

ENVIRONMENTAL MANAGEMENT PLAN FOR THE CONSTRUCTION AND OPERATION OF A NEW SEWAGE PUMP STATION AND RISING MAIN IN KUISEBMOND, WALVIS BAY



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ACRONYMS AND ABBREVIATIONS

Acronyms / Abbreviations

Definition

BID	Background Information Document
DEA	Department of Environmental Affairs
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
IAP	Interested and Affected Party
HSEQ	Health, Safety, Environment and Quality
IBA	Important Bird Areas
Km	Kilometer
m	Metre
WHO	World Health Organisation
PPE	Personal Protective Equipment
EMS	Environmental Management System
MEFT	Ministry of Environment, Forestry and Tourism
MWB	Municipality of Walvis Bay
OCE	Om’kumoh Consulting Engineers

1 ENVIRONMENTAL MANAGEMENT PLAN

1.1 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The Municipality of Walvis Bay requires an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) for the proposed new sewage pump station and rising main in Kuisebmond (hereafter referred to as The Development). The EMP provides management options to ensure impacts of the proposed construction activities and normal operations 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 taking part in the construction of this facility should be made aware of the contents 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 the construction and operations of The Development;
- 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 construction and operational personnel.

The Proponent could implement an environmental management system like ISO 14001. At the heart of an Environmental Management System (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.

1.2. THE EMP

1.2.1 Land Use, Planning, Design, Construction and Operations – Identified Impacts and Mitigation Measures

The following is the summary of the identified impacts and mitigation measures:

- The current zoning designates the area as suitable for the construction and operations of the new sewage pump station in Kuisebmond.
- The planned construction is in line with the Environmental Management Act of Namibia of 2007 that came into force on 6 February 2012 and requires The Applicant to apply for an Environmental Clearance Certificate with an EIA and EMP.
- The Planned construction is in line with the Municipality of Walvis Bay design plans
- The most significant risks identified were impacts to air quality and odour control; noise production; handling and disposal of underground water during the dewatering process; groundwater and soil contamination, increased traffic; and corrosion.
- Monitoring of the impacts should be conducted by Municipality of Walvis Bay in in collaboration with and with the support of other partners, as applicable.

1.2.2 Responsibilities and Implementation of the EMP

- The appointment of a reputable contractor for the construction of the sewage pump station will ensure that construction is carried out to industry specifications and that the best work practices are followed.
- Municipality of Walvis Bay has overall responsibility for environmental management during both the construction and operations/maintenance phases of the proposed new sewage pump station in Kuisebmond.
- Municipality of Walvis Bay's Environmental Department will be responsible for assisting Management to ensure that the commitments as set out in this EMP are implemented during the design, construction and operations/maintenance phases. The Environmental Department is responsible for ensuring that the contractors involved with the proposed project comply with the EMP and will conduct regular inspections.
- The Contractor Managers will be contractually required to comply with the various commitments in this EMP. The contractors will be formally audited on the implementation of the in order to determine compliance with EMP.

The EMP gives the environmental commitments, which will be implemented by the Municipality of Walvis Bay and their Contractors. Table 11.1 to Table 11.3 outline the management of the environmental elements that may be affected by the different activities, grouped in each phase of the development. These groups are as follows:

- Planning Phase

- Construction Phase
- Operational Phase
- Decommissioning Phase

Contents of these tables should be incorporated into a HSEQ Management System.

