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

Assessed by:

OM'KUMOH CONSULTING ENGINEERS

Multi-Disciplinary Consulting Engineers and Project Managers

Assessed for:

WALVIS BAY

YOUR OASIS OF OPPORTUNITIES

APRIL 2021

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EXECUTIVE SUMMARY

Om'kumoh Consulting Engineers cc (OCE) was appointed by the Municipality of Walvis Bay (MWB), Project Proponent, to conduct an Environmental Impact Assessment (EIA) for the construction and operation of a new sewage pump station and rising main in Kuisebmond, Walvis Bay. The construction of the new pump station in Kuisebmond has location latitudinal and longitudinal coordinates S 22°56'23.04" E 14°31'17.96". The site is located within the Walvis Bay Townlands, Kuisebmond area. The MWB is the owner of the land at the existing sewage pump station in Kuisebmond.

The MWB is the municipal service provider (water, sewerage and land) in the town of Walvis Bay. MWB is responsible for all operation and maintenance of water and sanitation infrastructure in the town Walvis Bay. Kuisebmond is one of the oldest townships of Walvis Bay and the current bulk sewer network in the area consists of a gravity sewer reticulation network, various sewer pump stations, and rising main infrastructures.

The existing main Kuisebmond pump station was built in 1986, and the infrastructure is now in the process of dilapidation at such a rapid rate that it requires continuous replacement of infrastructure. Hence, the MWB aims to construct and operate a new sewerage pump station and rising main at Kuisebmond which will replace the existing infrastructure. The purpose of the new infrastructure development is to improve sewerage services to adjacent communities in Kuisebmond.

The scope of the EIA was to determine the potential environmental impact emanating from the construction and operations of the proposed new sewage pump station in Kuisebmond, Walvis Bay. Relevant environmental data was compiled by making use of primary and secondary data, from a reconnaissance site visit and from stakeholder consultation. Potential environmental impacts and associated social impacts were identified and addressed in this report. An environmental management plan was created and has been included in this environmental impact assessment report.

The assessment has been undertaken to determine the potential impact of construction activities and future operation of the pump station and rising main on the environment, and to determine all safety, health and social impacts associated with these activities. This will enable decision makers and stakeholders to make informed decisions regarding the development from an environmental perspective.

The potential environmental impacts from the proposed development are related to a number of aspects like:

- Site clearance, including site footprint, etc.
- Removal/relocation of illegal houses currently on the premises
- Changes to surrounding landscape and/or topography (visual impact)
- Soil and groundwater pollution
- Handling and disposal of underground water during dewatering process
- Traffic impact
- Social impact on surrounding community

- Waste management
- Health, Safety and Security impacts
- Noise impact
- Air Quality and Odour
- Overflowing of sewerage into nearby properties
- Dust
- Soil and Groundwater Pollution
- Heritage Impacts (Archaeology)

Impacts can generally be mitigated, but it is recommended that before construction can commence the MWB should reach an agreement with the illegal occupants of the shacks at the proposed site which is municipal property. The illegal occupants are concerned because they do not have a place to relocate to. Kuisebmond do not have sufficient vacant land available for relocation purposes. Currently, the MWB are currently in discussions with various stakeholders within and outside the organisation in order to provide the best possible outcome with regards to the removal of illegal shacks and the relocation of illegal occupants from the site. The MWB will henceforth provide the IAPs with information on the way forward once their internal discussions are concluded.

Furthermore, the impact assessment demonstrated that the potential negative environmental impacts can all be mitigated to be within acceptable levels. The most significant impacts 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.

The Environmental Management Plan (EMP) should be used as on-site reference document during all phases of construction, operations and future decommissioning. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality (HSEQ) policy as well as Environmental Policy should be used in conjunction with the Environmental Management Plan. Contractors and responsible personnel must be taught the contents of these documents, where applicable.

