APP-003878

JT FREIGHTING CONSUMER FUEL INSTALLATION NEAR OKAHANDJA
ENVIRONMENTAL MANAGEMENT PLAN

Prepared by:

Prepared for:

April 2024

Project:	**JT FREIGHTING CONSUMER FUEL INSTALLATION, OKAHANDJA: ENVIRONMENTAL MANAGEMENT PLAN**	
Report: **Version/Date:**	Final April 2024	
Prepared for: **(Proponent)**	JT Freighting CC P.O. Box 805 Mariental Namibia	
Lead Consultant	Geo Pollution Technologies (Pty) Ltd PO Box 11073 Windhoek Namibia	TEL.: (+264-61) 257411 FAX.: (+264) 88626368
Main Project Team:	**Quzette Bosman** (BA Geography/Sociology); (BA Environmental Management) **André Faul** (B.Sc. Zoology/Biochemistry); (B.Sc. (Hons) Zoology); (M.Sc. Conservation Ecology); (Ph.D. Medical Bioscience) **Johann Strauss** (BA. Geography/Psychology/Environmental Management)	
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Report Approval	 **André Faul** Conservation Ecologist	

I Daniel van der Merwe, acting as a representative of JT Freighting CC hereby confirm that that all material information in the possession of the Proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this plan is fairly represented in this report and the report is hereby approved.

Signed at Okahandja on the 07 day of May 2024.

JT Freighting CC

CC/2011/1375
Company Registration Number

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PHOTOS

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
DWA	Department of Water Affairs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
GPT	Geo Pollution Technologies
HIV	Human Immunodeficiency Virus
IAPs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
MEFT	Ministry of Environment, Forestry and Tourism
mm/a	Millimetres per annum
MSDS	Material Safety Data Sheet
PPE	Personal Protective Equipment
ppm	Parts per million
UNCCD	United Nations Convention to Combat Desertification
WHO	World Health Organization

GLOSSARY OF TERMS

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

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

Competent Authority - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Construction - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

Cumulative Impacts - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

Environmental Impact Assessment (EIA) - process of assessment of the effects of a development on the environment.

Environmental Management Plan (EMP) - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

Environmental Management System (EMS) - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

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

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

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

Mitigate - The implementation of practical measures to reduce adverse impacts.

Proponent (Applicant) - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an

activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Scoping Process - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

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

Stakeholder Engagement - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".

Stakeholders - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Sustainable Development - "Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations" – the definition of the World Commission on Environment and Development (1987). "Improving the quality of human life while living within the carrying capacity of supporting ecosystems" – the definition given in a publication called "Caring for the Earth: A Strategy for Sustainable Living" by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

1 INTRODUCTION

JT Freighting CC (the Proponent) requested Geo Pollution Technologies (Pty) Ltd to prepare an environmental management plan (EMP) for an **existing** consumer fuel installation located on plot 491 farm Osona Commonage No. 65 near Okahandja. The facility has one aboveground 23 m^3 diesel tank which is used to supply fuel to their fleet of vehicles and machinery on site. The facility is constructed and operated according to South African National Standards (SANS) as prescribed by Namibian legislation.

In order to comply with Namibian legislation, and to adhere to all codes and standards applied in their operations, the Proponent wishes to apply for an environmental clearance certificate (ECC) for the fuel installation's operations. In support of the ECC application, the EMP will be submitted to the Ministry of Environment, Forestry and Tourism (MEFT). The EMP provides management options to ensure environmental impacts of the facility are minimised. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