Table 1.1 Planning Phase

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the operations of the facility in Namibia.	Ensure that all the necessary permits from the various ministries, local authorities and any other bodies that govern the operations are available.	During Planning phase.	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	<p>Appoint a contractor and employees and enter into an agreement which includes the EMP.</p> <p>Ensure that the contents of the EMP are understood by the contractor, subcontractors, employees and all personnel who will be present on site.</p>	During operations.	Contracts on file.	Proponent, Contractor
Management	Establish a management system to implement and monitor Health, Safety and Environment.	<p>Have the following emergency plans, equipment and personnel in place to deal with all emergencies: Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE Manuals</p> <p>Adequate protection and indemnity insurance cover for incidents;</p> <p>Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergencies.</p>	During Planning phase.	<p>Documentation on file Personal Protection Equipment (PPE) on site.</p> <p>Document the operational procedures.</p> <p>Signage related to restricted areas, dangerous areas, and PPE requirements on site.</p> <p>Emergency response material on site.</p>	Proponent
Restoration Fund/Insurance	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the site should operational activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.	During Planning phase.	Insurance or warranty statement of restoration fund/insurance	Proponent
Reporting	To establish a reporting	Establish a reporting system to report	Throughout all phases	Monitoring Reports.	Proponent;

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
	system to report on monitoring aspects of construction, operation and decommissioning as outlined in the EMP	on aspects of construction, operation and decommissioning as outlined in the EMP. Keep monitoring reports on file for submission with Environmental Clearance Certificate renewal applications where needed.			Contractor
Environmental Clearance Renewal	To renew the Environmental Clearance Certificate every three years	Appoint a specialist environmental consultant to update the EMP and apply for renewal of the Environmental Clearance Certificate.	Prior to expiry of Environmental Clearance Certificate	Renewed Environmental Clearance Certificate	Proponent; Independent Specialist Consultant

