creation (Positive Impact)

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	2	2	1.66	2	5	3.5	Positive	5.16 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - Various employment opportunities will be created during all phases of the development, ranging from highly skilled to unskilled. The development is expected to create more than 10 skilled and unskilled posts. Preference should be given to local residence and to Namibian Citizens. - When recruiting, the responsible contractor should ensure gender equality is taken into consideration that both men and women are employed equally and treated equally. - Equity, transparency, should be put into account when hiring and recruiting and that Public Participation i.e. Community Leaders or Community committees should also take part in the recruiting process for decision makings. - In terms of human resource development and capacity building, the contractor must enforce training programs that skilled workers should always train unskilled workers when necessary, in order for them to enhance their performances and to gain more knowledge that they might demonstrate at other levels in future. 									
Mitigated	1	2	5	2.66	3	5	4	Positive	6.66 (LM)

Cumulative Impacts

Possible cumulative impacts associated with the construction phase include increase in traffic along gravel road. Therefore increase in emissions from these vehicles, decreasing the air quality around the proposed establishment. Wear and tear on the road, coupled with increased risk of road traffic incidences. These impacts will however be short lived.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	2	2	1.66	5	3	4	Negative	6.64 (LM)
Mitigation measures:									
Mitigated	1	2	1	1.66	4	3	3.5	Negative	5.81 (LM)

As discussed in the different sections, impacts are expected to be low to medium, short lived and site specific. An Environmental Management Plan (EMP) will ensure that the impacts of the construction work is minimised and includes measures to reduce the identified impacts during construction of the facility while ensuring that vehicles and pedestrian traffic are suitably protected to avoid accidents and injuries. The appointed contractor should be made aware of the content and environmental requirements of this report so as to plan the construction phase accordingly.

11.2. Impacts Associated with Operational Phase

Specific impacts identified, associated with the operational phase are:

Spillage

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	5	2	3	4	4	4	Negative	7 (LM)
Mitigation measures: <ul style="list-style-type: none"> - Spillages might occur during delivery to the storage tanks. Risks of such an impact can be lowered through proper training of staff and the installation of suitable containment structures. - Spillages occurring at the filler point and dispensing (i.e. offloading) area must be contained and cleaned up. - Any water containing waste (wastewater) generated as a result of the spillage and associated clean up, must be disposed of safely and in accordance with environmental legislation. - No product must be allowed to be discharged into municipal storm water / sewer system and or surrounding environment. 									
Mitigated	1	0	1	0.66	0	2	1	Negative	1.66 (L)

Overfilling of Storage Tanks

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	3	2	2.33	4	4	4	Negative	6.33 (LM)
Mitigation measures: <ul style="list-style-type: none"> - Overfilling of the tanks may also take place and proper monitoring of the product levels in the tanks must take place to eliminate overfilling. - The Underground Storage Tanks must be fitted with an overfill protection device. 									
Mitigated	1	0	1	0.66	0	1	0.5	Negative	1.16 (L)

Overfilling of Vehicles

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	3	1	2.33	5	5	5	Negative	7.33 (LM)
Mitigation measures: <ul style="list-style-type: none"> - The operators must be well trained and must focus on filling the vehicle to avoid the overfilling. - This impact can also be reduced by the installation of spill containment areas around the pumps. 									
Mitigated	1	1	1	1	2	2	2	Negative	3 (L)

Fire and Explosion Hazard

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. Therefore, an integrated fire prevention plan should be drafted before “start-up” of the facility. Special note must be taken of the regulations stipulated in sections 47 and 48 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990).

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	2	4	2	3	2.5	Negative	6.5 (LM)
Mitigation measures: <ul style="list-style-type: none"> - All personnel have to be sensitised about responsible fire protection measures and - The Emergency Response Plan should be implemented and should address the potential spills and workers should be trained on the actions that are to be taken if such an events are to occur; - Regular inspections should be carried out to inspect and test, firefighting equipment and pollution control measures at the fuel storage facility. - All fire precautions and fire control at the fuel retail facility must be in accordance with SANS 10089-1:1999, or better. A holistic fire protection and prevention plan is needed. - Experience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to prevent, curb and avoid conditions that may result in fires. - It must be assured that sufficient water is available for firefighting purposes. 									
Mitigated	1	0	1	0.66	0	2	1	Negative	1.66(L)

