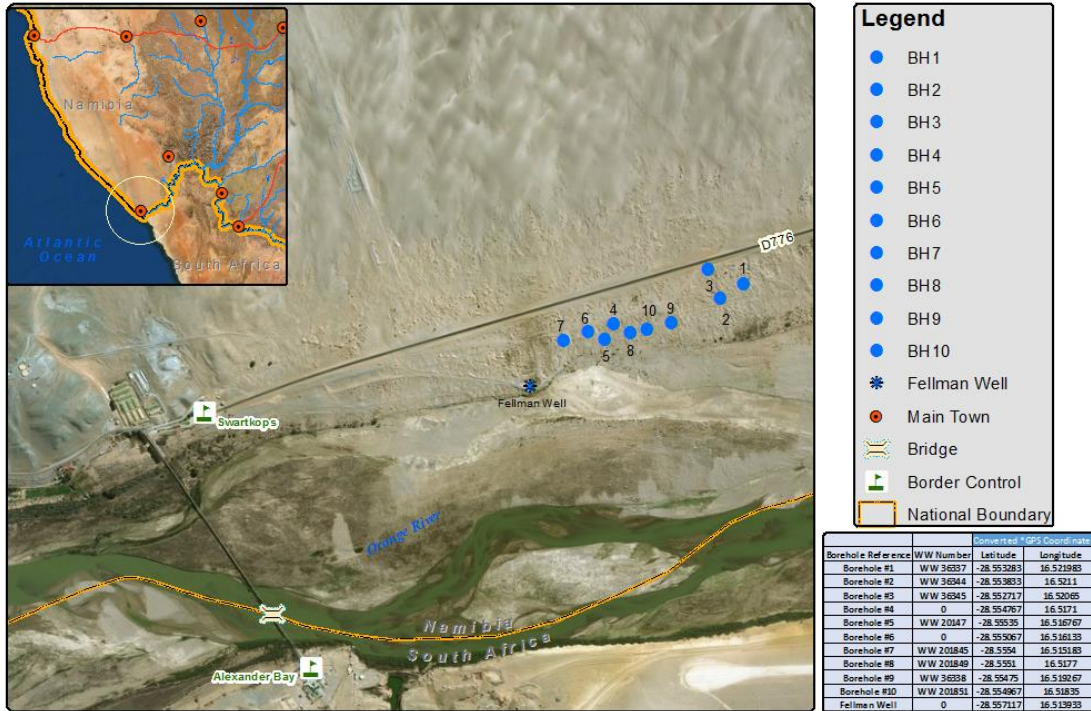
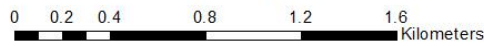


ENVIRONMENTAL MANAGEMENT PLAN (EMP)



ORANJEMUND TOWN COUNCIL BOREHOLES



Scale: 1:17, 000

FOR THE ABSTRACTION OF WATER FROM 10 x BOREHOLES AND 1 (ONE) FELHMAN WELL IN THE PALEO CHANNEL (NORTHERN BANK OF THE ORANGE RIVER) FOR URBAN, IRRIGATION AND INDUSTRIAL PURPOSES, FOR THE ORANJEMUND TOWN COUNCIL, //KARAS REGION



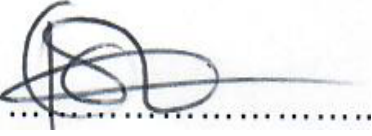


June 2020

+264 61 225 776 / +264 811 220 114

info@tec.com.na / www.tec.com.na

P.O.Box 35473, Kleine Kuppe, Windhoek

Unit 11, No 40, Elysium Fields Office Complex, Berg Street, Klein Windhoek, Namibia

DOCUMENT INFORMATION		
Title	Environmental Management Plan (EMP) for the abstraction of Water From 10 x Boreholes and 1 x Felhman Well in the Paleo channel (Northern Bank of the Orange River) for Urban, Irrigation and Industrial purposes	
ECC Application Reference number	APP: 001592	
Listed Activity	Activity 8: Water Resource Developments 8.1 The abstraction of ground or surface water for industrial or commercial purposes 8.7 Irrigation schemes for agriculture excluding domestic irrigation.	
Location	Oranjemund, //Karas Region	
Proponent	Oranjemund Town Council	
Author:	Signature	Date
Mr. Ipeinge Mundjulu (EAP) ¹		15 June 2020
Reviewer:		19 June 2020
Mr. Jonas Heita (EAP)		
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Office: +264 61 225 776 Mobile: +264 811 220 114 Email: info@tec.com.na Website: www.tec.com.na	 Tortoise Environmental Consultants (TEC) One Step @ a time	Unit 11, No 40 Elysium Fields Office Complex Berg Street Klein Windhoek

