

**APP-001350**  
**PROPOSED CONSTRUCTION AND OPERATION OF THE**  
**WLOTZKASBAKEN WATER SUPPLY INFRASTRUCTURE,**  
**ERONGO REGION**

**ENVIRONMENTAL ASSESSMENT SCOPING REPORT**



**Assessed by:**

**Assessed for:**



**Erongo Regional Council**

June 2023

<b>Project:</b>	<b>PROPOSED CONSTRUCTION AND OPERATION OF THE WLOTZKASBAKEN WATER SUPPLY INFRASTRUCTURE, ERONGO REGION: ENVIRONMENTAL ASSESSMENT SCOPING REPORT</b>	
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## **1 OBJECTIVE OF THE EMP**

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Erongo Regional Council requested Geo Pollution Technologies (Pty) Ltd to undertake an environmental assessment for their proposed construction and operations of the Wlotzkasbaken water supply infrastructure. The project entails the construction and operation of a bulk water supply reservoir, supply water pipeline and water distribution system within the Wlotzkasbaken Township, Erongo Region. The project is divided into three main components namely establishment of the water supply reservoir, supply water pipeline and water distribution system.

The EMP is based on the environmental impact assessment conducted for the proposed construction and operations in 2023 (Bosman et al., 2023). The EMP provides management options to ensure impacts of the proposed project activities 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 EMP acts as a stand-alone document, which can be used during the various phases (planning, construction, operational and decommissioning) of any proposed activity or development.

All contractors and sub-contractors taking part in construction and operational activities related to the project, should be made aware of the relevant sections of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of the various activities;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with both construction and operational activities;
- ◆ to monitor and audit the performance of the construction and operational personnel in applying such controls; and

to ensure that appropriate environmental training is provided to responsible personnel and contractors.

## **2 ASSESSMENT AND MANAGEMENT OF IMPACTS**

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The sections below outline the management of the environmental elements that may be affected by the activities associated with the various phases of the operation. These phases are as follows:

- ◆ Planning Phase
- ◆ Construction Phase (including maintenance and upgrades)
- ◆ Operational Phase
- ◆ Decommissioning Phase

The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on where appropriate. Delegation of mitigation measures and reporting activities should be determined by the Proponent and included in the EMP. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the environmental clearance certificate (ECC) and must be submitted to the Ministry of Environment, Forestry and Tourism. Renewal of ECC will require bi-annual reports based on the monitoring prescribed in this EMP.

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

### **2.1.1 Planning**

During the phases of planning for construction, operations and decommissioning of the proposed project, 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 project are in place and remains valid. This includes fuel permits where needed.
- ◆ Ensure that design parameters, where required, is approved by relevant authorities prior to construction.
- ◆ 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. Provision should be made for monthly environmental performance audits and reports.
- ◆ 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, if required. This is a requirement by MEFT.
- ◆ Appoint a specialist environmental consultant to update the EA and EMP and apply for renewal of the environmental clearance certificate prior to expiry, if required.

### 2.1.2 Ideals and Aspiration: Community Beliefs and Aspirations

Information about the project may bring about a change in cultural perceptions of institutional servicing of the settlement area. Although the project objectives are to provide access to potable, piped water (accommodating the increase in demand and reliability of service), the perception of having a installed service may change the nature of the settlement. The perception is strongly cumulative in nature and experienced by the majority of the community. This could have been compounded by the planned, additional township development as proposed by the Proponent. Expected change and perceptions of the project may affect the aspirations of property owners. Access to piped water may be considered as a benefit at the perceived cost of tradition. The service may further affect the aspirations of those considering additional development and or expansion. For a portion of the community, the impact will be considered in a negative light. This is mainly due to the perceived quality of completed project components (as per concerns received). A larger segment of the community considers access to piped water in a positive light. Such perception is strongly based on the successful implementation of the project. With overall consideration to all contacted community parties, the impact is described in a positive light.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Information sharing about proposed expansion and related possible environmental constraints	2	2	2	2	3	28	3	Probable
Daily Operations	Information sharing related to maintenance schedule and repairs	2	1	2	2	2	12	2	Probable

**Desired Outcome:** Continued sharing of activity plans with IAPs and governing agencies. Maintaining an open door policy with neighbours/home owners' association and employees.