Provided that the recommended mitigation measures are successfully implemented, there is no environmental reason not to issue an environmental clearance certificate for the proposed 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
Km	Kilometer
kV	Kilo Volts
m	Metre
MEFT	Ministry of Environment, Forestry and Tourism
MWB	Municipality of Walvis Bay
OCE	Om'kumoh Consulting Engineers

1 INTRODUCTION

1.1 INTRODUCTION TO THE PROPOSED DEVELOPMENT

The existing main Kuisebmond pump station and rising main was built in 1986, and the infrastructure is now in the process of dilapidation at such a rapid rate that continuous replacement of infrastructure is on-going. Therefore, Municipality of Walvis Bay requires the replacement of the existing sewage pump station in Kuisebmond.

The Municipality of Walvis Bay appointed Om'kumoh Consulting Engineers cc to provide a professional consultancy service for the design of the proposed project, and to conduct an Environmental Impact Assessment (EIA) for the construction and operation of a new sewage pump station in Kuisebmond, Walvis Bay (Figure 1.1).

The proposed construction of the new sewage pump station is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC) in terms of Environmental Management Act No. 7 of 2007 and the Environmental Impact Assessment Regulations (2012): Listed Activity 2 Waste Management, Treatment, Handling, and disposal activities "2.1 (s) The construction of facilities for waste sites, treatment of waste and disposal of waste."

The new main sewer pump station will replace the existing Kuisebmond pump station and also make provision for the connection of inflow from Kuisebmond Stadium Pumps Station. The new pumpstation include the following infrastructure:

- Inlet work and Screening facility;
- Wet well,
- pump house,
- Emergency storage sump;
- Motor control centre (MCC);
- Bulk electrical connection;
- Electrical cabling to the equipment;
- Standby generator with an automatic changeover panel;
- Ablution Facility and Storeroom; and a
- Boundary wall.

The purpose of the new infrastructure development is to improve sewerage services to adjacent communities In Kuisebmond. The assessment has been undertaken to determine the potential impact of construction activities and future operation of the pump station and rising main on the environment, and to determine all safety, health and social impacts associated with these activities. This will enable decision makers and stakeholders to make informed decisions regarding the development from an environmental perspective.

The construction of the new sewage pump station in Kuisebmond will be located at latitudinal and longitudinal coordinates S 22°56'23.04" E 14°31'17.96". The site is located within the Walvis Bay Townlands, Kuisebmond area. The Municipality of Walvis Bay is the owner of the land.

