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ENVIRONMENTAL MANAGEMENT PLAN

CONSTRUCTION OF A NEW MAIN SEWERAGE PUMP STATION AND RISING MAIN IN KUISEBMOND, WALVIS BAY

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Document Status

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TABLE OF CONTENTS

List of Figures:

List of Tables

1. INTRODUCTION

Kuisebmond is one of the old and built-up townships of Walvis Bay, named after the Kuiseb River and most residents of Walvis Bay live in the area. The current bulk sewer network in the Kuisebmond area consists of a gravity sewer reticulation network and various sewer pump stations and rising main infrastructures.

The existing Kuisebmond pump station infrastructure was built in 1986 and has been serving part of the township. The station is situated on Erf 4246, allocated for municipal use, and bounded by Nathaniel Maxuilili Avenue and Frankie Abraham Street. In the eastern direction, the pump station is bordered by the existing residential developments.

The pump station is at least 34 years old, well beyond the 15-year useful life for the mechanical and electrical components and approaching the life of the concrete structure. In most instances the condition of the equipment has degraded to the extent that the systems require extensive maintenance to ensure functionality and reliability.
The pump station is now in extremely poor states of condition. Despite system-wide repairs and regular maintenance, the pump station needs replacement to provide safe and reliable operation and to accommodate the full sewer load through the system.

2. OBJECTIVES OF THE EMP

An Environmental Management Plan (EMP) can be defined as "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".* EMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life-cycle.

The EMP has been compiled to provide recommendations and guidelines in order to minimize the environmental impacts during the construction phase and should be used for compliance monitoring during the construction phase of the Construction of a New Main Sewerage Pump Station and Rising Main in Walvis Bay.

This EMP informs all relevant parties [the Project Coordinator, the Contractor(s) and all other staff employed by Walvis Bay Municipality and Om'kumoh Consulting Engineers at the site as to their duties in the fulfilment of the legal requirements for the construction

and operation of the sewer and sewerage infrastructure with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

The objectives of the EMP are to:

- ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- identify measures that could optimise beneficial impacts; and
- to ensure compliance with safety requirements.

3. LEGAL REQUIREMENTS

The Contractor must identify and comply with all Namibian environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the design, construction and implementation phases of the project must be complied with.

The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

- Environmental Management Act EMA (No 7 of 2007)
- Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)
- Labour Act 11 of 2007
- Health and Safety Regulations GN 156/1997 (GG 1617)
- National Heritage Act 27 of 2004
- Water Resources Management Act 11 of 2013

4. DESCRIPTION OF PROPOSED ACTIVITY

The existing Kuisebmond sewer pump station was built in 1986 serves part of the Kuisebmond area and the current flow rate is estimated to be in the range of 2400m³/day. The Kuisebmond pump station has now reached the design lifespan and the objective of proposed project is for the design and construction supervision of a new sewer pump station and rising main to replace the existing infrastructure.

5. LOCATION OF ACTIVITY ON SITE

The project area is situated in the Kuisebmond Township and the existing pump station serves part of the township. The proposed sewer rising main is also envisaged to be constructed along the existing old line which runs through different developed areas.

Figures 1 & 2: The locality map and catchment area of the Kuisebmond pumps station

6. PUMP STATION CATCHMENT AREA

The area coverage and flow contributing units were traced from the as-built drawings received from the client. From this, the Kuisebmond pump station catchment area includes 3585 erven in total. However, the sewer infrastructure masterplan (February 2014) provided by MWB reported that the catchment area includes a total of 4204 erven: 4089 residential, 96 commercial and 19 industrials. It is assumed that part of the area has been re-directed to the newly build Kuisebmond Lifting station which transfer the sewer to the Cemetery Pump station.

The Kuisebmond pump station catchment area includes various built-up developments, and the spatial allocation of the different land uses as presented in **Table 1** below.

Land Use	No. of Erven
• Single Residential	3299.00
• Gen. Residential	78.00
• Special Designated Area	1.00
• Local Business	2.00
• General Business	121
• Light Industrial	1.00
• Institutional	22.00
• Municipal Purpose	21.00
• Public Open Space	16.00
• Private Open Space	13.00
• Street & Street Widening	11.00
Total	**3585.00**

7. SCOPE OF THE EMP

In order to ensure a holistic approach to the management of environmental impacts during the construction and operation of the proposed sewerage infrastructure, this EMP sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The EMPr is a dynamic document subject to influences and changes as are wrought by variations to the provisions of the project specification.

4.1 LAYOUT OF THE EMP

The EMP is divided into three phases of development. Each phase has specific issues unique to that period of the construction and operation of the waste water treatment works and associated infrastructure. The impacts are identified and given a brief description. The three phases of the development are then identified as below:

4.1.1 *PLANNING AND DESIGN PHASE*

This section of the EMPr provides management principles for the planning and design phase of the project. Environmental actions, procedures and responsibilities as required during the planning and design phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Coordinator and Environmental Control Officer.

4.1.2 *CONSTRUCTION PHASE*

This section of the EMPr provides management principles for the construction phase of the project.

Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Coordinator and Environmental Control Officer.