¹ EAP – Environmental Assessment Practitioner

Executive Summary

Like many other towns in Namibia, the Oranjemund town is dependent on ground water resources in-order to meet the domestic water demand for the inhabitants, industrial activities and food production (irrigation). To that effect, the Oranjemund Town Council (ORTC) was issued with a water abstraction permit by the department of water affairs to abstract a maximum of **22,000 m³/day** (Water abstraction permit no: **10862**). However, the permit expired in 2018. As a result, the Town council seeks to renew the water abstraction permit from the Department of Water Affairs.

At present, the town is supplied fresh water from 10 x production boreholes (equipped with screens) and 1 x Felhmann well, which are located on the northern bank of the Orange river, upstream of the Sir Ernest Oppenheimer Bridge. Water is pumped to the central Swartkops reservoir from where it is fed by gravitation to the town reservoirs, and further distributed to the town and Namdeb Mining Area 1 Reclamation Plant

The current water demand is estimated at an average of about **14,932 m³/day** which translates to **447,960 m³/month** and **5,375,641 m³/year** (5.4 Mm³/a). The 10 x boreholes and 1 x Felhman well have a combined pumping capacity of **20,570m³/day** which translates to **7,405,200 m³/year** (7.4 Mm³/a). Meaning, the current water source (10 x borehole and 1 x Felhman well) has sufficient capacity to sustain the water current water demand of **5.4 Mm³/a** as well as the imminent water demand increase associated with the proclamation of the town and potential in-flux of people.

This implies that the granting of a water abstraction permit up to a maximum of < **7.4 Mm³/a**, is sustainable.

The Environmental Management Plan (EMP) is a tool used to mitigate potential environmental risks associated with the proposed project / activity, and provides a risk management strategy and logical framework for implementation of the proposed water abstraction activities, in order to mitigate potential environmental and social impacts identified during the EIA process.

As a result, the EMP recommends mitigation measures in order to ensure that the recommended water abstraction activities and associated activities are conducted in an environmental friendly manner, and in accordance with the provisions of the Environmental Management Act and EIA regulations.

Furthermore, the EMP outlines specific roles and responsibilities for the proponent (ORTC and sub-contractors) and non-compliance is punishable.

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1. INTRODUCTION

1.1. Water Source

Like many other towns in Namibia, the town of Oranjemund is dependent on ground water resources in-order to meet the domestic water demand for the inhabitants, industrial activities and food production (irrigation). The formation of the paleo channel over hundreds of years resulted in the formation of an alluvial aquifer where the town has installed **10 x boreholes and 1 x Felhman well** which is constructed using the Dr. Felhman technology (River Bank Filtration).

To that effect, the Oranjemund Town Council (ORTC) was issued with a water abstraction permit by the department of water affairs to abstract a maximum of **22,000 m³/day** (Water abstraction permit no: **10862**). However, the permit expired in 2018. As a result, the Town council seeks to new the water abstraction permit from the Department of Water Affairs.

1.2. Water Demand

The current water demand is estimated at an average of about **14,932 m³/day** which translates to **447,960 m³/month** and **5,375,641 m³/year** (5.4 Mm³/a). The 10 x boreholes and 1 x Felhman well have a combined pumping capacity of **20,570m³/day** which translates to **7,405,200 m³/year** (7.4 Mm³/a). Meaning, the current water source (10 x borehole and 1 x Felhman well) has sufficient capacity to sustain the water current water demand of **5.4 Mm³/a** as well as the imminent water demand increase associated with the proclamation of the town and potential in-flux of people.

1.3. Sustainable Yield

This implies that the granting of a water abstraction permit not exceeding < **7.4 Mm³/a**, is sustainable.

1.4. Project Rationale

- **Domestic water use:** Estimated population of about 10,000 inhabitants
- **Industrial:** Mining activities
- **Irrigation:** Food production

1.5. Environmental management plan (EMP) Context

This document constitutes the Environmental Management Plan (EMP) for the renewal of the water abstraction permit number: **10862** for the Oranjemund Town Council.