Table 1.2 Construction Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Ecological Impact	<p>The footprint of the new sewage pump station and rising main in Kuisebmond is relatively small. The area has very little fauna and flora as it is an already disturbed site.</p> <p>This impact will mostly be due to human activities during construction, which includes site clearance, vehicular activities and noise potentially interrupting the birds' feeding, roosting and nesting site.</p> <p>The rising main footprint is small because construction will be done in sections to avoid disturbance to fauna, flora and traffic activity.</p>	<ul style="list-style-type: none"> • On-going awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, especially to breeding birds, and of poaching and road kills. At the same time, the need for reporting incidents should be stressed, and reporting procedures clarified. Biodiversity awareness and training must be provided to the contractor before to construction commences. • The contractor is to report all biodiversity (fauna and flora) related incidents in report format and incident investigation must be completed. • Anti-poaching measures should be strictly enforced, with zero tolerance, and this should be emphasised during induction to contractors; construction workers should be under supervision at all times to prevent poaching; offenders should be prosecuted. 	<ul style="list-style-type: none"> • The contractor should report all biodiversity (fauna and flora) related incidents and the incident investigation must be completed. 	Proponent, Contractor
Removal of illegal shacks / relocation of illegal occupants	<p>The illegally occupation of houses/shacks at the proposed site of the existing sewage pumping station is of concern because Kuisebmond lacks available land for residents. Illegal occupants have raised concerns with where to relocate to before construction commences. The lack of available land to relocate the illegal occupants may cause a delay with construction as they may refuse to relocate</p>	<p>Before the construction phase commences the Municipality of Walvis Bay and residents illegally occupying houses/shacks at the site should reach an agreement with regards to the removal of the illegal shacks and relocation of the occupants to ensure the commencement of construction phase.</p>	<p>All information regarding the actions taken with regards to the removal of illegal shacks and relocation of illegal occupants must be included in the monitoring report.</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Health, Safety and Security	<p>During construction phase, construction workers and heavy equipment will be onsite. Excavations for the construction of new sewage pump station and rising main will expose the public to safety risks. Pedestrians may fall into open trenches or vehicles may drive into them. This would require safety barricades and signs to be provided on site. Heavy machinery increases the risk of injuries.</p> <p>Currently a suitable method for dewatering of underground water has not been selected however if the coffer dam option is selected then additional health and safety measures needs to be taken to ensure the safety of the public.</p>	<p>All Health and Safety standards specified in the Labour Act should be complied with. The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site.</p> <p>The Contractor should be obliged to comply to the following:</p> <ul style="list-style-type: none"> ➤ Compliance to Health and Safety Regulations pertaining to a commitment to a Health and Safety policy, risk assessment, , training and awareness, incident management, Health and Safety documentation and control ➤ Provide employees with personal protective clothing, first aid kits being available on site, warning signs, etc. ➤ Equipment must be locked away on site to discourage criminal activities. ➤ Install proper safety barricades and signs at the perimeter of the site to warn and direct pedestrians and vehicle traffic away from construction site ➤ Induction training for all who enter the site is required. ➤ Security personnel to prevent unauthorised entry of the construction site. ➤ The contractor must ensure that suitable emergency facilities, including first aid kits are available on site. ➤ The contractor should select personnel to be trained in first aid. A notice with the numbers of all emergency services must be readily available. 	<p>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 itself.</p> <p>Consult with the Traffic department and implement a traffic management plan for sections of the roads to be closed or traffic diverted when necessary during the delivery of equipment and excavations. The contractor should inform the proponent with a weekly work schedule.</p> <p>All HSE information and reporting to be included in a final report once construction finishes and the site is handed over to the Municipality of Walvis Bay.</p>	Proponent and Contractor
Traffic Impact	The proposed sit is already a busy area with pedestrians and road traffic. Therefore, an increased traffic may cause more accidents involving	<ul style="list-style-type: none"> ➤ During rising main pipeline construction sections of roads will have to be closed and traffic diverted. ➤ The contractor must advertise locally the times that road closure will occur. The 	The Contractor must prepare a weekly traffic plan to know when traffic authorities and the general public need to be informed of possible obstructions	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>pedestrians and vehicles. Construction activities are expected to have some impact on the movement of traffic to the site and its vicinity when construction material and equipment must be transported to the site and especially where such pipelines must be installed next to the roads.</p>	<p>contractor must also liaise with the relevant traffic department to ensure that traffic flow along the affected route is minimally disrupted. Alternative roads should be clearly indicated with signs and/or personnel directing traffic.</p> <ul style="list-style-type: none"> ➤ Excavations of the rising main pipeline construction must be done in sections. Each section must be covered before the next section is initiated. ➤ The contractor must ensure the least amount of disruption to traffic at site. 	<p>Any traffic issues complaints received should be recorded in the monitoring report together with steps taken to mitigate the impacts.</p> <p>All traffic information and reporting must be included in a final report once construction finishes and the sites are handed over to the Applicant</p>	