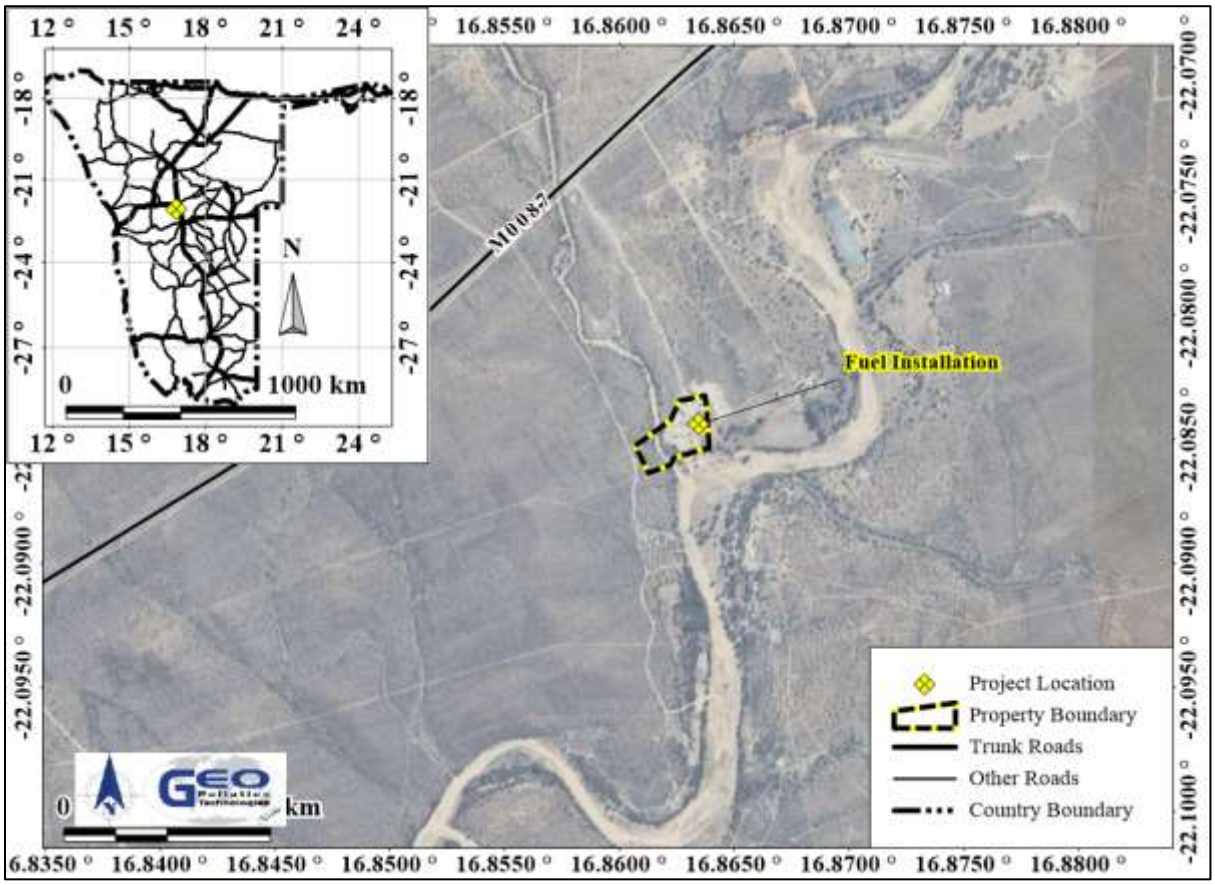

Figure 1-1 Project location

The EMP is a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the facility. All monitoring and records kept should be included in a report to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality policy, Environmental Policy, or similar could be used in conjunction with the EMP. Operators

and responsible personnel must be taught the contents of these documents. Local authority or national regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

This EMP will be used to apply for an ECC in compliance with Namibia's Environmental Management Act (Act No 7 of 2007).

2 SCOPE

The scope of the EMP is to:-

- Provide a brief overview of all components and related operations of the facility.
- Summarise the legal and regulatory framework within which the fuel storage facility operates.
- Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the facility.
- Identify potential impacts of the facility on the environment.
- Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- Provide sufficient information to the relevant competent authorities and the Ministry of Environment, Forestry and Tourism to make informed decisions regarding the development.

3 METHODOLOGY

The following methods were used to prepare the EMP:

1. Baseline information about the site and its surroundings was obtained from primary information and existing secondary information.
2. Potential environmental impacts emanating from the operations, construction / maintenance and decommissioning of the facility were considered and possible enhancement measures were listed for positive impacts while mitigation / preventative measures were provided for negative impacts as part of the EMP.

4 FACILITY OPERATIONS AND RELATED ACTIVITIES

The consumer fuel installation is situated on plot 491 farm Osona Commonage No. 65 (Figure 1-1). Operations entail one 23 m^3 aboveground diesel storage tank situated within a concrete bund area with a spill slab, both the bund area and slab being connected to an oil water separator, to protect the environment from any leaks or spills. Operations associated with the consumer fuel installation continue at the site on a daily basis. This mainly involves the receipt of diesel from road tankers once a month, storage of the fuel in the aboveground storage tank, and dispensing of fuel to the fleet of vehicles and machinery via pumps by authorised employees as required. Regular tank dips and reconciliations are performed to ensure there are no product losses and that fuel deliveries are scheduled on time. Maintenance continues on a daily basis and may include cleaning of the oil water separator and some minor construction activities. Maintenance include minor repairs and general upkeep of the consumer fuel installation and associated infrastructure as well as general upgrade activities. This may include painting, servicing and/or replacement of equipment. The site is constructed and operated according to SANS 10131-2004 standards, as required by Namibian legislation.