#### Actions

##### **Mitigation:**

- ◆ Information sharing about the project's progress should be made available to governmental agencies (such as NamWater), interested and affected parties and the home owners' association. The Proponent and affected parties should use the information generated during the environmental assessment to realistically plan for future growth and optimisation of the distribution system. Open communication regarding future development should be maintained.
- ◆ Project details related to the number of construction teams, proposed construction camp sites and related security details must be shared with the local home owners' association.
- ◆ Employees to be informed about parameters and requirements for references upon employment.
- ◆ The Proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.
- ◆ A community liaison officer should be appointed during the construction phase especially to facilitate community grievances and concerns.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Records kept of all information shared with authorities, neighbours and employees

### 2.1.3 Revenue Generation and Employment

The construction phase will require a large workforce which will be contracted by the Proponent. Semiskilled and unskilled labour will make up the largest segment of the labour force. Such labour may easily be sourced from the nearby urban centres. Through the remuneration of professional services as well as the general labour force, revenue streams related to the construction industry will be boosted. The short duration of the project will however negate economic resilience aspects. Employment will not be permanent and no significant employment opportunities will be created during the operational phase.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Employment and contribution to local economy	2	2	2	2	2	24	3	Definite
Daily Operations	Employment contribution to local economy	1	1	1	1	1	3	1	Definite

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

#### **Actions**

##### **Mitigation:**

- ◆ The Proponent must employ local Namibians and contractors 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:**

- ◆ Summary report based on employee records.

### 2.1.4 Demographic Profile and Community Health

The project is reliant on labour during the construction and operational phase. An increase in foreign people in the area (foreign labourers and, potential job seekers) may potentially increase the risk of criminal and socially/culturally deviant behaviour. Differences in ethical and acceptable behaviour may foster feelings of rejection, mistrust and negatively affect the community health. The duration of the project is however limited and it is not foreseen to create a change in the demographic profile of the local community, especially since only the security component of the project team will remain on site during the evenings. Furthermore, the community only has a handful of permanent residents while the majority of dwellings are occupied periodically during the year. Therefore risks to the demographic profile and community health is further reduced.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	In-migration of labour force and socially or culturally deviance	2	-1	1	1	2	-8	-1	Probable
Indirect Impacts	The spread of disease	2	-1	2	2	2	-12	-2	Probable

**Desired Outcome:** To prevent the spread of communicable disease and prevent / discourage criminal and or socially deviant and destructive behaviour.

#### **Actions:**

##### **Prevention:**

- ◆ Employ only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Consultations with and involvement of local communities in project planning and implementation.
- ◆ Mandatory and regular training for workers on required lawful conduct and legal consequences for failure to comply with laws.
- ◆ Adhere to all municipal by-laws relating to environmental health.
- ◆ All provisions of the Labour Act must be adhered to.
- ◆ Construction teams and related workforce to be easily identifiable and distinguishable.
- ◆ All employees to carry company identification tags and a list of employees to be available at the site office.
- ◆ Sufficient provisions to be made available by the contracting teams for labourers in terms of lunch, tea and bathroom breaks.
- ◆ Educational programmes for employees on HIV/AIDS and general upliftment of employees' social status.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Project inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Summary report based on educational programmes and training conducted.
- ◆ Employment records kept on file.



### 2.1.5 Access to Piped Water

The project is in line with the objectives of Namibia's NDP5 and related implementation plans and strategies. It contributes to the economy and development of Namibia. Providing access to piped water increases the development index of Namibia as the project increases the number of people who have access to potable, piped water. The project further affords home owners the ease and surety of water supply, especially during times of greater demand.

Project Activity/Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Operation	Contribution to economy, contribution to access to piped water in Namibia	1	3	3	3	2	24	3	Definite
Indirect Impact	Ease of access to potable water and surety of supply	2	2	3	3	2	20	3	Definite

**Desired Outcome:** Provision of potable, piped water to all even in Wlotzkasbaken inclusive of possible future development areas.

**Actions:**

**Enhancement:**

- ◆ Compile a maintenance register and share with the home owners' association to ensure continued maintenance is conducted on all aspects of the pipeline.
- ◆ Provide an open channel for communication for the reporting of leaks, irregularities and repairs required.