4.1.3 *OPERATIONAL AND MAINTENANCE PHASE*

This section of the EMPr provides management principles for the operation and maintenance phase of the project;

8. ROLES AND RESPONSIBILITIES

An indication of the persons who will be responsible for the implementation of the impact management actions;

8.1. PROJECT COORDINATOR

The Project Coordinator is responsible for overall management of project and EMPr implementation. The following tasks will fall within his / her responsibilities

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

8.2. ENVIRONMENTAL CONTROL OFFICER (ECO)

- Conduct regular site visits to be able to report on and respond to any environmental issues;
- Report compliance and non-compliance issues to the municipal representative and authorities as applicable;
- Advise the Contractor on environmental issues within the defined work areas;
- Review access and incidents records that may pertain to the environment and reconcile the entries with the observations made during site inspection, monitoring and auditing;
- Recommend corrective action when required for aspects of noncompliance with the EMP;
- Take immediate action on site where clearly defined and agreed "no-go" areas are violated or in danger of being violated and to inform representative of the occurrence immediately and to take action;
- Be contactable by the public regarding matters of environmental concern as they relate to the operation of the works; and
- Take immediate action on site when prescriptive conditions are violated,

8.3. CONTRACTOR

The Contractor is responsible for the overall execution of the activities envisioned in the construction phase including the implementation and compliance with recommendations and conditions of the EMP. The Contractor must therefore ensure compliance with the EMPr at all times during construction activities and maintain an environmental register which keeps a record of all environmental incidents which occur on the site during construction of the treatment facility. These incidents may include:

- Public involvement / complaints;
- Health and safety incidents;
- Incidents involving Hazardous materials stored on site; and/or
- Non-compliance incidents.

The Contractor is also responsible for the implementation of corrective actions issued by the ECO and Project Coordinator within a reasonable or agreed period of time.

9. MITIGATION AND/OR MANAGEMENT MEASURES

A variety of potential impacts are associated with the planning and design, construction and operation phase of this project. These impacts can be categorised as general construction related impacts as well as construction impacts specifically related to this site. General best practice rules to construction should be followed at all times. Maintenance guidelines are also provided for the operational phase of the development.

Activity/Impact	Mitigating Actions and Approaches
Construction of a temporary site offices and lay down area may have a limited impact on the topography	Limit earthworks to the minimum required for the proposed facilities such as site office
Commercial activities hindered because of the difficulty of access	Local residents should be employed during the construction phases wherever feasible
Water for wash down of vehicles and machinery on site may contaminate groundwater	Provision of uncontaminated water for dust suppression and wash down of vehicles and machinery
Spills or leaks of fuels, lubricants or chemicals from machinery and vehicles may contaminate groundwater	Spill control measures should be implemented to prevent spills from infiltrating into the groundwater table. Measures should include appropriate materials handling and storage procedures, and development of contingency plans in the event of a spill
Noise pollution during construction	Make sure all machinery and vehicles are fitted with appropriate mufflers, and that all mufflers and acoustic treatments are in good working order;
	Make sure all machinery and vehicles are regularly maintained and broken parts (such as mufflers) are replaced immediately

	Make sure all machinery and vehicles are operated efficiently and according to the manufacturers specifications, by trained and qualified operator
	Make sure that activities likely to cause adverse noise impacts are timed to have least impact on surrounding land users and other site activities (such as the residential areas)
	Make sure all personnel are issued with hearing protection and are advised of its proper use
	Consultation of earthwork hours with affected residents and nearby sensitive receivers
Inadequate storage and management of litter, construction waste and liquid wastes prior to disposal	Waste management measures should be implemented to prevent litter and debris and liquid wastes from entering soil excavations
Effluent from construction workers' temporary amenities leaching into groundwater, carrying nutrients and micro-organisms	Provision of temporary amenities for workers. Effluent should be treated or suitably disposed off-site
Contamination of the storm water from litter and construction wastes and	Waste control measures should be implemented to prevent litter and construction waste from infiltrating into the groundwater table

untreated effluent from temporary workers' amenities	Provision of suitable workers' amenities facilities. If possible, effluent should be disposed of off-site at a nearby STP
High volume of excavation and filling may alter flow paths within the portions under construction	Re-use any excess excavation material generated by the construction within the site or on the other nearby projects. The deposit of waste to landfill is a last resort.
	Reduce as much as possible difference between cut and fill
Odor generated from sewer of worker's amenities	Provision of suitable workers' amenities, located within the construction area and, if possible, downwind from residential areas
Effluent from construction workers' temporary amenities leaching into groundwater, carrying nutrients and micro-organisms	Regular maintenance of workers' amenities, including the emptying of effluent storage tanks
Traffic congestions	Provision of shared worker's transport from workers accommodation to the proposed Project site
	Installation of warning signs and specified speed limits (site roads should reduce traffic speeds to 20 km/hr)
	The use of local construction materials where practical to avoid long
	Provision of adequate lighting on site road and parking areas
	Timing of construction activity, such as restricting construction traffic to designated roads during designated times, avoiding peak hour traffic