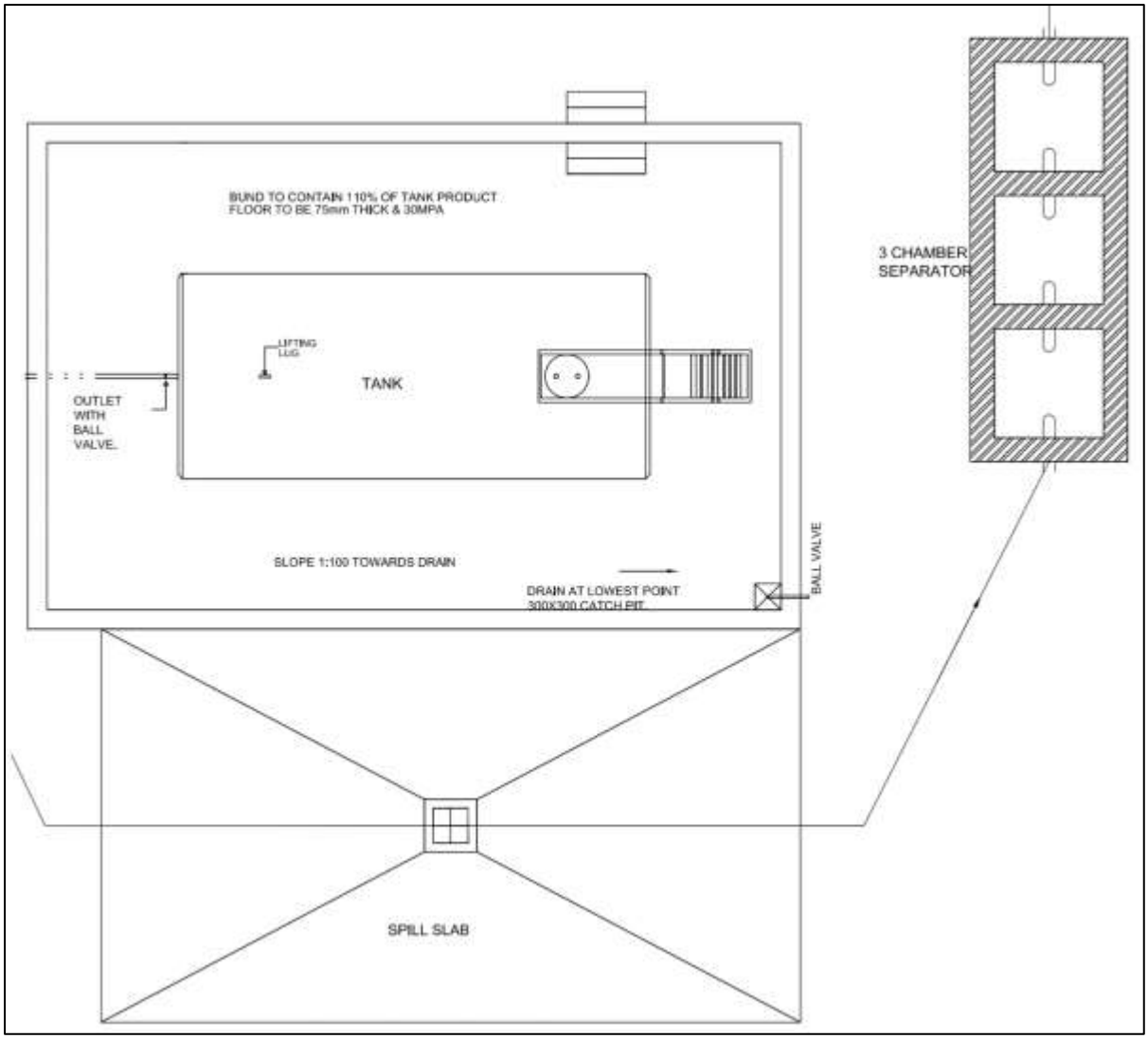

Figure 4-1 Site plan

Photo 4-1 Existing storage tank inside a bund wall

Photo 4-2 Spill slab at refuelling point

Photo 4-3 Emergency oil spill kit

Photo 4-4 Oil water seperator

5 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 5-1 to Table 5-3 govern the environmental assessment process in Namibia and/or are relevant to the facility.

Table 5-1 Namibian law applicable to the fuel storage facility

Law	Key Aspects
The Namibian Constitution	♦ Promotes the welfare of people. ♦ Incorporates a high level of environmental protection. ♦ Incorporates international agreements as part of Namibian law.
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment. ♦ Promotes sustainable management of the environment and the use of natural resources. ♦ Provides a process of assessment and control of activities with possible significant effects on the environment.
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act. ♦ Lists activities that requires an environmental clearance certificate. ♦ Provides Environmental Impact Assessment Regulations.
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	♦ Regulates petroleum industry. ♦ Makes provision for impact assessment. ♦ Petroleum Products Regulations (Government Notice No. 155 of 2000). o Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002).
Water Resources Management Act Act No. 11 of 2013	♦ Provides for management, protection, development, use and conservation of water resources. ♦ Prevention of water pollution and assignment of liability.

Law	Key Aspects
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Defines the powers, duties and functions of local authority councils.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. ♦ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees. ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	♦ Governs the control of noxious or offensive gases. ♦ Prohibits scheduled process without a registration certificate in a controlled area. ♦ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.
Pollution Control and Waste Management Bill (draft document)	♦ Not in force yet. ♦ Provides for prevention and control of pollution and waste. ♦ Provides for procedures to be followed for licence applications.

Table 5-2 Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	♦ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities. ♦ SANS 10131:2004 is specifically aimed at storage and distribution of petroleum products in aboveground storage tanks. ♦ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations. o Provides requirements for spill control infrastructure

Table 5-3 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.
1985 Vienna Convention for the Protection of the Ozone Layer	♦ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered. ♦ Adopted to regulate levels of greenhouse gas concentration in the atmosphere.
United Nations Framework Convention on Climate Change (UNFCCC)	♦ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.
Convention on Biological Diversity, Rio de Janeiro, 1992	♦ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.

The installation is listed as an activity requiring an ECC as per the following points from Section 9 of Government Notice No. 29 of 2012:

- 9.1 "The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974." Fuel is stored on site for daily operations.
- 9.2 "Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste." The Proponent has a 23 m^3 aboveground fuel storage facility. The facility is licenced as per the Ministry of Mines and Energy (MME) requirements.
- 9.5 "Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin." The Proponent has a 23 m^3 aboveground fuel storage facility.

6 ENVIRONMENTAL CHARACTERISTICS

This section lists pertinent environmental characteristics of the study area.

6.1 LOCALITY AND SURROUNDING LAND USE

The facility is located on plot 491 farm Osona Commonage No. 65 centred on (- 22.084429°S, 16.863485°E) (Figure 1-1). The site is situated next to the Swakop River and operations are located outside the Okahandja townlands. Properties up and downstream of the operations have been and are in the process of being subdivided into various small holdings which

accommodate a variety of land uses. Agricultural use are associated with the majority of the properties while sand mining, conducted by various parties, are conducted up and downstream of project area.