**Responsible Body:**

- ◆ Proponent

**Data Sources and Monitoring:**

- ◆ Records kept of project construction, completion and operation (billing etc).
- ◆ Maintenance register to be kept

### 2.1.6 Traffic

The construction phase may increase traffic flow to the site. An increase in traffic to and from the site may increase the risk of incidents and accidents and road degradation (movement of construction vehicles and equipment). Construction activities may require sections of internal roads to be closed off during the laying of the distribution lines. Laying of any pipes across the roads will require rehabilitation of excavated road surfaces.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Laying of distribution lines. Delivery of equipment and building supplies	2	-1	2	2	2	-12	-2	Definite
Indirect Impact	Dust and increased collision risk. Road degradation	2	-1	2	2	2	-12	-2	Definite

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

#### **Actions**

##### **Prevention:**

- ◆ Erect clear signage where relevant, regarding parking and access and exit points around construction sites and at the construction camps.
- ◆ Preparation and implementation of a traffic management plan to be approved by supervision engineer. Plan to include community communication plan of roads to be crossed (excavated) for the laying of the pipeline, communication with regards to project progress and when property access may be affected.
- ◆ Road safety training to be provided to all staff.
- ◆ Clear communication from the project team should include timing of construction and progress reports to indicate if and when construction activities will cause temporary closure of any section of road.

##### **Mitigation:**

- ◆ Construction vehicles delivering material should not be allowed to obstruct any traffic or entrances / exists of erven without prior arrangement and proper signage where such measures apply.
- ◆ If any traffic impacts are expected, traffic management should be performed to prevent these.
- ◆ Measures should be in pace to avoid or repair damage to road surfaces during the construction phase, especially during wet conditions.

##### **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.

### 2.1.7 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. Some activities, especially associated with the operation of heavy equipment, machines and heavy motor vehicles and or hazardous chemicals, poses the main risks to employees. In addition to these expected risks, severe climatic characteristics of the area (e.g. east wind conditions) may contribute to conditions such as sunstroke, fatigue, dehydration and related symptoms. Security breaches are another concern which relates to the properties established within the settlement as well as the construction camps themselves. A construction workforce presents the opportunity of ill-intending persons to pose as project team members for nefarious and criminal reasons. Constructions sites are often targeted by criminal element and the site will therefore increase the risk of crime within the local area. Theft or damage of construction materials and properties is an important local risk.

Safety risks may further be encountered should any part of the project fail. Un-rehabilitated heaps or poorly constructed road crossings (trenches for the pipeline) present traffic risks while failing pipeline and related infrastructure may result in leaks and or localised flooding.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Physical injuries, exposure to chemicals and criminal activities	1	-2	3	3	2	-16	-2	Probable
Daily Operations	Physical injuries or damage to property	1	-2	3	3	2	-16	-2	Probable

**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).
- ◆ 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 a maintenance register for all equipment and hazardous substance storage areas.
- ◆ During operations, allow for security guards and measures and restrict loiterers from entering the site. Consideration should be awarded to the existing security within the settlement and the possible expansion of such security as opposed to new security being introduced. This should be discussed with the home owners' association.

##### **Mitigation:**

- ◆ Selected personnel should be trained in first aid and a first aid kit must be available on site. 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.).

**Responsible Body:**

- ◆ Proponent
- ◆ Contractors

**Data Sources and Monitoring:**

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

### 2.1.8 Fire

Construction activities may increase the risk of the occurrence of fires. Fires outside of designated areas, especially near structures and residences, may increase the risk of the occurrence of uncontrolled fires as most of the houses are wooden. Chemicals and fuels stored and used for general construction activities may be flammable. Improper waste burning or discarding of cigarette buds around waste areas, or in the vicinity of hazardous chemicals, further increases fire risks. The site is located in a sparsely developed area with no fire brigade or related trained persons, which will increase the difficulty of fighting fires. Although a fire is improbable due to the lack of vegetation, the risk remains and in such a case the impact will be significant.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Fire and explosion risk	1	-2	2	2	1	-10	-2	Improbable
Daily Operations	Fire and explosion risk	1	-2	2	2	1	-10	-2	Improbable