Damage to Pipelines and Tanks- Damages to pipelines and tanks may occur due to vehicle movements and excavations. Leakage of the damaged structure is most likely to follow.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	1	1	1.33	1	1	1	Negative	1.33 (L)
Mitigation measures: <ul style="list-style-type: none"> - Due to vehicle collision and damage during excavations. This can be mitigated through careful designs, warning signs and sensible operations in the area. - Utility clearance investigations should be conducted before any excavation commences on the site. 									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

Surface Water Contamination – Surface runoff from the site is expected to flow in a South-Easterly direction. It is highly unlikely that contaminated surface runoff from the site will reach any surface water bodies like Oshanas which is way far from the site as there is no surface body like in a 500m radius from site except the ephemeral river which is 1km south of the site and it hardly carries surface water.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	4	5	5	4.66	5	3	4	Negative	8.66 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - Proper containment mechanisms installed such as oil/water separators should be able to contain any spillages that might occur during the operation of the facility. - In case of accidental spill, it must be all employee's responsibility to ensure that all accidental surface spills of oil or fuel is contained on-site and transferred to the oil/water separator - Littering of empty tin oil containers can also cause spillage, therefore the contractor must ensure handling and storage of all petrol/ oil equipment are properly managed in an approved manner. 									
Mitigated	1	1	1	1	1	2	1.5	Negative	1.5 (L)

Groundwater Contamination

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	5	3	3.66	1	3	2	Negative	7.32 (M)
Mitigation measures:									
<ul style="list-style-type: none"> - Due to leakage and spillage, the risk of groundwater pollution can be lowered through proper training of staff and the installation of suitable containment structures. - Overfilling of the tanks may also take place and proper monitoring of the product levels in the tanks must take place to eliminate overfilling. - Regular tank and pipeline tightness inspections are advised to eliminate the risk of impact on the environment due to leakage. 									
Mitigated	1	1	1	1	1	2	1.5	Negative	1.5 (L)

Increase Noise Pollution

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	5	2	3.33	5	5	5	Negative	8.33 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - As more vehicles are expected to frequent the site, but the impact is expected to be minimal. Sound volumes should be kept low if public address systems are used on the site. 									
Mitigated	1	1	1	1	2	1	1.5	Negative	2.5 (L)

Air Quality- In terms of air quality, hydrocarbon vapours will normally be released during delivery as liquid displaces the gaseous mixture in the tanks.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	4	4.66	5	5	5	Negative	9.66 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - In terms of air quality, hydrocarbon vapours will normally be released during delivery as liquid displaces the gaseous mixture in the tanks. This will be released through vent pipes on the tanks. Vent pipes should be placed in such a manner as to prevent impact on potential receptors. - All venting systems and procedures have to be designed according to SANS standards and placed in a sensible manner. 									
Mitigated	1	0	1	0.66	0	2	1	Negative	1.66 (L)

Health Impacts- The operations of the retail facility can cause serious health and safety risks to workers on site. Occupational exposures are normally related to dermal contact with fuels and inhalation of fuel vapours during handling of such products.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	4	4.66	5	5	5	Negative	9.66 (LM)
<p>Mitigation measures:</p> <p>For the reason stated above, adequate measures must be brought in place to ensure safety of staff on site, and includes:</p> <ol style="list-style-type: none"> 1. Proper training of operators; 2. First aid treatment; 3. Medical assistance; 4. Emergency treatment; 5. Prevention of inhalation of fumes; 6. Protective clothing, footwear, gloves and belts; safety goggles and shields; 7. Manuals and training regarding the correct handling of materials and packages should be in place and updated as new or updated material safety data sheets becomes available; and 8. Monitoring should be carried out on a regular basis, including accident reports. 									
Mitigated	1	1	1	1	2	2	2	Negative	3 (L)