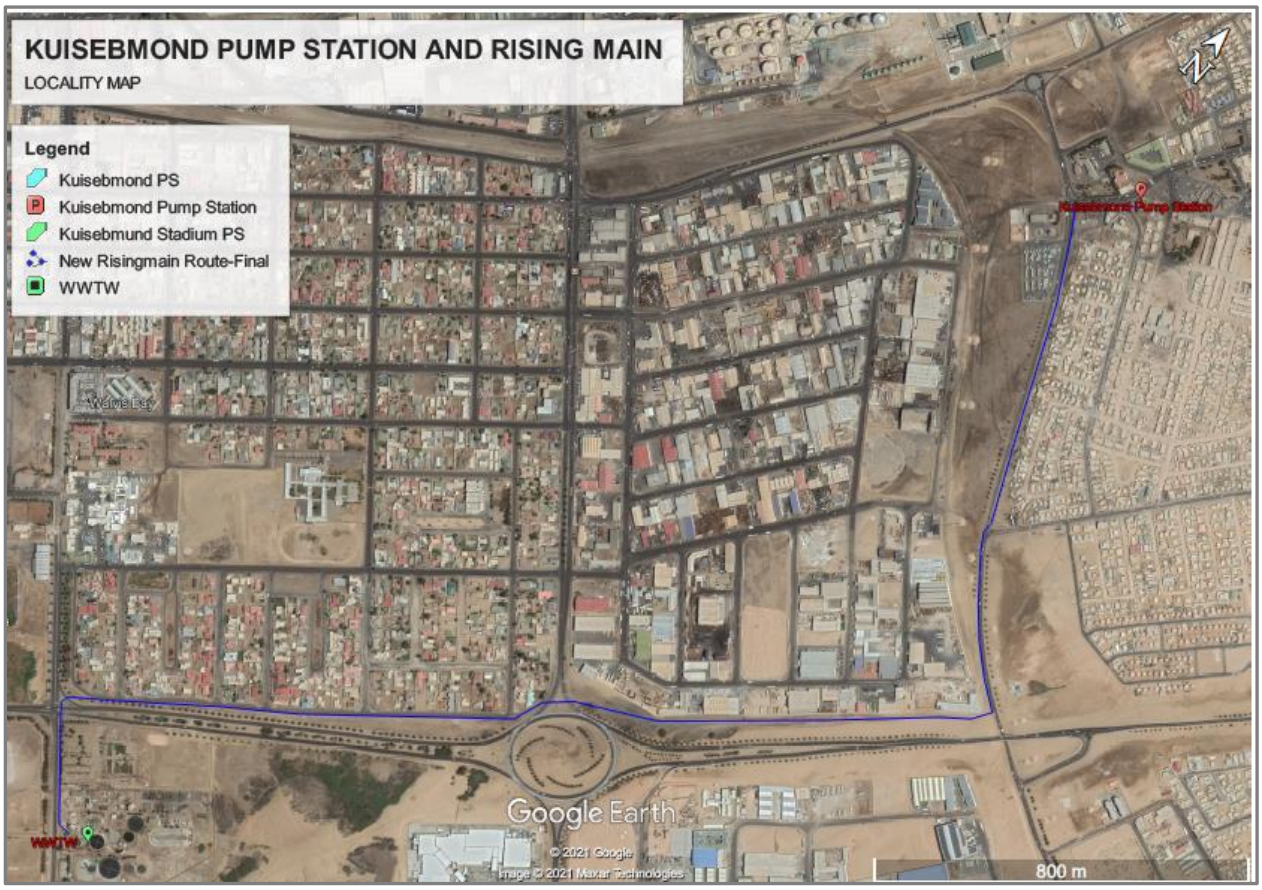

Figure 1.1. The location of the proposed sewage pump station and rising main in Kuisebmond, Walvis Bay

1.2 PROJECT JUSTIFICATION

The Municipality of Walvis Bay (Project Proponent) is the municipal service provider (water, sewerage and land) in the town of Walvis Bay. The Municipality of Walvis Bay (MWB) is responsible for all operation and maintenance of water and sanitation infrastructure in the town Walvis Bay.

Kuisebmond is one of the oldest townships of Walvis Bay and the current bulk sewer network in the area consists of a gravity sewer reticulation network, 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 pump station is at least 34 years old, well beyond the 15-year useful life for the mechanical and electrical components and approaching the design life of the concrete structure. The facility is in an extremely poor condition and the equipment has degraded to the extent that the systems require extensive maintenance to ensure functionality and reliability. Therefore, the pump

station needs replacement to provide safe and reliable operation and to accommodate the full sewer load through the system.

1.3 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Environmental Impact Assessments procedure is regulated by the Ministry of Environment, Forestry and Tourism (MET) in terms of the Environmental Management Act, 7 of 2007. This Act was gazetted on 27 December 2007 (Government Gazette No. 3966). The Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) were promulgated on 6 February 2012.

The Municipality of Walvis Bay wishes to obtain an Environmental Clearance Certificate for the construction and operation of a new sewage pump station and rising main in Kuisebmond, Walvis Bay. Om'kumoh Consulting Engineers cc conducted the EIA process in terms of the Environmental Management Act, 7 of 2007. This process includes: a screening phase and a scoping phase, which includes an impact assessment and development of an Environmental Management Plan (EMP).