1.6. What is an EMP?

The Environmental Management Plan (EMP) is a tool used to mitigate potential environmental risks associated with the proposed project / activity, and provides a risk management strategy and logical framework for implementation of the proposed water abstraction activities, in order to mitigate potential environmental and social impacts identified during the EIA process, in accordance with the provisions of the Environmental Management Act (Act No.7 of 2007), EIA Regulations of 2012 and any other relevant / applicable legislation.

As a result, the EMP recommends mitigation measures in order to ensure that the recommended water abstraction activities and associated activities are conducted in an environmental friendly manner, and in accordance with the provisions of the Environmental Management Act and EIA regulations

Furthermore, the EMP outlines specific roles and responsibilities for role-players against which they can be evaluated and non-compliance is punishable.

1.7. Purpose of the EMP

The purpose of the EMP is to identify potential environmental and social impacts associated with the water abstraction activities, in-order to ensure compliance to the EMA.

The aim of the EMP is to ensure that the activities undertaken during the renewal of the water abstraction permit are conducted in accordance with the following:

- i. Environmental Management Act (No. 7 of 2007),
- ii. EIA regulations of 2012 (GN: 30), and
- iii. Best environmental practices (benchmarks)
- iv. Any other applicable legislation (*as presented in Table 3.1 to 3.3*)

The EMP provides environmental guidelines to be followed throughout the lifespan of the renewal of the water abstraction permit. The guideline comprise of the following:

- a) Environmental Aspects,
- b) Management Objective,

- c) Mitigation Measures / Actions Required,
- d) Monitoring Indicators, and
- e) Party Responsible

1.8. Objective

The objective of the EMP is to prevent / minimize (where possible), unacceptable and adverse environmental, social or economic impacts that may arise from the proposed development. Overall, the EMP aims to prevent any negative impact/s (real, potential or perceived) that may result from the proposed water abstraction activities.

1.9. EMP Scope

The EMP does not only focus, and it is not limited to the margins of the water sources, but it includes the bigger picture, and serve as the guiding tool to protecting the natural, bio-physical and socio-economic environment both in the surrounding area. The bigger picture is important because, most impacts (e.g water pollution, ecological impacts, etc) may not be confined to the margins of the renewal of the water abstraction permit sites).

1.10. Possible adjustments to the EMP

The EMP is an open-ended document and maybe considered inconclusive. In other words, the EMP should allow room for adjustments if new information becomes available at a later stage, in which new / additional mitigation measures may become necessary.

The necessity of possible adjustments to the EMP at a later stage may be attributed to:

- a) Lack of information at the time of drafting the initial EMP,
- b) Evolution or addition of new activities, or
- c) Unintended omission of potential impacts during the initial project design and development of the initial EMP.
- d) Development of industry best practice.

This implies that, in-addition to the information contained herein, any other relevant information that may surface during the construction operations, through internal monitoring or auditing by the Environmental Compliance Officers (ECOs), can be added to the EMP (evolution of activities), and such changes or inclusions will be binding to the proponent and all contractors / sub-contractors.

1.11. Implementation Framework and Accountability to the EMP

For effective implementation of the EMP, the Institutional roles are presented below. However, the specific roles and responsibilities are defined and broken down as presented in Sections 5 and 6, respectively.

Table 1-1: Role players, Institutional Framework

Role-player	Company / Institution	Role
Proponent	Oranjemund Town Council	Compliance to the EMP
Environmental Consultant	Tortoise Environmental Consultants (TEC)	Development of the EMP
Environmental Compliance Officer/s (ECO)	Ministry of Environment & Tourism (MET) – Department of Environmental Affairs (DEA)	Monitoring Compliance to EMP: <ul style="list-style-type: none"> ➤ Un-announced spot checks, ➤ Warning, penalties / fines, license suspension, etc
Public	Interested and affected parties (I&APs)	Report to the ECOs, any activity of environmental concern (e.g Pollution, safety risks, etc)

2. PROJECT INFORMATION

2.1 Project Location

The borehole and the Felhman well are located in the Paleo channel on the upstream of the northern bank of Orange River as shown in following (figure 2.1).