6.2 CLIMATE

According to the Köppen-Geiger Climate Classification system the project is located in a hot semi-arid climate (BSh) (http://koeppen-geiger.vu-wien.ac.at/present.htm). This means that the area receives precipitation below potential evapotranspiration, but not as low as a desert climate and has a mean annual temperature of at least 18 °C. Average rainfall received is 300-350 mm/a with a variation of 30-40%. Monthly rainfall peaks in February. The potential evapotranspiration is 2,500 – 2,600 mm/a. By dividing the mean annual potential evapotranspiration into the mean annual precipitation, an aridity index value for the area was computed as 0.12, which indicates the area to be Arid. The average annual minimum temperature is 4-6 °C, while the average annual maximum temperature is 32-34 °C, with an average annual temperature range of 28-30 °C. The average diurnal temperature (difference between daily minimum and maximum temperature) for this area is around 16-18 °C. Direct normal solar irradiance for the area is 7.775 kWh/m²/day.

Long term precipitation data was obtained from the CHIRPS-2 database (Funk et al., 2015). The CHIRPS-2 dataset (Climate Hazards Group Infra-Red Precipitation with Station data version 2) consists of long term precipitation data (1981 to near-present) obtained from satellite imagery and in-situ station data and therefore represents more recent data. Data is averaged over an area of roughly 5 km by 5 km. This averaging effect should be kept in mind during data analyses as high precipitation from single thunder storm cells would be averaged out, thereby providing a reduced daily maximum precipitation value.

The average annual precipitation for the last 42 years was calculated as 285 mm/a, with a coefficient of variance of 38%. Heavier precipitation (single day events) occur between Jan and Feb, with a single event of 51 mm in April (last 42 years data) being the highest. Daily and seasonal precipitation data (Funk et al., 2015) is presented in Table 6-1 and in Figure 6-1. Seasonal (July to June) total precipitation, centred on the average line for the last 42 years, is presented, with the daily total precipitation and the seasonal cumulative precipitation. From the figure it is clear that 7 out of the last 10 seasons were below the average.

Table 6-1 Rainfall statistics (Funk et al., 2015)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm)	13	13	8	0	0	0	0	0	0	0	0	6
Maximum (mm)	304	212	133	93	4	3	0	1	4	24	53	120
Average (mm)	77	80	51	20	0	0	0	0	1	7	16	32
Variability (%)	73	59	64	98	309	299	453	384	148	92	72	76
Daily maximum (mm)	44	42	39	51	4	2	0	1	4	13	15	26
Average rain days	9	9	6	3	0	0	0	0	1	2	4	5

Season July - June average: 285 mm | Season coefficient of variation: 38 %

Date range: 1981-July-1 to 2023-June-30 | Lat: 22.08443°S; Long: 16.86349°E

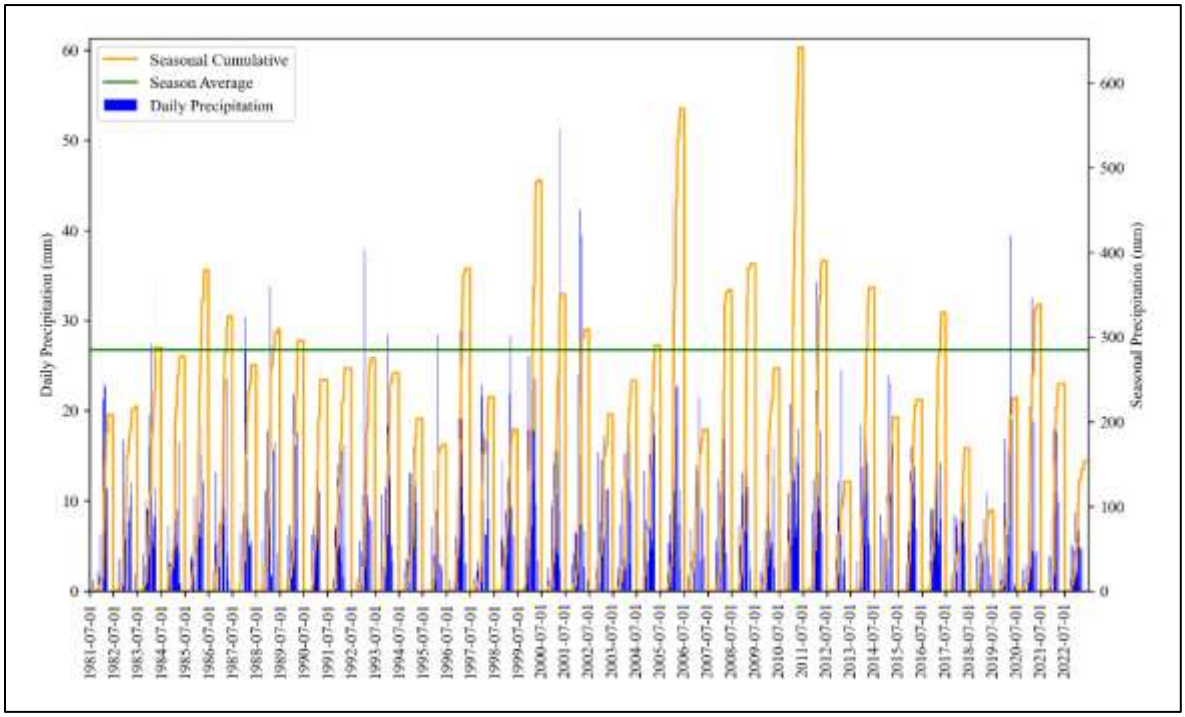

Figure 6-1 Daily and seasonal rainfall (Funk et al., 20215)

Monthly temperature data was retrieved from the Modern-Era Retrospective analysis for Research and Applications version 2 (MERRA-2) data set for a height of 2 m above surface (Ronald Gelaro, et al., 2017). This data set is a NASA atmospheric reanalysis, incorporating satellite data integration and aims at historical climate analyses at 0.5 ° x 0.625 ° spatial resolution. Table 6-2 presents statistics of daily data abstracted from the data set for the last 42 years. The lowest temperature (-2.46 °C) over the data period was determined for the month of July. The highest maximum temperature (40.3°C) of the data period of was determined for November.