<p>Handling and disposal of wastewater during the dewatering process</p>	<p>During the construction, excavations will have to be made to install underground infrastructure like pipelines and for foundations and other constructions. The depth of groundwater table in the project area ranges between 700mm and 1100mm from the natural ground surface. Water will thus most likely be encountered during excavations. The water will have a high salinity. The water encountered will therefore be treated as wastewater that has to be disposed of in a suitable manner. High salinity may disrupt natural decomposition processes that occur in sewage treatment works. Waste water will be encountered and possible impacts should be mitigated.</p>	<p>Water containing hydrocarbons may not be disposed of in the sewer system. Large volumes of water with a high salinity may not enter the sewer system. The contractor will have to permission to pump the wastewater into the sewer system.</p> <p>Before excavations commence the contractor must liaise with the Municipality of Walvis Bay to determine the most suitable method of disposal of the waste water.</p>	<p>A groundwater pollution survey has to be conducted before construction commences to estimate the volume of water that will be encountered and that will need to be disposed of.</p> <p>Minutes of the meeting with the Municipality of Walvis Bay must be kept on file.</p> <p>A record of the volume of waste water removed must be kept together with information on treatment and disposal.</p> <p>All information and reporting to be included in a final report once construction finishes and the sites are handed over to the Applicant.</p>	<p>Proponent and Contractor</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Underground Utilities	Excavations will be made at the sewage pump station site and rising main route. Underground utilities like telecommunications, water and electricity supply and sewers are at risk of being damaged.	<ul style="list-style-type: none"> ➤ Proponent should appoint a qualified and reputable contractor. ➤ The contractor must determine exactly where amenities and pipelines are situated before construction commences, e.g. ground penetrating radar surveys or similar surveys to reduce the risk. ➤ Consult with the Municipality and other service suppliers essential. ➤ Proper training of construction personnel would reduce the possibility of the impact occurring. 	<p>Maps and location information of existing underground amenities must be kept on file.</p> <p>All information and reporting such as incidents relating to underground utilities must be included in a final report once construction finishes and the site is handed over to the Municipality of Walvis Bay</p>	Proponent and Contractor
Noise Pollution from construction activities	Noise pollution will exist due to heavy vehicles accessing the site with building materials. Cement mixing, drilling and excavating will be some additional noise producing activities. But this is not expected to be significant due to the small scale of the project.	<p>The Walvis Bay Municipality has no regulations with regard to noise levels.</p> <p>The World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the construction phase. This limits noise levels to an average of 70 db over a 24 hour period with maximum noise levels not exceeding 110 db during the period. It is recommended that any complaints regarding noise be registered.</p> <p>Construction activities must be during daytime from 7h00 to 17h00.</p>	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and if appropriate, acted upon.	Contractor
Air Quality and Odour	Odour impact emanating from the existing pump station and air emissions from the construction equipment such as diesel generators. Diesel generators release many hazardous air contaminants and greenhouse gases (GHG) including particulate matter (diesel soot and aerosols), carbon monoxide, carbon	The construction phase of the sewage pump station must be kept short to lower the GHG emissions emanating from diesel generators. Once the construction of the pump station is completed the pump station will make use of electricity.	Complaints regarding air quality and odour to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	dioxide and oxides of nitrogen. The consumption of one liter of diesel emits approximately 2.4 to 3.5 kg of CO ₂ . However, construction phase is short and temporary thus the impact will be minimal			
Dust Pollution from construction activities	<p>Dust may be generated during excavations and due to increased traffic to and from the site for deliveries and removals. This might be aggravated during periods of strong winds. This occurs regularly in Walvis Bay during the winter months when east winds occur. The nature of soil in Walvis Bay is such that it is moist due to frequent fog and mist rain and as a result of a very shallow water table. The dust impact would thus be limited to periods of strong winds when larger sand particles can be transported. However, the limited nature of the construction activities will not result in significant dust generation.</p> <p>The area do experience windy conditions due to its close proximity to the coast and occasionally east wind conditions worsens dust emissions in the area.</p>	<ul style="list-style-type: none"> ➤ Vehicles and machinery will be maintained in good working order ➤ Avoid new access route development where possible. Speed limits on roads will be limited to a maximum speed consistent with the minimisation of dust generation. Nominal speed limit of 40 km/h applies. ➤ Complaints regarding dust to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure. ➤ Personnel are to be issued with dust masks for health reasons if required. 	Complaints regarding dust to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	The area sometimes do experience windy conditions due to its close proximity to the coast and occasionally east wind conditions worsens dust emissions in the area.			