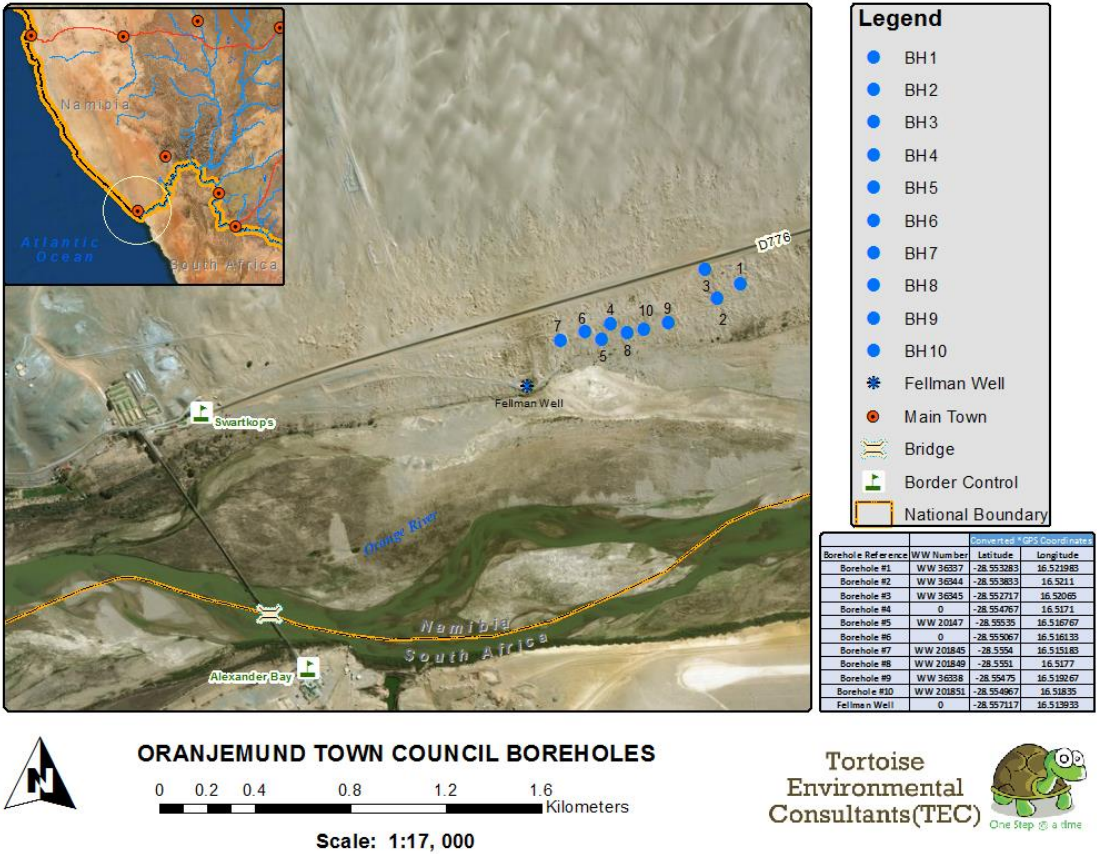





Figure 2-1: Aerial view of the 10 x borehole and 1 x felhmann well, Oranjemund

2.2 Boreholes

Borehole number	GPS Coordinates		Borehole Depth	
	Latitude	Longitude		
BH #1	S 28°33'197"	E 16°31'319"	25.90	
BH #2	S 28°33'2'30"	E 16°31'266"	21.09	
BH #3	S 28°33'163"	E 16°31'239"	33.78	
BH #4	S 28°33'285"	E 16°31'156"	32.02	
BH #5	S 28°33'298"	E 16°31'101"	27.19	

BH #6	S 28°33'30"	E 16°31'062"	29.71	
BH #7	S 28°33'286"	E 16°31'026"	34.42	
BH #8	S 28°33'321"	E 16°31'006"	28.14	
BH #9	S 28°33,324'	E 16°30,911'	37.32	
BH #10	S 28°33,324'	E 16°30,911'	37.32	
Fehlman Well +	S 28°33'427"	E 16°30'836"	17.05	

3. COMPLIANCE AND LEGAL FRAMEWORK

This chapter outlines the regulatory framework applicable to the proposed project. Table 2 provides an overview of applicable policies, plans and strategies and Table 3.1 provides a list of applicable national legislation.

3.1 Compliance to the EMP

The EMP is binding to the proponent, and all contractors / sub-contractors. This implies that each and every entity that may have any kind of engagement or involved in / with the activities of the renewal of the water abstraction permit should comply with the EMP throughout the project lifespan. Non-compliance may have serious consequences e.g withdrawal of licenses by the authorities.