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

#### **Actions:**

##### **Prevention:**

- ◆ Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans from the site and signage, an emergency response plan and a firefighting plan.
- ◆ Clear instructions on the implementation of the emergency response plan and firefighting plan should be made available. For example, in case of fire there should be a person available to communicate the emergency to emergency response teams, as well as to the home owners association (possible residents on site). Therefore a working mobile phone should be available at all times etc.
- ◆ Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- ◆ Ensure all flammable chemicals and fuels are stored according to material safety data sheet (MSDS) and SANS instructions and all spills or leaks are cleaned up immediately.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Maintain firefighting equipment and promote good housekeeping.
- ◆ No fires should be allowed on site an extra vigilance should be afforded during cold days.
- ◆ Any LPG gas cylinders should be stored in an enclosed, secure area and serviced regularly with fire extinguishers readily available.
- ◆ The Proponent should liaise with the local Fire Brigade to ensure that all fire requirements are met and that contractors adhere to all requirements related to fuel storage and handling.

##### **Mitigation:**

- ◆ Implement the fire protection and firefighting plan in the event of a fire.
- ◆ Quick response time by trained staff will limit the spread and impact of fire.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A register of all incidents must be maintained. 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.
- ◆ Record when fire drills were conducted and when firefighting equipment were tested and training given.

### 2.1.9 Dust

Particulate matter is a known health concern related to air quality. Specific parameters were developed by the World Health Organisation (WHO) relating to the allowable limits of particulate matter in ambient air. Construction activities will require the digging of a trench into the soil next to residences. The scale of the proposed operations are so limited that it is not foreseen that dust will have a significant health impact on any resident. Dust may, at most, be a nuisance factor for residents, considering cumulative aspects and the windy climate of the area. Any possible impact which may emanate from the project will be on a local scale. Human labour will be used during the construction phase and limited vehicle use will be required for the transportation of materials and equipment. It is not foreseen that the greenhouse gas emissions (GHG) from such activities will have a significant impact on the community health.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive dust generated from construction activities, exposure to airborne particulates	1	-1	2	2	1	-5	-1	Definite

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

#### Actions

##### **Mitigation:**

- ◆ Personnel issued with appropriate masks where excessive dust are present.
- ◆ Mitigation measures should be in place, such as dust suppression where excessive dust generation is expected.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary.
- ◆ Notice to be given to nearby receptors prior to activities generating excessive dust which cannot be mitigated, if any.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

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

### 2.1.10 Noise and Vibration

Construction noise, which may constitute high volume and repetitive noises, are known to impact human health. Excessive noise may result in nuisance to nearby receptors and possible hearing loss in staff. Noise standards have been developed by the WHO to protect communities against the health impacts and nuisances of noise. The project will have a short construction period which will ensure very short periods of noise to be experienced by residents. Mechanical excavations will increase the intensity of the construction noise generated. The impact is not considered to be of significance due to the temporary nature and short duration planned for the construction phase.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive noise and vibrations generated from construction activities – nuisance and hearing loss	2	-2	2	2	1	-20	-3	Probable
Indirect Impact	Cumulative noise	2	-1	2	2	2	-12	-2	Probable

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

#### Actions

##### **Prevention:**

- ◆ Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment and not to cause a nuisance.
- ◆ Allow for a community grievance mechanism.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.
- ◆ Notification to residents (through a community liaison officer) of construction commencement.
- ◆ To reduce vibration levels, it is recommended that all machinery and vehicles be maintained in a good condition and that a maintenance record be kept.
- ◆ Any machinery and vehicles that cause excessive vibrations (indicative of possible malfunction) should be given defect notices and taken off site immediately. Machinery and/or vehicles may only be used again on site once they have been serviced and approval has been granted by the site supervisor.
- ◆ Unnecessary vibrations can be minimised by ensuring that no machinery or vehicles are left idling when not in use.
- ◆ The appropriate and correct placement of specific work activities can ensure the reduction of handling of machinery that cause heavy vibrations.
- ◆ Ensure personnel running the equipment are trained accordingly so that machinery is used properly.
- ◆ Pre assessment to allow for mitigation measures for any elevated levels of vibrations should take place if there is any suspicion that there may be excessive vibration levels on site during construction. These mitigation measures should then be in accordance with local regulations and standards.
- ◆ Should any blasting be conducted, a related survey of all properties will have to be conducted and an amendment to the environmental assessment and related environmental management plan will have to be submitted to MEFT.

##### **Mitigation:**

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



- ◆ An assessment of the vibrations from within premises where complaints are recorded can help determine better mitigation measures.