Table 6-2 Temperatures statistics based on Merra-2 data

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (°C)	7	10	7	5	1	-1	-2	-1	0	3	5	9
Maximum (°C)	40	40	39	36	32	29	30	33	37	40	40	40
Average (°C)	26	25	24	22	19	15	15	18	22	25	26	26
Diurnal (°C)	15	14	14	15	16	17	17	18	19	18	17	16

6.3 TOPOGRAPHY AND DRAINAGE

The site is located in the north-western expanses of the of the Khomas Hochland Plateau region which is characterised by rolling hills with many summit heights. The Windhoek Graben which strikes in a northern direction caused the forming of a broad valley within the graben structure. The eastern valley side is well defined while the site is located near the western valley side which is less well defined. The property borders the Swakop River and elevation is slightly higher (approximately 1 m) towards the river and the consumer fuel installation is located approximately 200 m for the river bank.

The site is located within the upper reaches of the Swakop River, an ephemeral river draining the central part of Namibia towards the Atlantic Ocean. Two major surface water storage dams are located in the Swakop River, and are relevant to the facility. The Von Bach Dam, 12.3 km upstream and the Swakoppoort Dam, 32.4 km downstream of the site.

6.4 GEOLOGY AND HYDROGEOLOGY

The project is located in the Southern Marginal Zone of the Damara Supergroup. The Damara Supergroup formed during the orogenesis of the Khomas Sea in the Damara ocean during the Neoproterozoic Age (850 Ma). Damara Supergroup consist locally out of the Nosib and Swakop Groups. The metasedimentary rocks of the Southern Marginal Zone consist primarily of the Kuiseb Formation (NKs) of the Swakop Group. Rocks of the Kuiseb Formation is prevalent in the study area and underlies the surface cover. The Kuiseb Formation consists of a monotonous sequence of schistose pelitic and psammitic meta-turbidites with intercalations of graphitic schist, calc-silicate rocks, marble, tremolite schist, scapolite schist and the Matchless amphibolite. Metamorphic conditions were of amphibolite facies grade with a progressive northward increase in peak temperatures reaching anatectic conditions in the northern Khomas Hochland near the syn-orogenic Donkerhoek (EdDh) monzogranites and pegmatites.

Two main aquifer types are found in the area, namely secondary (fractured rock) aquifers hosted in the mica schist of the Kuiseb Formation, and primary (unconsolidated sediment) aquifers formed in the unconsolidated sediments in rivers and valleys. Host rock fracturing along fault planes results in better development of secondary porosity in brittle rocks like quartzite compared to the schistose terrain found at the project location which is prone to plastic deformation rather than brittle fracturing. Late- to post-tectonic anatectic or intrusive rock that occur in the area may cause boundary effects on groundwater, influencing its flow velocity and direction. Groundwater flow is expected to take place through primary porosity in the surface cover. Groundwater flow in the secondary aquifer is expected to flow along fractures, faults and other geological structures (secondary porosity) present within the underlying formations (hard rock formations). Groundwater flow tend to accumulate in areas where more recent movement has taken place. The Windhoek Graben structure formed during post orogenic times and potentially hold more groundwater than older smaller structures.

Table 6-3 presents groundwater statistics for 60 boreholes in a 5 km radius around the project. The groundwater information was obtained from Department of Water Affairs (DWA) borehole database. This database is generally outdated and more boreholes might be present. The average depth of 44 of the 60 boreholes is 12 m below surface and the yield of 12 of the 60 boreholes ranges between 0 and 25 m³/h. The average groundwater level of 6 of the 60 known boreholes is 18 m below surface, ranging between 3 and 34 m below surface.

Table 6-3 Groundwater statistics

	Depth (m)	Yield (m^3/h)	Waterlevel (m)	Waterstrike (m)	TDS (ppm)	SO_4 (ppm)	NO_3 (ppm)	F (ppm)
Datapoints	44	12	6	60	10	10	9	10
Minimum	1	0	3	0	83	1	0.1	0.2
Average	12	6	18	2	623	102.5	6.4	1.0
Maximum	76	25	34	39	2150	448	9.3	5.1
Group A	*0-50*	*>10*	*0-10*	*0-10*	*0-1000*	*0-200*	*0-10*	*0-1.5*
	40	3	3	57	7	7	9	8
Group B	*50-100*	*5-10*	*10-50*	*10-50*	*1000-1500*	*200-600*	*10-20*	*1.5-2.0*
	4	2	3	3	1	3	0	0
Group C	*100-200*	*0.5-5*	*50-100*	*50-100*	*1500-2000*	*600-1200*	*20-40*	*2.0-3.0*
	0	1	0	0	1	0	0	1
Group D	*>200*	*0-0.5*	*>100*	*>100*	*>2000*	*>1200*	*>40*	*>3*
	0	6	0	0	1	0	0	1
60 boreholes in a 5.0 km radius from 22.08443°S 16.86349°E								

Statistical grouping of parameters is for ease of interpretation, except for the grouping used for sulphate, nitrate and fluoride, which follow the Namibian guidelines for the evaluation of drinking-water quality for human consumption, with regard to chemical, physical and bacteriological quality. In this case the groupings has the following meaning:
Group A: Water with an excellent quality
Group B: Water with acceptable quality
Group C: Water with low health risk
Group D: Water with a high health risk, or water unsuitable for human consumption

6.5 PUBLIC WATER SUPPLY

Water supply for this project is sourced from the Namwater Von Bach - Gross Barmen central scheme.