This report is the Scoping Report, the main purpose of which is to provide information relating to the proposed new sewage pump station and rising main such as to:

- Identify existing environmental (bio-physical and socio-economic) conditions of the area in order to determine the sensitivity of key environmental features;
- Consult all Interested and Affected Parties (I&AP's), with specific emphasis on the community closest to the affected area to ensure that their needs and concerns are taken into account;
- Comply with relevant Namibian legislation, policies and procedures and guidelines;
- Recommend methods to minimise the identified negative impacts (identified throughout the project life cycle) of the proposed project and its associated infrastructure and enhanced the positive ones;
- Recommend further investigations if some of the issues identified cannot be adequately addressed.

Information applicable to the site has been collated from the review of desktop information, satellite imagery, site visits by the EIA team and stakeholder consultation. The potential impacts of the proposed new sewage pump station and rising main could therefore be assessed.

This document will be submitted to the Directorate of Environmental Affairs (DEA) along with the EMP. It is the opinion of the Lead Consultant that sufficient information is available to address all impacts that have been identified thus far with a high level of confidence. Thus this Scoping Report will be submitted for immediate consideration for Environmental Clearance, without the need for further investigations.

1.4 EIA TEAM

Om'kumoh Consulting Engineers cc is an independent firm of consultants who was appointed to undertake the environmental impact assessment processes.

Faye Namupala has experience of over 15 years in managing, advising and compliance to environmental management, natural resource management and environmental impact assessment practices in the fishing, mining and construction sector.

The relevant curriculum vitae documentation is attached in Appendices A. The environmental project team is outlined in Table 1.1 below.

Table 1.1: The Environmental Project Team

Team	Name	Designation	Tasks and Roles	Organisation/ Company
Municipality of Walvis Bay	Henok Shikongo	Engineer: Water, Waste and Environmental Management	Project Development	Municipality of Walvis Bay
	Kapalesa Katjomuise	Technician: Water, Waste and Environmental Management	Assist Project Development	Municipality of Walvis Bay
EIA Project Management	Faye Namupala	EIA Project Manager	Management of the process and stakeholders.	Om'kumoh Consulting Engineers cc
	Melaku Mekuriaw	Civil Engineer: Water and Municipal Services	Project Design and Implementation	Om'kumoh Consulting Engineers cc

1.5 CONTACT DETAILS OF THE PROJECT PROPONENT

The contact details of those responsible for the project at Municipality of Walvis Bay are included in Table 1.2.

Table 1.2: Contact details of the Municipality of Walvis Bay

Title	Municipality of Walvis Bay
Name	Henok Shikongo
Postal Address	P.O. Box 5017, Walvis BAy
Physical Address	Civic Centre, Nangolo Mbumba Drive, Walvis Bay
Telephone	Tel: +264 64 214 300
Fascimile	Fax. +264 64 214 310
Email	hshikongo@walvisbaycc.org.na

2 SCOPE

The scope of the EIA is to:-

- ❖ Provide sufficient information to determine whether the Development will result in significant adverse impacts;
- ❖ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels;
- ❖ Comply with the Environmental Management Act; and
- ❖ Provide sufficient information to the Ministry of Environment, Forestry and Tourism to make an informed decision regarding The Development.

3 METHODOLOGY

The following method was used to investigate the potential impacts of the proposed Development on the socio-economic and biophysical environment:

- ✓ Baseline information about the Kuisebmond area was obtained from existing secondary Information such as maps and documents, outlining the proposed new sewage pump station and rising main, Design drawings and other EIAs in the Walvis Bay area
- ✓ Site visits to the proposed project area by Om'kumoh Consulting Engineers
- ✓ Consultation with the Municipality of Walvis Bay technical project team
- ✓ Secondary data was obtained for the fauna and flora assessment
- ✓ The comments and questions of interested and affected parties (I&APs) were gathered through various forms of correspondence (municipality meeting, face to face meetings and emails).

The main purpose of this Scoping Report is to indicate the relevant environmental aspects relating to the proposed sewage pump station and rising main project need to be considered and to provide an assessment and/or mitigation measures, where required. Furthermore, this Scoping Report has determined a number of potential environmental impacts and provides measures to mitigate any such impacts if they were to occur (see Section 10). The Scoping Report requirements are outlined in Table 3.1 as set out in Section 8 of the Environmental Impact Assessment Regulations that were promulgated in February 2012 in terms of the Environmental Management Act, 7 of 2007.