**Responsible Body:**

- ◆ Proponent
- ◆ Contractors

**Data Sources and Monitoring:**

- ◆ WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Report on complaints and actions taken to address complaints and prevent future occurrences.

### 2.1.11 Waste production

Various waste streams result from the construction and maintenance activities. Waste may include hazardous waste associated with hydrocarbon products and chemicals, as well as soil and water contaminated with such products. Construction/maintenance waste may include building rubble and discarded material and equipment. Domestic and general waste will be generated by employees. Waste presents a contamination risk and when not removed regularly may become a health and/or fire hazard and attract wild animals and scavengers. Sewage is a form of liquid biological waste that needs disposal. During the construction of the reservoir and supply water pipeline, construction waste was left on site and documented by the project team. Disregard for proper waste management has afforded the construction phase of the project ill-repute and additional waste management measures must be imposed on all contractors during the construction phase of the distribution lines.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Construction waste production, littering, illegal dumping, contaminated materials	2	-2	2	2	2	-24	-3	Probable

**Desired Outcome:** To reduce the amount of waste produced, and prevent pollution and littering as well as safety risks associated with the unremoved waste.

#### Actions

##### **Prevention:**

- ◆ Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- ◆ Ensure adequate temporary waste storage facilities are available.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of waste.
- ◆ All regulations and by-laws relating to environmental health should be adhered to.
- ◆ All construction waste produced must be removed on a weekly basis and record kept of all waste removed from site.
- ◆ Each contractor should clearly indicate their area of operations and be held accountable for all domestic and construction related waste within the area and related construction camp.
- ◆ Weekly site inspections should be conducted by a representative of the Proponent or an appointee of the Proponent to ensure that proper waste management, security and implementation of the EMP is adhered to.
- ◆ An independent waste and EMP management audit should be conducted on a monthly basis for the duration of the construction phase.
- ◆ Waste management performance should be linked to the completion of construction milestones.
- ◆ All contractors should submit a waste management and rehabilitation plan as part of tender provisions.
- ◆ Ensure all ablution facilities (chemical toilets) are properly constructed and serviced and that the contents is disposed of at the nearest, registered effluent treatment plant.

##### **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).

- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the regional council regarding waste and handling of hazardous waste.
- ◆ Empty chemical containers that may present a contamination/health risk must be treated as hazardous waste. Workers should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.
- ◆ Report all fuel spills greater than 200l litres to the Ministry of Mines and Energy and enact emergency response plans for fuel spills.

**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/project.
- ◆ Waste management plan, weekly and monthly audit reports kept on site.
- ◆ Operational and maintenance record of all chemical toilets kept on site.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

### 2.1.12 Ecosystem and Biodiversity Impact

Construction related activities present the greatest risk to biodiversity within the area. Destruction and or disturbance of sensitive areas, such as the hummock dunes (some of which are located in undeveloped areas), will impact the localised ecosystems, especially during the trenching activities for the distribution lines. Impacts may further extend to human-wildlife conflict such as chance encounters with scorpions and or spiders. The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish exists. Completed project components such as the supply water pipeline has seen the establishment of vegetation around some infrastructure features. Disturbed soil is typically favourable for the establishment of weeds and invader species. However, no significant impact on the biodiversity of the area is predicted due to the operational phase. Poaching and illegal collection of plant and animal materials may occur. No employee should be allowed to catch animals or collect plant materials (such as seaweed).

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Impact on fauna and flora. Loss of biodiversity	1	-1	3	2	2	-7	-1	Improbable
Daily Operations	Change in localised ecosystems	1	-1	3	2	2	-7	-1	Improbable

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

#### **Actions.**

##### **Prevention:**

- ◆ Clearly demarcate sensitive habitat areas (such as the hummock dunes) prior to construction. Clearly indicate no-go areas.
- ◆ Educate all contracted and related employees on the value of biodiversity and strict conditions prohibiting harvesting and poaching of fauna and flora must be part of employment contracts. Include prohibitions or regulations on the collection of seaweed, beach wood, etc.
- ◆ Report any extraordinary animal sightings to MEFT or the Ministry of Fisheries and Marine Resources (such as beached whales etc).
- ◆ 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.
- ◆ Direct all lights down to working surfaces and use minimal lighting at night at the construction camps.