Waste Production and Ablution facilities	The ability of products and building rubble to act as a waste which must be cleaned up or removed off-site. Ablution facilities must be made available to construction personnel.	<p>The contractor must ensure that adequate temporary disposal facilities are available at the construction site. Products that can be re-used or re-cycled should be kept separate. Waste should be disposed of regularly and at appropriate disposal facilities.</p> <p>Due to the nature of some hazardous materials they should be disposed of in an appropriate way at an appropriately classified waste disposal facility.</p> <p>Make use of the Material Safety Data Sheets available from suppliers if the user is not sure how to dispose of the substance.</p> <p>Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained.</p> <p>A mobile chemical abluion facility should be made available to anybody working at the site. The ratio of the number of these abluion facilities to the number of employee's onsite should be discussed and agreed upon with the Local Authority in terms of the Labour Act as well as Environmental Health Act.</p>	<p>Regular visual inspection.</p> <p>Waste from this mentioned abluion facility needs to be appropriately disposed of at such a dedicated local authority facility regularly.</p> <p>Hazardous waste disposal receipts should be kept on file.</p>	Contractor
Soil and groundwater contamination	Porous surface substrate can allow unwanted hazardous and ecologically	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	detrimental substances to seep down to the water table either at the site of spill or after being washed away by surface flow. Leakages from construction vehicles, accidental spills of fuel, paints and other chemicals might occur. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground infrastructure. However, due to the small scale of the project and the scarcity of surface water in the area, the risk of hazardous spills can be effectively managed.	<p>impact occurring.</p> <p>All vehicles and machinery to be used on site should be inspected regularly for oil leaks.</p> <p>Under no circumstances should any hydrocarbon product in excess of 30 cubic meters be kept on site. Any such advancement should be done with a review of this Scoping Report and Environmental Management Plan.</p> <p>Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained.</p>	<p>offsite.</p> <p>Should any spills occur, contaminated soil is to be removed and rehabilitated or replaced with uncontaminated soil and a spill report form must be completed by the contractor. The spill report form must include the nature, extent and location of the hazardous spill and the actions taken to contain it.</p>	
Heritage Impact	Sites with archaeologically or culturally important significance might be uncovered during the construction phase. These can include graves, stone walls or cultural artefacts. However, the project area have been largely previously disturbed and there are no known sites of heritage significance.	<p>Construction personnel must be informed of the possibility of finding historical artefacts and be instructed to report any such findings without delay.</p> <p>If such a site is found during the construction activities the construction process must be halted and the relevant authorities must be informed. Construction may only continue at that location once permission has been given. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed.</p>	Report any irregularities to the authorities as stipulated.	Contractor, Proponent
Employment	The magnitude of the proposed new sewage pump station and rising main is on a small scale. A maximum of ±20 temporary job	Employ local residents of Walvis Bay as far reasonably possible.	A summary report of employment created during the project.	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	opportunities will be created to unskilled, semi-skilled and skilled workers during the construction phase.			
Sewage overflow	Sewage overflow in Kuisebmond is a concern. Sewage overflow in Kuisebmond is caused by the existing lack of capacity (wet flow rate higher than pump station capacity to handle the flow rate) and technical (mechanical and electrical) breakdowns.	The construction of the new sewage pump station in Kuisebmond will be an upgrade in sewage handling capacity and technical capabilities.	A summary report of all reported sewage spillage overflows before, during and after the construction of the new sewage pump station in Kuisebmond to determine the effectiveness of the new sewage pump station and rising main.	Proponent
Cumulative Impacts	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.	<p>The clustering of existing infrastructure in the area, including other power lines, the road, communication masts, as well as other developments would increase the cumulative effect of any impacts associated with the present development.</p> <p>With increased development and the cumulative effects associated with it, it becomes increasingly important to adhere to all mitigation measures as stipulated in the EMP.</p>	<p>Summary report based on all other impacts and monitoring must be created to give an overall assessment of the impact of this construction phase.</p> <p>This will assist in future applications for clearance certificates for sewage infrastructure.</p>	Proponent, Contractor