6.6 FAUNA AND FLORA

The site falls with the Highland shrubland (Dense Shrubland) vegetation type which is part of the Acacia Tree and Shrub Savanna Biome of Namibia (Mendelsohn J, 2002). This area is known for its very high plant diversity and up to 50% grass cover as reflected on site. The most common plant found in the Swakop River is the Tamarisk (*Tamarix usneoides*) and the Mesquite (*Prosopis spp*). The mesquite is an invasive species that is competing with Camelthorn. Rooihaak (*Acacia reficiens*).

6.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within the Otjozondjupa Region and lies 15 km southwest of Okahandja. The town had a population of 22, 639 during the 2011 census. The town has established businesses and industries and plays and important part in the economic sector of the region and northern Namibia.

7 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this section is to list the most pertinent environmental impacts that are expected from the operational, construction (upgrades, maintenance, etc.) and potential decommissioning activities of the facility.

7.1 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the facility are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operation of the facility. This EMP act as a stand-alone document. All personnel taking part in the operations of the facility should be made aware of the contents in this report, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of construction activities (upgrades, maintenance, etc.) and operations of the facility;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the facility;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible operational personnel.

7.2 IMPLEMENTATION OF THE EMP

Section 7.3 outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation measures and reporting activities should be determined by the Proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the site managers. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the Ministry of Environment, Forestry and Tourism. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the operations, construction and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

7.3 MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION

The following section provides management measures for both the operational phase as well as construction activities related to facility.

7.3.1 Planning

During the phases of planning for operations, construction and decommissioning of the facility, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction activities and operations of the facility are in place and remains valid. This includes the petroleum products licence.
- Ensure that design parameters, where required, are approved by relevant authorities prior to any construction activities at the facility.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
    - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals
    - Adequate protection and indemnity insurance cover for incidents;
    - Comply with the provisions of all relevant safety standards;
    - Procedures, equipment and materials required for emergencies.
- Establish and maintain a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- Appoint a specialist environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry.

7.3.2 Skills, Technology and Development

During various phases of the facility's operations, training is provided to a portion of the workforce to be able to operate and maintain various features of the fuel storage facility according to the required standards. Skills are transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development of the town, region and nationally.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the fuel industry.

Actions

Mitigation:

- If the skills exist locally, contractors and employees must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- The Proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.
- Skills development and improvement programs to be made available as identified during performance assessments.
- Employees to be informed about parameters and requirements for references upon employment.
- Persons engaged with the operation of the facility should be trained in fire-fighting as well as spill management.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- Bi-annual summary report based on employee training.

7.3.3 Revenue Generation and Employment

Operational and construction activities of the facility rely on employment. Skilled and unskilled labourers are employed or contracted for various tasks of construction (upgrade and maintenance) and operations. Unskilled labour may be sourced locally while it is expected that skilled contractors within Namibia will be used for specialised work. Skilled persons will further be required during operation of the facility. The presence of the facility therefore contributes to employment creation in the skilled and unskilled labour sector.

Desired Outcome: Contribution to national treasury and provision of employment to local Namibians.

Actions

Mitigation:

- The Proponent must employ local Namibians where possible.
- If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- Deviations from this practice must be justified.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on employee records.

7.3.4 Demographic Profile and Community Health

The project relies on labour for operations and construction activities. The facility is an existing facility and the scale of the project itself is limited. Therefore, it is not foreseen that is has / will result in changes in the demographic profile of the local community. Exposure to factors such as communicable disease like HIV/AIDS, often associated with the transport industry, as well as alcoholism/drug abuse may impact the local community.

Desired Outcome: To prevent the in-migration and growth in informal settlements, prevent the spread of communicable disease and prevent / discourage socially deviant behaviour.

Actions:

Prevention:

- Employ only local people from the area, deviations from this practice should be justified appropriately.
- Adhere to all municipal by-laws relating to environmental health which includes but is not limited to sand traps for the various facilities and sanitation requirements.

Mitigation:

- Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.
- Appointment of reputable contractors.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- Bi-annual summary report based on educational programmes and training conducted.

7.3.5 Fuel Supply

The existing consumer fuel installation aid in securing fuel supply to the fleet and equipment of the Proponent. This will aid in the efficiency of the operations of the Proponent while reducing spillage and contamination risks associated with daily carting of fuel to the site.

Desired Outcome: Ensure a secure fuel supply remains available.

Actions

Mitigation:

- Ensure compliance to the petroleum regulations of Namibia.
- Proper management to ensure constant supply.
- Record supply problems and take corrective actions.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Record supply problems and corrective actions taken and compile a bi-annual summary report.

7.3.6 Traffic

The presence of the consumer fuel installation reduces the need for daily trips to transport fuel in small volumes to the site as required for operations. This generally decreases the volume of traffic on the roads and thus the risk of incidents and accidents. Construction activities (upgrades) may result in temporary traffic impacts as a result of larges vehicles accessing the site for delivery and collection of equipment and machinery.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- Erect clear signage at the turnoff to the site.
- Clearly mark access and exit points at the facility (to avoid internal incidents)

Mitigation:

- Tanker trucks delivering fuel, should not be allowed to obstruct any traffic.
- If any traffic impacts are expected, traffic management should be performed to prevent these.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

7.3.7 Health, Safety and Security

Activities associated with the construction and operational phases are reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery and handling of hazardous chemicals (inhalation and carcinogenic effect of some petroleum products), and potential explosion risks, poses the main risks to employees. Security risks are related to unauthorized entry, theft and sabotage.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment (PPE) where required.
- Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances.
- All Health and Safety standards specified in the Labour Act should be complied with.
- Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.