	Design a traffic plan to make sure that traffic avoids, where possible, congested and heavily populated areas and dusty roads
Heavy noises near residential plots can affect tranquility	Construction works within 100m of schools should be restricted to outside school hours (such as before and after school, during school holidays or weekends, or left as the final stage of works); Wire fence meshing, dust screens or wooden hoardings should be installed to delineate the construction area and therefore decrease impacts; The access points for construction vehicles should be a minimum of 100m from plots access
Dust emissions generated from earthworks due to loading and unloading of materials on site and from uncovered truckload in addition to the potential dust emissions that could occur as a result of excavation for the sewer pipeline network	Minimizing the height and slope of stockpiles to ensure erosion of unconsolidated materials during rainfall events does not occur
	Side enclosure and covering, by impervious sheeting, of any aggregate or other dusty material stockpiles
	Dusty vehicle loads transported to, from and within the Project site should be covered by sheets and should not be overloaded
	Use of water sprays to decrease dust generation
Contamination of storm water from exposed soils sediments	The height and slope of stockpiles should be limited to minimize erosion of unconsolidated materials during rainfall events
	Locating stockpiles on flat areas, away from storm water. Ensure that sediment or erosion cannot reach a waterway; Diversion of overland flow around work areas / construction sites

Generation of excavation material to be disposed of	Re-use of excavated material for the project or other projects in the area
Potential public safety concerns associated with the excavation works for the installation of the water supply network	The area surrounding the excavations should be fenced off or otherwise restricted from public access to prevent injury or accident due to entry onto a construction site
Potential worker accidents from constructing manholes	Following mitigation measures are recommended for the prevention of gas emissions
Generation of debris to be disposed outside the project site	Solid waste that cannot be re-used shall be disposed of in approved landfills
Dust emissions during breaking of concrete that might affect worker's health	Use of water sprays to decrease dust emissions
Adverse impact on the health of the workers andresidents in and around the due to deterioration of the air quality, increase of noise and traffic	Implement the air quality, noise and traffic mitigation measures as described in the relevant sections
	Ensure all machinery is in good order and repair and not leaking fuel or volatile emissions from fuel tanks or fuel lines

Volatile emissions during earthwork phase from solvents and fuels stored or used on the Project site	A full list of all volatile fuels and chemicals stored on site should be kept by the site supervisor, including accompanying volumes, locations and Material Safety Data Sheets (MSDSs)
Exhaust and dust emissions from construction vehicles and machinery	Use of modern machinery, with adequate pollution control devices. Regular maintenance and inspection programs for all construction vehicles.
	Proper and efficient operation of construction machinery and vehicles by qualified workers
	Regular maintenance and inspection program for all construction vehicles
	Minimize unnecessary operation of construction machinery, including efficiency of trip times and reduction of double handling through appropriate placement of stockpiles, haul roads, work depots and work areas
	Daily visual checks to ensure the above points are followed, particularly in regards to smoke emissions from vehicles and plants. Equipment generating smoke should be given defect notices and taken out of service until repaired and approved for re-deployment by site supervisor.
Visual effect on aesthetics	Design facilities' facades in a subtle way that matches its surroundings and reduce their size as much as possible to minimize the potential negative effects on aesthetics.

Use of potentially harmful materials (e.g. PCB)	Limit use of harmful materials. If unavoidable, impose monitoring and maintenance
Improper sewer dosage may alter quality	Regular monitoring of sewer content and of treatment performance
Halted operation due to electricity cuts	Use backup sources of power (e.g. traditional, renewable, etc.)
Pollution in case generators are needed	Use double hulled storage tanks for fuel
Contamination of water due to spills and propagation of chemical elements (e.g. PCB, oil, etc.)	Store chemicals in a contained location with no drainage connection to the water network
	Ensure that transformers are located on impermeable and contained surfaces
Risk of leakage from fuel storage tanks	Cover area where fuel storage tank is located with impervious material to limit leakage to groundwater
Noise pollution during operation	Plant trees and shrubs around facility and fitting of mufflers on equipment
Aesthetic issue	Plant trees and shrubs around facility and along the pipeline
Additional use of energy to operate the facility (electricity)	Use alternative power sources such as solar power
Deterioration of landscape (trees and plants) that exists at the proposed new site location	Plant trees and shrubs around facility and pipeline

14.1 Monitoring Environment Effects and Mitigation

During the construction phase, the resident engineer on site would designate a person to continuously monitor the activities that have been highlighted above that would cause a negative impact and that subsequently necessitate mitigation action. The monitoring would ensure that mitigation measures are strictly followed and any nonconformance would be reported to the resident engineer for correction. Some monitoring activities would include but not be limited to:

- **Site inspection**
- **Construction activities**
- **Disposal activities**
- **Worker behavior**
- **Traffic**
- **Power supply**

Such a monitoring effort would limit any negative impact from nonconformance and would enable a better implementation of the management plan.

In order to ensure that the plant and the corresponding entities (tanks, network, valves and fittings, etc.…) are properly operating there would be a team led by the Walvis Bay Municipality, designated for their follow-up. During operation this team would also monitor on a regular basis the level of water in the lake, chlorination dosage and power supply – the main potential sources of negative impacts.

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