Table 1.3 Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Flora and fauna mortalities	<p>This impact is concerned about birds colliding against sewage pump station structures mid-flight. This impact is increased by poor visibility for instance in an event of a windy, rainy, foggy or dusty weather or at night when the birds cannot see the sewage pump station infrastructure. These collisions may result in birds' mortality or injuries. The risk of bird and other fauna mortalities at the proposed site is unlikely because the location of existing pump station. The site has been previously disturbed.</p> <p>Flora will have little to no impact because of the disturbance to the existing facility.</p>	<p>Build the sewage pump station and rising main but observe and report on faunal mortalities especially bird collisions in the monitoring report.</p> <p>To prevent the impact of lighting on birds all lighting at the premises must be directed downwards and the minimum lighting required must be used at night</p> <p>To prevent the impact of lighting on birds all lighting at the premises must be directed downwards and the minimum lighting required must be used at night.</p>	<p>A record should be kept of any extraordinary fauna sightings or encounters on site.</p> <p>Report on collisions should be noted in the monitoring report especially when it is birds of the Red Data species such as Greater Flamingo (Vulnerable), Lesser Flamingo (Vulnerable and Globally Threatened) and Great White Pelican (Vulnerable).</p> <p>All flora and fauna related information to be compiled in a Monitoring report.</p>	Proponent
Damage to Infrastructure due to the Corrosive Environment	Walvis Bay is well known for its extreme corrosive environment. Bird droppings do accelerate corrosion.	All sewage pump station and rising main equipment must adhere to industry specifications and corrosion protection is required. Nesting of birds at the new sewage pump station should be discouraged.	<p>Regular inspections and maintenance of the pump station and rising main is required to detect and repair any possible damage.</p> <p>Keep a maintenance record.</p>	Proponent
Traffic Impact	Traffic impacts are only expected when there is maintenance and excavations required at the proposed	During the proposed development maintenance, sections of roads may have to be closed and traffic diverted. The contractor must also liaise with the relevant traffic department to ensure that	Any traffic complaints received should be recorded in the monitoring report and corrective action taken noted.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	development.	<p>traffic flow along the affected route is minimally disrupted. The contractor must advertise locally the times that road closure will occur. Alternative roads should be clearly indicated with signs and/or personnel directing traffic.</p> <p>The contractor must ensure that everything is in place for the pipeline repair near or below roads, prior to closing the road, to ensure the minimum traffic disruption.</p>		
Health , Safety and Security	During maintenance of the proposed development worker may be exposed to several health and safety risks.	<p>An integrated health and safety management system acts as a monitoring tool and mitigating tool. The monitoring tools are elaborated upon in the EMP.</p> <p>Typical mitigating measures within the health and safety management systems are:-</p> <ul style="list-style-type: none"> • Operational and procedural manuals • Health and safety training • Housekeeping rules • Colour coding areas, pipes, equipment and substances • Personal protective equipment (e.g. protective clothing like safety boots and hard hats) • Safe working procedures and permits to work • Clearance certificates for confined spaces • Emergency response plans • Material Safety Data Sheets (MSDS) • First aid treatment and training • Medical procedures and emergency services • Safety reminders and/or drills 	A report should be compiled every 6 months of all Health, Safety and Security aspects reported such as incidents. The report should contain dates when training was conducted and when safety equipment and structures were inspected and maintained.	Proponent
Air quality and Odour Impacts	The major sources of GHG carbon dioxide (CO ₂), methane (CH ₄), and nitrous	GHG and VOCs emissions from waste water collection and treatment processes are unknown in Walvis Bay. Therefore, emission factors can be	Regular monitoring of the effectiveness of odour control technologies at the sewage pump	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>oxide (N₂O) emissions are located within the WWTP. The pump station is regarded as pre-treatment. The pump station will emit volatile organic compounds (VOCs). Therefore, the GHG emissions carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) emissions emanating from the new sewage pump station in Kuisebmond will be minimal. However, the magnitude of VOC emissions from the pump station is unknown. Furthermore, it will be more beneficial to calculate the GHG emissions and VOCs for the entire wastewater system in Walvis Bay instead of a part of the wastewater collection system, namely the new Kuisebmond pump station.</p> <p>There are several odour control technologies available to reduce or eliminate odour from sewage pump stations.</p>	<p>calculated to determine the extent of GHG and VOC emissions for the Walvis Bay wastewater treatment system.</p> <p>Install odour control technologies to eliminate bad odours at the pump station.</p>	<p>station.</p> <p>Odour control technology must be regularly inspected and inspection records must be kept.</p> <p>Complaints regarding odour to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure</p>	