3.2 Environmental Management Act (No.7 of 2007)

Section 27 of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) provides a list of activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (herein referred to as: listed activities). The proposed expansion of the hospital triggers the following listed activities.

The EMP should conform to the provisions of the Environmental Management Act (EMA), Act No. 7 of 2007 and EIA regulations of 2012 (Government Notice: 30).

The EIA Regulations defines a '*Management Plan*' as:

"...a plan that describes how activities that may have significant impacts on the environment are to be mitigated controlled and monitored."

3.3 EMP Requirements

Table 3-1: EMP Requirements as outlined in Section 8 of the EIA Regulations

Requirement
<p><i>(j) a draft management plan, which includes –</i> <i>(aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure;</i></p>

(bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and

(cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.

3.4 Listed Activities

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required.

The proposed project triggers a number of Listed Activities as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) (herein referred to as the EMA) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) (herein referred to as the EIA Regulations).

Table 3-2: Listed Activities triggered by the proposed project

Activity	Applicability
"8.1 The abstraction of ground or surface water for industrial or commercial purposes. or	The project entail the abstraction water for commercial purposes
"8.2 The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources"	The abstraction of water exceeds the threshold authorised in terms of Water Resource Management Act.

3.5 Water Resources Management Act, (Act No. 11 of 2013)

The renewal of the water abstraction permit will be submitted to the Department of Agriculture Water and Forestry in accordance with the provisions of the Water Resources Management Act, 2013 (No. 11 of 2013).

Table 3-3: Policies, Plans and Strategies

Policy / Plan	Relevance	Applicability to the Proposed Project
5th National Development Plan	Outlines the country's National Development Plans (NDPs), in line	The proposed project is a development that forms part of the bigger picture

Policy / Plan	Relevance	Applicability to the Proposed Project
(NDP) and Vision 2030	with the Harambee Prosperity Plan (HPP) and vision 2030	of achieving economic progression, social transformation and environmental sustainability. Agriculture as a pillar for social well-being, through food production, household income and improved livelihoods

Table 3.2: Other Legal Instruments / National Statutes

National Statutes	Relevance	Applicability to the Proposed Project
Environmental Assessment Policy (1995)	Promotes Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards environmental sustainability	Environmental Protection
Water Act, 1956	Provides for the control, conservation and use of water for domestic, agricultural, urban and	Prohibits water pollution and the discharge of wastewater, effluent
Water Resources Management Act, 2013 (No. 11 of 2013) Promulgated, but not gazetted	Provides a framework for managing water resources based on the principles of integrated water resource management. It provides for the management, protection, development, use and conservation of water resource	Section 44 stipulates the requirements for a licence to be held for water abstraction. Section 68 makes provisions for prevention of water pollution.
Soil Conservation, 1969 (Act 76 of 1969) and the Soil Conservation Amendment Act (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Monitor and apply the soil conservation mechanisms
Forest Act 12 of 2001 Forest Act Regulations 2015	To provide for the protection of the environment and the	Forestry permits maybe required for vegetation clearing



National Statutes	Relevance	Applicability to the Proposed Project
	control and management of forest. Relevant sections: <ul style="list-style-type: none"> - Approval required for the clearance of vegetation on more than 15 hectares (Section 23, subsection 1 (b)). - Tree species and any vegetation within 100m from a watercourse may not be removed without a permit (Section 22, subsection 1 (b)) 	
Public Health Act (Act No. 36 of 1919)	Advocates for Public Health and safety	Protective clothing
The Occupational Safety and Health Act No. 11 of 2007	Advocates for employee and public safety, health	In the working context "SAFETY" implies "free from danger"
National Heritage Act, No. 27 of 2004.	The Act provides provision of the protection and conservation of places and objects with heritage significance.	Refer to handling procedures presented in the Scoping Report

4. ROLES AND RESPONSIBILITIES

This section outlines the roles and responsibilities of the key personnel responsible for the day to day management of activities to ensure effective implementation of the EMP.

4.1 Roles and Responsibilities

Assignment of responsibilities is necessary to ensure that key procedures are followed. Ultimately, the overall responsibility for the implementation of the EMP lies with the proponent (ORTC).

To ensure accountability, it is necessary to assign responsibilities. The key role-players for project implementation are;

- a) The **Environmental Compliance Officer (ECO)** representing the Ministry of Environment, Forestry and Tourism (MET), or an appointed independent environmental officer, who is responsible for monitoring and auditing.
- b) **The Proponent: (ORTC).**
- c) **The Project Manager** the person responsible for the management of the water abstraction activities project.