Table 3.1 Scoping report requirements stipulated in the EIA regulation

REQUIREMENTS FOR A SCOPING REPORT IN TERMS OF THE FEBRUARY 2012 REGULATIONS	REFERENCE IN REPORT
(a) the curriculum vitae of the EAPs who prepared the report;	Section 1.4 and Appendix A
(b) a description of the proposed activity;	Section 5
(c) a description of the site on which the activity is to be undertaken and the location of the activity on the site;	Section 5
(d) a description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	Section 6, Section 7 & Section 8
(e) an identification of laws and guidelines that have been considered in the preparation of the Scoping Report;	Section 4
(f) details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including - (i) the steps that were taken to notify potentially interested and affected parties of the proposed application; (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given; (iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application; and (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Section 7, Appendix B, Appendix C, Appendix D & Appendix E
(g) a description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	Section 5 & Section 6
(h) a description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Section 8 & Section 9
(i) terms of reference for the detailed assessment; and	Section 9
(j) a management plan, which includes - (i) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure; (ii) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and (iii) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.	Section 10

4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an EIA according to Namibian legislation. The following legislation pertaining to the Development and the proposed development governs the EIA process in Namibia.

The Republic of Namibia has five tiers of law and a number of policies relevant to waste management, treatment, handling, and disposal activities, namely:

- The Constitution
- Statutory law
- Common law
- Customary law
- International law

The Key Environmental Policies currently in force include:

- The EIA Policy (1995).
- Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1994).

As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to protect the natural environment and to mitigate against adverse environmental impacts.

In the context of the proposed sewage pump station and rising main development, there are several laws and policies currently applicable. They are reflected in Table 4.1.

Table 4.1: Relevant legislation Applicable to the proposed new sewage pump station and rising main in Kuisebmond

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
The Constitution of the Republic of Namibia (1990)	Article 91 (c) and Article 95 (i)	The Municipality of Walvis Bay should ensure that the proposed sewage pump station and rising main coexist with the natural environment and most importantly, the well-being of the Namibian citizens in terms of facilities and services.
Environmental Management Act EMA (No. 7 of 2007)	Section 58, Section 56, Section 27	The EMA and its regulations inform and guide the EA process.
Environmental Impact Assessment (EIA) Regulations of 2012 (GN 28-30)	GN 30 S21 Scoping Report (GN 30 S8) Assessment Report (GN 30 S15)	
Labour Act 11 of 2007	Details requirements regarding minimum wage and working conditions (Section 39).	The Municipality of Walvis Bay should ensure that all workers involved in the construction, operations and maintenance of the proposed activity comply with this Act. Municipality of Walvis Bay and its project operators should ensure that the safety and welfare of workers are not compromised during the construction, operation and maintenance of the new network structures.
Public Health Act 36 of 1919	Section 119	
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	
Forestry Act 12 of 2001 Nature Conservation Ordinance 4 of 1975	Section 22 Section 23	The Directorate of Forestry do not have jurisdiction within townlands however the provisions are guidelines for conservation of vegetation. The Municipality of Walvis Bay should notify the relevant authorities in order to be allowed to construct in their jurisdictions. If there are any protected species, a permit to remove them is required.
Atmospheric Pollution Prevention Ordinance (11 of 1976)	The control of noxious or offensive gases Dust control	The Municipality of Walvis Bay should adhere to the requirements of the ordinance.
National Heritage Act (Act 27 of 2004)	Section 48	The Municipality of Walvis Bay should immediately inform the National Heritage Council of Namibia should any archaeological material, e.g. graves be found during the