Mitigation:

- Selected personnel should be trained in first aid and a first aid kit must be available on site, training should include water flooding events. The contact details of all emergency services must be readily available.
- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes:operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- Security procedures and proper security measures must be in place to protect workers and clients, especially during cash in transit activities.
- Strict security that prevents unauthorised entry.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any incidents must be recorded with action taken to prevent future occurrences.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

7.3.8 Fire

Operational and maintenance activities may increase the risk of the occurrence of fires. Although not as flammable as petrol, diesel is flammable and therefore presents a fire risk. Fire is not limited to only fires originating on site, but due to the location of the facility, fires originating elsewhere can also spread to the facility.

Desired Outcome: To prevent property damage, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan, firefighting plan and spill recovery plan.
- Maintain firefighting equipment, implement good housekeeping practises to clear all potentially flammable waste and dry vegetation, ensure firebreaks around the sit is maintained, and conduct personnel training (firefighting, fire prevention and responsible housekeeping practices).
- Ensure all chemicals are stored according to MSDS and SANS instructions.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Clean all spills / leaks.
- 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).
- Follow SANS standards for design, operation and maintenance of the facility, this includes refuelling locations and distances from boundaries.
- The Proponent should liaise with the local fire brigade to ensure that all fire requirements are met. This includes, but is not limited to SANS 10400 T: 2011.

Mitigation:

- In case of a fire, the firefighting plan must be initiated immediately and all emergency procedures must be performed as practiced during training. This includes notifying the fire brigade and neighbouring operators, engaging emergency stops, using firefighting equipment, etc.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.3.9 Air Quality

Fuel vapours are released into the air during refuelling of the storage tank. Prolonged exposure may have carcinogenic effects. Dust may be generated by vehicles accessing the site as well as during any construction activities.

Desired Outcome: To prevent health impacts and minimise the dust generated.

Actions

Mitigation:

- Personnel issued with appropriate masks where excessive dust or vapours are present.
- A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression.
- Employees should be coached on the dangers of fuel vapours.
- Vent pipes must be properly placed as per SANS requirements.
- Dust suppression should be implemented if required.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any complaints received regarding dust or fuel vapours should be recorded with notes on action taken.
- All information and reporting to be included in a bi-annual report.

7.3.10 Noise

Construction (maintenance and upgrades) may generate noise. During operations, noise pollution will exist due to vehicles accessing the site to offload fuel or refuel. Activities are generally remote from receptors other than Proponent. The nature is related mainly to ongoing refuelling.

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- Follow Health and Safety Regulations of the Labour Act and/or World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- All machinery must be regularly serviced to ensure minimal noise production.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Health and Safety Regulations of the Labour Act and WHO Guidelines.
- Maintain a complaints register.
- Bi-annual reporting on complaints and actions taken to address complaints and prevent future occurrences.

7.3.11 Waste Production

Waste is produced during the operational phase. Waste may include hazardous waste associated with the handling of hydrocarbon products etc. Domestic waste may be generated by the facility and related operations. Waste presents a contamination risk and when not removed regularly may become a fire hazard. Construction (maintenance) waste will be generated during any maintenance activities, this may include building rubble and discarded equipment contaminated by hydrocarbon products such as removed bunding, reticulation and old storage tanks. Contaminated soil and water are considered as a hazardous wastes.

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering.

Actions

Prevention:

- Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- Ensure adequate waste storage facilities are available.
- Ensure waste cannot be blown away by wind.
- Prevent scavenging (human and non-human) of waste.
- All regulation and by-laws relating to environmental health should be adhered to.

Mitigation:

- Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil).
- The spill catchment traps and oil water separator should be cleaned regularly and waste disposed of appropriately. Surfactants (soap) may not be allowed to enter the oil water separator.
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- Liaise with the municipality regarding waste and handling of hazardous waste.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- Any complaints received regarding waste should be recorded with notes on action taken.
- The spill catchment areas and equipment must be regularly inspected and all hydrocarbons removed once detected.
- All information and reporting to be included in a bi-annual report.

7.3.12 Ecosystem and Biodiversity Impact

The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. No significant impact on the biodiversity of the site is predicted as the site is currently void of natural fauna and flora.

Desired Outcome: To avoid pollution of and impacts on the ecological environment.

Actions.

Mitigation:

- No riverbank vegetation close to the site is allowed to be removed without prior, written authorisation from the MEFT.
- Report any extraordinary sightings to the Ministry of Environment, Forestry and Tourism.
- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- Prevent scavenging of waste by fauna.
- Workers must be educated on the importance of biodiversity and poaching and illegal collection of plants (including firewood) prohibited.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- All information and reporting to be included in a bi-annual report.

7.3.13 Groundwater, Surface Water and Soil Contamination

Operations entail the storage and handling of hydrocarbons (diesel) which present a contamination risk. Contamination may either result from failing storage facilities, or spills and leaks associated with fuel handling.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- Spill control structures and procedures must be in place according to SANS standards or better on all areas where fuel is handled.
- All fuelling should be conducted on surfaces provided for this purpose. E.g. The use of drip trays / concrete slabs with regularly maintained seals between slabs connected to an oil water separator.
- The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- Proper training of operators must be conducted on a regular basis (Fuel handling, spill detection, spill control).