4.1.1 The Environmental Compliance Officer (ECO):

The ECO refers to the party responsible for the environmental monitoring and auditing to ensure that the provisions of the EMP are complied with.

The ECO shall have adequate environmental knowledge to understand and interpret the EMP and pertaining environmental aspects associated with the project. The specific tasks of the ECO are as follows:

- To undertake all monitoring and auditing activities in-order to ensure compliance with the EMP.
- Conduct inspections and monitoring at reasonable intervals (e.g. every month, quarterly or annually), throughout the duration of the project. Depending on the risks, some projects may require regular inspections.
- Issue compliance or non-compliance orders to the proponent, contractors / sub-contractors.
- Compile compliance Reports pertaining to any non-compliance incident/s, and a Rehabilitation Report following the conclusion a specific activity.

- Liaise closely with all key stakeholders i.e. the Project Manager and the Environmental Commissioner.
- Provide guidance on any environmental management issues, incidents or emergencies that may arise throughout the project lifespan.
- Assist in providing recommendations for remedial action in the event of non-compliance.
- Auditing or monitoring activities may involve investigation, as well as structured observation, measurement, and evaluation of environmental data over a period of time.

4.1.2 The Proponent:

The proponent, hereinafter referred to as ORTC, shall assume overall responsibility to ensure implementation of the EMP and will be held accountable against the remedial measures outlined herein. It is recommended that the client should appoint a Project Manager who will be responsible for monitoring of daily operations.

The specific responsibilities of The Proponent are as follows:

- Appoint a Project Manager (M) to oversee the daily onsite activities.
- Liaise closely with the SM and ECO on any environmental management issues, incidents or emergencies.
- Ensure that all activities on and around the site are conducted in accordance with the requirements of the EMP at all times.
- Ensure that all sub-contractors and visitors to the site are conversant with the requirement of the EMP, relevant to their roles on site.
- Shall develop a **communication strategy** between The Proponent, Project Manager, workers, the ECO and any other relevant stakeholder.
- Shall develop an **organisational structure** to ensure that:
 - There are clear channels of communication;
 - There is an organisational hierarchy for effective implementation of the EMP; and
 - Conflicting or contradictory instructions are eliminated;
 - Ensure that all instructions and official communications regarding environmental matters shall follow the organisational structure as determined
 - Ensure that that EMP requirements are assigned to specific people / positions with the capacity and experience required for implementation.

4.1.3 The Project Manager:

The **Project Manager (PM)** should:

- Ensure that each team recruited to work at the sites, adheres to the EMP;
- Ensure that a **copy of the EMP is kept on site at all times and as it may be requested by authorities conducting spot checks at any time.**
- Ensure that all staff attend an induction session before commencement of any work on site and that they are adequately informed of the requirements of the EMP;
- Take special care to prevent irreversible damage to the environment.

4.2 Instructions

All instructions and official communications shall follow the organisational structure as determined by the Proponent. Based on the adopted structure, it is essential that responsibilities outlined are assigned to specific parties with adequate capacity and experience required to implement the EMP.

4.3 Disciplinary Actions

The EMP is a legally binding document. Non-compliance with the EMP may result in disciplinary action being taken against the Proponent. Such actions may take the form of;

- Financial penalties, Legal action, fines, and/or Suspension of work.

The disciplinary action shall be determined according to the nature and extend of the non-compliance, and exact penalties are to be weighed against the severity of the incident.

5. POTENTIAL IMPACTS AND MITIGATION MEASURES

5.1 Approach to mitigation measures

To enable a systematic approach to impact identification, activities have been classified into two (2) phases; Socio-Economics and Environment. Specific aspects have been identified and for each aspect, specific mitigation measures have been recommended Table 5. It is important to note that this EMP is limited to the continuous existing of water abstraction from existing borehole and future plans for increase in abstraction in response to population growth and economic activities of the ORTC.