Legislation/Policy/Guideline	Relevant Provisions	Implications for the project
		construction phase.
Water Resources Management Act (No. 11 of 2013) Water Act 54 of 1956	The Water Resources Management Act 24 of 2004 does not have regulations as yet; therefore the Water Act No 54 of 1956 is enforced which: Prohibits the pollution of underground and surface water bodies (Section 23). ▪ Liability of clean-up costs after closure/ abandonment of an activity (Section 23).	The protection of ground and surface water resources should be a priority. The main threats will most likely be concrete and hydrocarbon spills during construction and hydrocarbon spills during operation and maintenance.
The Pollution Control and Waste Management Bill (in preparation)	The entire Bill	The proponent should apply emissions and management measures and acquire the necessary permits.
Regional, Town and City Structure Plan (1996) Townships and Division of Land Ordinance 11 of 1963	Details the functions of the Township Board including what they consider when receiving an application for Township Establishment (Section 3).	The proposed layout and land uses should be informed by environmental factors such as water supply, soil etc. as laid out in Section 3.
Walvis Bay Town Planning Scheme No. 40: Town Planning Ordinance 18 of 1954	Subdivision of land situated in any area to which an approved Town Planning Scheme applies must be consistent with that scheme (Section 31).	The proposed use of the project site must be consistent with the Walvis Bay Town Planning Scheme
Road Ordinance 1972 (Ordinance 17 0f 1972)	Width of proclaimed roads and road reserve boundaries (Section 3). Control of traffic on urban trunk and main roads (Section 27). Rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads (Section 36). Infringements and obstructions on and interference with proclaimed roads. (Section 37). Distance from proclaimed roads at which fences are erected (Section 38).	The limitations applicable on Roads Authority proclaimed roads should inform the proposed layout and zonings where applicable.

5 PROJECT DESCRIPTION

5.1 Pump Station Catchment Area

Kuisebmond is one of the oldest townships of Walvis Bay and the current bulk sewer network in the area consists of a gravity sewer reticulation network, various sewer pump stations, and rising main infrastructures.

The Kuisebmond pump station catchment area includes 2787 erven in total and the different land use allocations is presented in table 5.1 below. In the absence of actual census data for the specific project area, it was assumed that the residential erven are fully developed and occupied with an average of 6 people per household (assuming middle income as per the red book), and the total number of population is estimated to be about **20 262**.

Table 5.1: Catchment area land use allocation.

Type of Development	No of Erven
Single Residential	2524.00
Gen. Residential	73.00
Special Designated Area	4.00
Local Bussiness	1.00
General Business	118
Light Industrial	1.00
Institutional	20.00
Municipal Purpose	20.00
Public Open Space	15.00
Private Open Space	1.00
Street & Street Widening	10.00
Total	**2787.00**

The current pump station catchment is a fully built-up area and there will not be any additional connection to the network that will contribute to the sewer load. However, provision has been made in the design for extra capacity of 15% to accommodate future densification and economic growth within the catchment area.

In addition, the new Kuisebmond pump station will make provision for the connection of the new Kuisebmond Stadium Pump Station which is being constructed in the vicinity of the area. Figure 5.1 below depicted the catchment area of the Kuisebmond and Stadium pump stations.