Groundwater and soil contamination	In the event of pipeline leaks, porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table. Groundwater might spread pollutants to	<p>A Baseline soil and groundwater sampling along the pipeline routes is required prior to construction.</p> <p>The following measures must be employed to prevent spillage into surface water drainage channels and groundwater sources:</p>	<p>A report should be compiled every 6 months of all spills or leakages reported. The report should contain the following information:</p> <ul style="list-style-type: none"> • Spill location • Date and duration of spill 	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	neighbouring receptors and may create an impact on underground utilities (i.e. fresh water supply to buildings, sewerage system).	<ul style="list-style-type: none"> Spillage control procedures must be in place Regular inspection and maintenance of all equipment and infrastructure of the proposed development The procedures to adhere to must prevent environmental damage during service and maintenance, and compliance with these procedures, including the correct use of sumps/manholes and regular reporting of spillages, must be audited and corrections made where necessary. <p>Proper training of operators must be conducted on a regular basis.</p> <p>The following measures must be employed to prevent spillage into groundwater sources:</p> <ul style="list-style-type: none"> Any spillage of more than 200l must be reported to the relevant authorities and remediation instituted. Spill clean-up equipment must be available appropriate to the relevant Material Safety Data Sheets (MSDS) Emergency shutoff systems must be in operation and activated if a leak at the proposed development is detected. 	<ul style="list-style-type: none"> Product spilled Volume of spill Remedial action taken Comparison of pre-exposure Baseline data with post remediation data (e.g. soil hydrocarbon concentrations) 	
Waste Production	Walvis Bay experiences strong winds and it carries domestic waste which must be cleaned up and disposed of regularly.	<p>A wall barrier must be built to prevent domestic waste blown by the wind from the premises.</p> <p>Waste to be clean-up and disposed of regularly at the landfill site. Waste management should be practised at all times.</p> <p>Waste management should be practised at all times. Dry waste is at risk of increasing the dust /litter impact so should be removed regularly.</p>	<p>Waste to be clean-up and disposed of regularly at the landfill site. Removal of waste should be at regular (weekly) intervals to maintain visual orderliness.</p> <p>Waste disposal inventory kept.</p>	Proponent
Sewage overflow	Eventually the new sewage pump station and rising main will near its end of life cycle. This is associated with	Frequent maintenance of the new sewage pump station can significantly increase its operational life. However, the new sewage pump station will eventually have to be decommissioned.	Maintenance record should be kept.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	breakdown and constant delays in maintenance which leads to sewage overflow in the community of Kuisebmond.			
Visual Impact	<p>The site is located in an urban environment. The site has been largely previously disturbed with urban infrastructure and roads. The proposed pump station will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint.</p> <p>The new rising main will be underground and it will blend in with the visual landscape.</p>	<p>The new pump station and rising main should blend in with the existing infrastructure. No specific measures need to be implemented however the site must maintain a similar visual impact to other residential and business buildings.</p>	<p>Routine maintenance on infrastructure will ensure that the longevity of structures is maximised. However, it is important that the real integrity of the structures is considered in the long term and not just appearances.</p> <p>Provide any information on maintenance or complaints in the monitoring report</p>	Proponent
Cumulative Impacts	<p>These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become</p>	<p>Mitigation and monitoring of all impacts must be conducted and its effectiveness monitored.</p> <p>Results of such monitoring must be used to adapt or modify mitigation measures.</p>	<p>Bi-Annual summary monitoring report based on all other impacts must be created to give an overall assessment of the impact of the Operational Phase.</p> <p>This will assist in future applications for clearance certificates for electricity supply operations.</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.			