Mitigation:

- Any spillage of more than 200 litre must be reported to the Ministry of Mines and Energy MME.
- Spill clean-up means must be readily available on site as per the relevant MSDS. Special focus should be placed on, and procedures be in place for, spills ending up in the ocean.
- Any spill must be cleaned up immediately.
- The spill catchment traps, drip trays and oil water separator should be cleaned regularly and waste disposed of at a suitably classified hazardous waste disposal facility.
- Surfactants (soap) may not be allowed to enter the oil water separator e.g. no soap usage on spill control surfaces.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, and a copy of documentation in which spill was reported to MME.

7.3.14 Visual Impact

This impact is not only associated with the aesthetics of the site, but also the structural integrity. The existing facility is in contrast with the existing landscape character. The site should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing.

Desired Outcome: To minimise aesthetic impacts associated with the facility.

Actions

Mitigation:

- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A maintenance record should be kept.
- A report should be compiled of all complaints received and actions taken.

7.3.15 Cumulative Impact

Possible cumulative impacts associated with the operational phase include increased noise that may occur as a result of trucks visiting the site for deliveries, dust generated on gravel roads, and possible hydrocarbon spills.

Desired Outcome: To minimise cumulative all impacts associated with the facility.

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.

7.4 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Decommissioning was however assessed as construction activities include modification and decommissioning. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure, if any, not forming part of post decommissioning land use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Health and Safety Regulations of the Labour Act or WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

7.5 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- The EMP.

8 CONCLUSION

The operations of JT Freighting as a whole have a positive impact on Otjozondjupa and Khomas Regions by generating revenue and contributing locally to skills transfer and training which in turn develops the local workforce during operations. The operations of the consumer fuel installation contribute positively toward JT Freighting, by ensuring a safe and reliable supply of fuel remains available to operational fleet and machinery.

Negative impacts can successfully be mitigated. SANS standards relating to the petroleum industry and prescribed by Namibian law must be followed during all operations of the fuel storage and handling facility. Spill control infrastructure should be inspected regularly and corrective action taken if it fails to meet the required standards. Staff should be trained on spill control procedures. Noise pollution should at all times meet the prescribed Health and Safety Regulations of the Labour Act and WHO requirements to prevent hearing loss. Fire prevention should be adequate, and health and safety regulations should be adhered to in accordance with the regulations pertaining to relevant laws and internationally accepted standards of operation. Any waste produced must be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house Health, Safety, Security and Environment

Management System in conjunction with the EMP. All operational personnel must be taught the contents of these documents.

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Appendix A: Consultant's Curriculum Vitae

ENVIRONMENTAL ASSESSMENT PRACTITIONER **Quzette Bosman**

Quzette Bosman has 16 years' experience in the Impact Assessment Industry, working as an Environmental Assessment Practitioner and Social Assessment practitioner mainly as per the National Environmental Legislation sets for South Africa and Namibia. Larger projects have been completed in terms of World Bank and IFC requirements. She studied Environmental Management at the Rand Afrikaans University (RAU) and University of Johannesburg (UJ), including various Energy Technology Courses. This has fuelled a passion towards the Energy and Mining Industry with various projects being undertaken for these industries. Courses in Sociology has further enabled her to specialize in Social Impact Assessments and Public Participation. Social Assessments are conducted according to international best practise and guidelines. Work has been conducted in South Africa, Swaziland and Namibia.

CURRICULUM VITAE QUZETTE BOSMAN

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	QUZETTE BOSMAN
Profession	:	Social Impact Assessor / Environmental Assessment Practitioner
Years' Experience	:	16
Nationality	:	South African
Position	:	Senior Environmental Consultant
Specialisation	:	ESIA & ESMP; SIA
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent German –speaking, reading - fair

First Aid Class A	EMTSS, 2017
First Aid LSM	OSH-Med International 2022
Basic Fire Fighting	EMTSS, 2017
Basic Industrial Fire Fighting	OSH-Med International 2022

EDUCATION AND PROFESSIONAL STATUS:

BA	Geography & Sociology	:	Rand Afrikaans University, 2003
BA	(Hons.) Environmental Management	:	University of Johannesburg, 2004

PROFESSIONAL SOCIETY AFFILIATION:

Namibian Environment and Wildlife Society
International Association of Impact Assessors South Africa (IAIA SA)
Member 2007 - 2012
Mpumalanga Branch Treasurer 2008/2009

OTHER AFFILIATIONS
Mkhondo Catchment Management Forum (DWAF): Chairperson 2008-2010
Mkhondo Water Management Task Team (DWAF): Member 2009

AREAS OF EXPERTISE:

Knowledge and expertise in:

- environmental impact assessments
- project management
- social impact assessment and social management planning
- community liaison and social monitoring
- public participation / consultation, social risk management
- water use licensing
- environmental auditing and compliance
- environmental monitoring
- strategic environmental planning

EMPLOYMENT:

2015 - Present	:	Geo Pollution Technologies – Senior Environmental Practitioner
2014-2015	:	Enviro Dynamics – Senior Environmental Manager
2010 - 2012	:	GCS – Environmental Manager (Mpumalanga Office Manager)

2007 - 2009	:	KSE-uKhozi - Technical Manager: Environmental
2006 -2007	:	SEF – Environmental Manager
2004 - 2005	:	Ecosat – Environmental Manager

PUBLICATIONS:

Contract reports	: +190
Publications	: 1