Generation of Waste

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	3	5	3	3.66	5	5	5	Negative	8.66 (LM)
Mitigation measures:									
<ul style="list-style-type: none"> - All general waste should only be collected by the waste disposal Licensed contractor authorized by the Local Authority which is Oniipa Town Council - Waste minimization policy. Bioremediation of contaminated soil. - Waste in the form of contaminated soil due to spillages might occur, but should be prevented through the use of containment areas as provided. - Tank sludge and spill clean - up materials should be managed via re-processing for product recovery or as a waste at a facility licensed to handle this type of material in an environmentally sound manner. - 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 is required, if applicable. Care should be taken when handling contaminated material. - Water containing soaps and other detergents must not enter the oil water / separator as it will place the hydrocarbons in suspension, rendering the oil water separator ineffective. - The cradle to grave principal should be kept in mind during waste disposal. - The work environment should be kept clean, thus good house-keeping should be maintained. 									
Mitigated	1	2	2	1.66	1	3	2	Negative	3.32 (L)

Economic Impacts (Positive Impact)

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	5	2.33	2	3	2.5	Positive	4.8 (LM)
Mitigation measures: <ul style="list-style-type: none"> - Creation of new employment opportunities. This is deemed to be a positive impact. It is not clear how many new, permanent employment positions will be created but it is expected to be about 20 or more people. - It is recommended to put local people at forefront when hiring or recruiting people, therefore unskilled people from the local community should be employed and semi-skilled from the region so that unskilled workers can be trained by semi-skilled for them to learn and be able to compete with others in future. - Equity, transparency, should be put into account when hiring and recruiting and that Public Participation i.e. Community Leaders or Community committees should also take part in the recruiting process for decision makings. 									
Mitigated	1	2	3	2	2	5	3.5	Positive	5.5(LM)

Stimulation of Economic Development (Positive Impact)

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	5	5	3.66	5	3	4	Positive	7.66 (LM)
Mitigation measures: <ul style="list-style-type: none"> - The development of the new modern fuel facility at Oshigambo is expected to enhance the economic development of the settlement and surrounding areas. The construction of the fuel retail facility with a convenience store and other needed services are expected to boost development confidence of the area. - Employment should be given to people from Oshigambo for them to boost the development of Oshigambo and for them to increase the value of their properties and to increase the value of their land. 									
Mitigated	1	5	4	3.33	5	5	5	Positive	8.33 (LM)

Cumulative Impacts

Possible cumulative impacts associated with the operational phase include increase in traffic frequenting the fuel retail facility. Therefore increase in emissions from these vehicles, decreasing the air quality around the proposed establishment and the nearby residential properties. Wear and tear of gravel road coupled with increased risk of road traffic incidences from the service station into the main road.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	4	3	3	5	3	4	Negative	7(LM)
Mitigation measures:									
Mitigated	2	3	3	2.66	5	3	4	Negative	6.66 (LM)

Heritage Impacts – There are no known heritage areas or artefacts deemed to be impacted by the operational phase.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	1	1	1	1	Negative	1 (L)
Mitigation measures:									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

Ecological Impacts

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	1	1	1	1	Negative	1 (L)
Mitigation measures: No known conservation worthy vegetation are present on the proposed facility. Limited impact on the flora can be expected, as very little vegetation exists at the site.									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

11.3. Impacts Associated with Decommissioning Phase

At this point, it is difficult to visualise and assess the decommissioning phase, although the procedures for decommissioning phase should be the same as for the construction phase however, there will be possible pollution from the fuel in the storage and dispensing equipment. Furthermore, during the decommissioning phase, an Environmental Impact Assessment (EIA) will be required and the disposal of decommissioned equipment and hazardous contaminated materials should be disposed following the disposal of hazardous material legislation.

At the time of the decommissioning phase, it is a must that all the storage facilities to be removed should be drained properly following guidelines for tank removal in order to reduce the risk of fuel spillage and groundwater contamination. Furthermore, all the rubble and waste that will be created during this phase should be disposed of at an approved waste facility and not dumped in the surrounding areas. These should be done in recognition with the Oniipa Town Council's waste management regulations and guidelines.

12. CONCLUSION

Melody Trading proposes to construct and operate a fuel retail facility outlet with the name (Melody Service Station) in Oshigambo village, in Oniipa Constituency in the Oshikoto Region. Nghivelwa Planning Consultant had conducted an Environmental Impact Assessment (EIA) and prepared an Environmental Management Plan (EMP) for the construction, operation and decommissioning phases of the proposed Melody Service Station. Therefore, potential environmental issues associated with the proposed activities have been identified. A number of potential impacts were assessed and mitigation measures are provided. The area is generally suitable for the fuel retail facility. All environmental risks can be minimised and managed through implementing preventative measures and sound management systems.

13. REFERENCES

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