Table 1.4 Decommissioning Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production and Ablution Facilities	Upon decommissioning, waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap. Ablution facilities must be made available to deconstruction personnel.	<p>To reduce the amount of waste, all re-usable materials, and other equipment must be removed to another site or sold as scrap.</p> <p>Those items that cannot be used again must be scrapped in the appropriate manner.</p> <p>Rehabilitation, if necessary, is to be done using funds designated for the purpose.</p>	<p>Regular visual inspection.</p> <p>A register of waste produced and disposal methods should be maintained.</p>	Proponent, Contractor
Ecological Impact	Operations spanning many years may create new habitat for fauna and flora. Upon decommissioning these habitats will be destroyed	<p>The municipality of Walvis Bay would have to ensure that no new habitat is created for flora and fauna. Before decommissioning every structural facility must be inspected to ensure that the dismantling and removal of any structure would not affect any organism that has become dependent on those structures for survival, shelter or breeding.</p> <p>Where new habitats were created, that is now occupied by fauna or flora the municipality of Walvis Bay must contact the Ministry of Environment, Forestry and Tourism or other appropriate organisations to establish the conservation status of it.</p> <p>The possibility of relocating the fauna or flora must be investigated and executed. Should the species be listed as vulnerable to extinction, a meeting should be held with MET in order to determine the appropriate handling of the situation.</p>	A report should be compiled of any fauna and flora that established itself on the premises. The report should include all actions taken to relocate or deal with the situation.	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Dust	Dust will be generated during the Decommissioning Phase and might be aggravated during periods of strong winds.	It is recommended that regular dust suppression be included in the Decommissioning Phase, when dust becomes an issue. Personnel should be issued with dust masks for health and safety reasons. Accumulation of rubble should not be allowed and must be taken to the dumpsite within reasonable time.	Regular visual inspection. A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon	Proponent, Contractor
Noise	Noise pollution will exist due to heavy vehicles accessing the site to collect rubble from demolished building materials. A crane may be erected for removing the pump station and rising main.	The Walvis Bay Municipality does not have any guidelines with respect to noise levels but the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment is followed. This limits noise levels in industrial areas to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period. At the residential areas nearby the daytime noise levels must not exceed 55 dB while at night it should be less than 45 dB. During decommissioning noise levels might be higher. This will however be short lived. All personnel must be issued with hearing protectors and neighbours must be notified of the time and duration of decommissioning. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the noise impact.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and if appropriate, acted upon.	Proponent, Contractor
Groundwater, and Soil Contamination	Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table either at the site of spill or after being washed away by	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. All vehicles and machinery to be used on site should be inspected regularly for oil leaks	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite. Should any spills occur, contaminated soil is to be removed	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>surface flow. Leakages from construction vehicles, accidental spills of fuel, paints and other chemicals might occur. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground infrastructure. However, due to the small scale of the project and the scarcity of surface water and groundwater in the area, the risk of hazardous spills can be effectively managed.</p>		<p>and rehabilitated or replaced with uncontaminated soil and a spill report form must be completed by the contractor. The spill report form must include the nature, extent and location of the hazardous spill and the actions taken to contain it.</p>	
Health, Safety and Security	<p>During decommissioning phase, construction workers and heavy equipment will be onsite. Heavy machinery, electricity and working at height, increases the risk of injuries. However, due to the relatively small scale of the project, the risk can be well managed.</p>	<p>All Health and Safety standards specified in the Labour Act should be complied with. The responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site. The Contractor should be obliged to adhere to the following:</p> <ul style="list-style-type: none"> ➤ Adhere to Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. ➤ Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities ➤ Ensure suitable personal protective equipment is in place for workers as well as permit to work systems 	<p>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 itself.</p> <p>The contractor must ensure that adequate emergency facilities, including first aid kits are available on site. Selected personnel should be trained in first aid. The numbers of all emergency services must be readily available.</p>	Proponent, Contractor

2 CONCLUSION AND RECOMMENDATION

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

Monitoring reports must be kept available for possible submission with future renewal applications for environmental clearance certificates.

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