Table 4. EMP Impact Identification Section and Associated Aspects

EMP Implementation / Potential Impact Category	Specific Aspects
A. Socio economic	Employment opportunities for Locals
	Alcohol and Drug abuse
	HIV / AIDS
B. Pollution and Waste Management	General waste categorised into: Material waste (off cuts), garden waste, concrete rubble and domestic waste
	Oil and Lubricant Spills
C. Environment	Water
	Ecology
	Rehabilitation
Cultural Heritage	Heritage resources / artefacts
Health and Safety	General safety at work place
	Ablution facilities

SECTION A: SOCIO ECONOMIC

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Responsibility
Employment opportunities from the expansion of the irrigations	Promote benefits to the local community	<ol style="list-style-type: none"> 1. Recruit locals for unskilled labour 2. Where possible, procure materials from local suppliers 	Employee structure and proportion of local employment	Proponent
Alcohol and Drug use	Prevent alcohol and drug use at the construction site	<ol style="list-style-type: none"> 1. Provide awareness on the dangers and health impacts of alcohol and drug use 2. All employees must be screen with the breathalyser to avoid intoxicated personnel on site 	Breathalyser report Monitor presence of alcohol at work place	Proponent
Working hours	Adhere to the Labour Act No. 11 of 2007	<ol style="list-style-type: none"> 1. Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations 	Verification of working hours against the labour Act	Proponent
HIV / AIDS	Provide HIV / AIDS awareness to employees	<ol style="list-style-type: none"> 1. Provide HIV / AIDS awareness at induction 2. Avail Condoms at on site 	Availability of condoms at construction site	Proponent

SECTION B: POLLUTION CONTROL AND WASTE MANAGEMENT

Environmental / Social Impact	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Oil Spills	Manage oil spills and leak from vehicles and Machinery	<ol style="list-style-type: none"> 1. There must be an immediate spill response kit on site 2. Ensure all vehicle and machinery must be well serviced and leak inspection are done. 3. Provide drip trays to stationary vehicle and machinery 4. The onsite re-fuelling area must be on concrete bund 5. Storage of fuel, oil and lubricants must be kept on bunded structure 6. If an oil spill occurs, collect the contaminated soil, store in drums and dispose at appropriate waste disposal site (e.g. ORTC disposal site) 	Physical verification and routine monitoring	Proponent
Solid Waste	<p>To manage solid waste,</p> <p>To prevent littering, pollution, contamination of water and general environmental health hazards</p>	<ol style="list-style-type: none"> 1. All waste produced on site should be contained and disposed as required by law. 2. There must be sufficient temporally ablution facility at the site for designated for males and female. 	Scattered waste, Littering and any other unsightly waste at the site (eyesore)	Proponent

SECTION C: ENVIRONMENT

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Surface Water	To avoid any potential water contamination or pollution	1. Refer to the adequate handling of oil and fuel above	Oil and grease trace in surface water	Proponent
Ground Water	To avoid contamination of underground water	1. Refer to the adequate handling of oil and fuel above	Oil and grease trace in ground water	Proponent
Water abstraction	To conserve the aquifer	1. Do not abstract more than the approved allocation as indicated in the permit 2. Install automatic measuring gauge to monitor abstraction 3. Carry out periodic pumping yield to assess aquifer sustainability	Abstraction reports	Proponent
Ecology	Rangeland Management	1. Adhere to the National Part Management Plan. 2. Create a tree database for monitoring 3. Monitor borehole yields in proximity	Inspection report	Proponent
Rehabilitation	To ensure that all disturbed areas are rehabilitated	1. All areas disturbed as a result of the borehole drilling activities should be cleaned up and rehabilitated	Physical verification	Proponent

SECTION D. HERITAGE AND ARCHAEOLOGY

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Heritage Resources / artefacts	Reduce the impacts borehole drilling and associated earthworks on heritage resources / artefacts	<ol style="list-style-type: none"> Heritage remains or artefacts discovered on site must be reported to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC) Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum 	Sighting report/s of heritage resources / artefacts	Project Manager