##### **Mitigation:**

- ◆ Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

#### **Responsible Body:**

- ◆ Proponent

#### **Data Sources and Monitoring:**

- ◆ All information and reporting to be included in a bi-annual report.
- ◆ Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.
- ◆ Photographic documentation of the hummock dunes and vegetation growth of various points as identified for the integrated monitoring plan.

### 2.1.13 Groundwater, Surface Water and Soil Contamination

Contamination risks are mostly related to the construction phase. Sources of contamination can be spills and leaks from construction vehicles, chemicals used during construction such as paints and sewage. Shallow groundwater may lead to rapid dispersion of pollutants, and may potentially negatively impact surrounding underground utilities of infrastructure. Changes in the soil structure due to site excavation, clearance and especially ground breaking may lead to trenches along which contamination may travel. Possible damage to existing french drains or septic tanks may further lead to contamination.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Contamination from hazardous material spillages and hydrocarbon leakages	2	-1	2	2	1	-10	-2	Probable

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

#### Actions

##### **Prevention:**

- ◆ Proper training of operators of construction machinery and vehicles and employees must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- ◆ Spill control measures, such as drip trays, should be in place where refuelling of construction machinery is required on the site.
- ◆ All construction machines should be maintained to be in a good working condition during operations.
- ◆ Employ drip trays and spill kits when servicing / repairs of equipment is needed.
- ◆ Where relevant, determine locations of any underground structures per erven to prevent damage to underground utilities which may lead to contamination.
- ◆ Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing.
- ◆ No dumping of rocks and removed soil in environmentally sensitive areas. Where possible it can be used to fill erosion ditches or old quarries, if any are present.

##### **Mitigation:**

- ◆ Any spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS.
- ◆ Any spill must be cleaned up immediately.

##### **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 Ministry of Mines and Energy

### 2.1.14 Visual Impact

Construction activities will be in stark contrast to the existing settlement character. However the impact will be of short duration. Furthermore, a most of the home owners are not permanent residents in the settlement and therefore is not exposed to the construction activities. The site should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing. Operations are not foreseen to change the landscape character, although the implementation of the piped water supply system will negate the use of the traditional water towers, which may, in time be removed or not included in new properties. Therefore the project might indirectly contribute to a change in the landscape character in the long term by choice of the community.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Aesthetic appearance and integrity of the construction sites	1	-1	2	2	2	-6	-1	Probable
Indirect Impact	Change in settlement and landscape character	3	1	2	2	2	18	2	Definite

**Desired Outcome:** To minimise aesthetic impacts associated with the establishment.

#### 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.
- ◆ All contractors camps to be clearly demarcated, fenced off and kept neat.
- ◆ Active construction areas to be clearly indicated, demarcated and kept neat.
- ◆ Construction to be approached in a systematic manner to ensure uniform and methodical completion of construction areas.
- ◆ Construction planning to be shared with home owners' association.
- ◆ All construction workers to be clearly visible with unique clothing.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

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

## **2.2 IMPACT SUMMARY**

The most significant negative impacts related to the project refers to the construction phase and required activities. Noise, security and possible disturbance and destruction of sensitive habitats rank as some of the most significant negative impacts. Of major concern is waste management and rehabilitation of construction sites.

Some positive aspects are of short duration during the construction phase and are associated mainly with employment and revenue generation. The greatest benefit of the project remains the access to piped water. The access to potable, piped water during the operational phase is the major project driver as well as positive aspect.

## **2.3 DECOMMISSIONING AND REHABILITATION**

Decommissioning of the water reticulation infrastructure is not foreseen during the validity of the environmental clearance certificate. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including underground infrastructure. 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 WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste project and not dumped in the surrounding areas. Future provision of piped water, if any, should be assessed prior to decommissioning and rehabilitation initiated. The EMP for the project will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

## **3 CONCLUSION**

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The above EMP, if properly implemented will help to continually minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The EMP should continue to be used as an on-site reference document during all phases of the project, and auditing should take place in order to determine compliance with the EMP for the proposed site. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism every six months (bi-annually) to allow for the future renewal of the ECC

## **4 REFERENCES**

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Bosman Q, Faul A, Strauss J. 2023 June; Proposed Construction and Operation of the Wlotzkasbaken Water Supply Infrastructure, Erongo Region: Environmental Assessment Scoping Report