SECTION E. HEALTH AND SAFETY

Environment Impact	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
General Safety at Work Place	Ensure that the safety of workers is not compromised and adhere to the Health and Safety Regulations, Government Notice 156/1997 (GG 1617)	<ol style="list-style-type: none"> 1. Develop a Health and safety Plan (should be part of the induction) 2. Train staff/employees on personnel safety and how to handle equipment and machinery 3. Provide protective gear (helmets, safety straps, hand gloves etc.) 4. Train and Provide first aid kits 5. Only qualified personnel must be allowed to operate special machine/instruments 6. No employee must be allowed to be onsite without PPE; 7. Adequate safety signs must be displayed on site. 	<p>Health and Safety included and reflected in the Induction Minutes</p> <p>adequate protective gear for all staff</p> <p>Availability of the first aid kit onsite</p>	Project Manager
Ablution	Reduce health risks and environmental pollution	<ol style="list-style-type: none"> 1. Ensure adequate, hygienic (clean) and user friendly ablution facilities for all staff. 2. Provision of separate Male and female toilets 3. Inspect ablution facilities regularly 	<p>availability, cleanliness and hygienic ablution facilities</p> <p>Incidents or complaints of waste discharge into the environment</p>	Project Manager
Dust and Noise	Mitigate dust and noise impacts to both employees and the public	<ol style="list-style-type: none"> 1. Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment. 	<p>Incident Report</p> <p>Public Complains</p>	Project Manager

6. CONCLUSION

Oranjemund Town Council intent to renew the water abstraction permit within the recommended sustainable yield of up to **7.4 Mm³/a**. The renewal is vital as it is the only water source for the town of Oranjemund. The water will be used for

- a) Domestic water requirements for the about 11,000 inhabitants,
- b) Industries (mining and others), and
- c) Irrigation (food production)

However, the project must be cognisant of sustainable development, especially for the conservation the aquifer to ensure its sustainability. Water in Namibia is a scarce resource that requires optimal use. The following conclusion were made;

1. The water abstraction has been constant over the years, with raise in the level of the Felhmann well. This is an indication that the abstraction rate is Not harming the safe yield of the aquifer.
2. For the continuous water abstraction from the aquifer, the ORTC should work together with the Ministry of Agriculture Water and Land Reform (MAWLR), determine the following aquifer values:
 - a. **Average transmissivity value**
 - b. **Storativity**
 - c. **The aquifer through flow and**
 - d. **The annual safe yield**

The aim of the EMP is to ensure legal compliance to prevent environmental fatal flaws. Non-compliance against the EMP is punishable and specific responsibilities has been assigned to role players in-order to ensure that the EMP is implemented. The key role-players are defined under section 4 should:

- **Read** the EMP (particularly the Project Manager) and ensure that they are fully conversant with provisions of the EMP,
- If need be, **Ask for clarity** from the Environmental Assessment Practitioner (EAP), Environmental Compliance Officer (ECO) or relevant authority,
- Ensure implementation of the recommended mitigation measures, and
- Communicate defaults / challenges to the ECO as soon as possible.

The ECO should monitor (conduct periodic and unannounced EMP audits) in-order to ensure compliance against the recommended mitigation measures.

7. RECOMMENDATIONS

- a) The proposed renewal of water abstraction up to a maximum of **7.4 Mm³/a** is **within the recommended sustainable yield and will not harm the aquifer**;
- b) The proponent should conduct a geophysical investigation in order to site and drill additional production and monitoring boreholes.
- c) ORTC and MAWLR must collaborate to establish proper monitoring mechanism that will lead to the suitability of the aquifer
- d) As prescribed by the Water Resources Management Act 11 of 2013, Drilling of monitoring boreholes will be required to monitor the groundwater table on daily basis. Production boreholes if installed correctly can also be used as monitoring boreholes on weekly basis provided that the pump is switched off 12hours before recording. Monitoring frequency should be done on daily basis, monitoring design and layout should be provided to MAWF;
- e) Based on the water abstraction data analysis and recommendations contained herein, it is recommended that an Environmental Clearance Certificate (ECC) be issued for the renewal of the water abstraction permit for up to a maximum of **7.4 Mm³/a**.

8. REFERENCES

- BGR-DWAF. (2006). Desk Study Report, Cuvelai-Etosha Groundwater Investigation, Version 1.1. Windhoek, Namibia
- BGR-DWAF. (2010). Multi-Layered Aquifers in the Central-North of Namibia and their Potential Use for Water Supply. Windhoek, Namibia
- Bräumle R. (2005). The Geology and Hydrogeology of the Cuvelai Etosha Basin. Windhoek, Namibia
- Christelis G. and Struckmeier W. (2015). Groundwater in Namibia, an explanation to the Hydrogeological Map. Windhoek, Namibia
- MAWRD. (2003). Groundwater Situation in the Cuvelai-Etosha Basin. Ministry of Agriculture, Water and Rural Development. Windhoek, Namibia
- Tordif E. (2009). Notes on Hydrogeology Training for Ministry of Agriculture, Water and Forestry, Department of Water Affairs and Forestry. Windhoek, Namibia