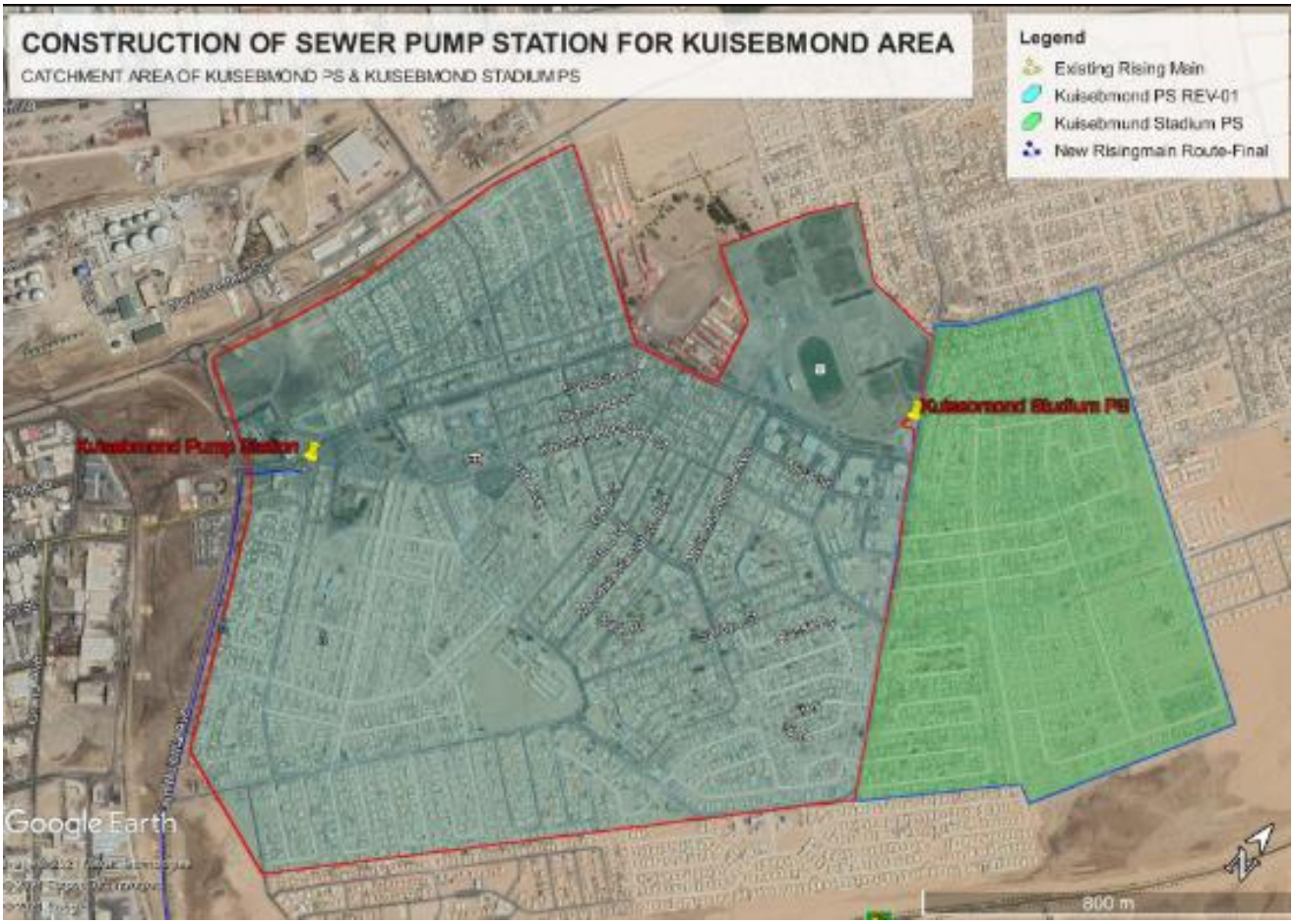

Figure 5.1. The Kuisebmond sewage pump station catchment area

5.2 Existing Kuisebmond Pumpstation

The existing Kuisebmond pump station infrastructure was built in 1986 and has been serving part of the township. 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 design life of the concrete structure. The facility is in an extremely poor condition and the equipment has degraded to the extent that the systems require extensive maintenance to ensure functionality and reliability. Therefore, the pump station needs replacement to provide safe and reliable operation and to accommodate the full sewer load through the system.

The existing sewage pump station currently services the local wastewater catchment via a network of gravity fed drains.

As depicted in the Figure 5.2 below, the pump station includes two inlet chambers, a pump house, wet sump, pump sump, generator room and a utility building. The pumping station incoming lines feed into two separate inlet manholes which are currently being used as sand trap as well. The pump station is an underground structure, circular in plan, with a wet sump around a centered dry pump sump. The pump sump floor is about 4.4 m below the natural ground level.

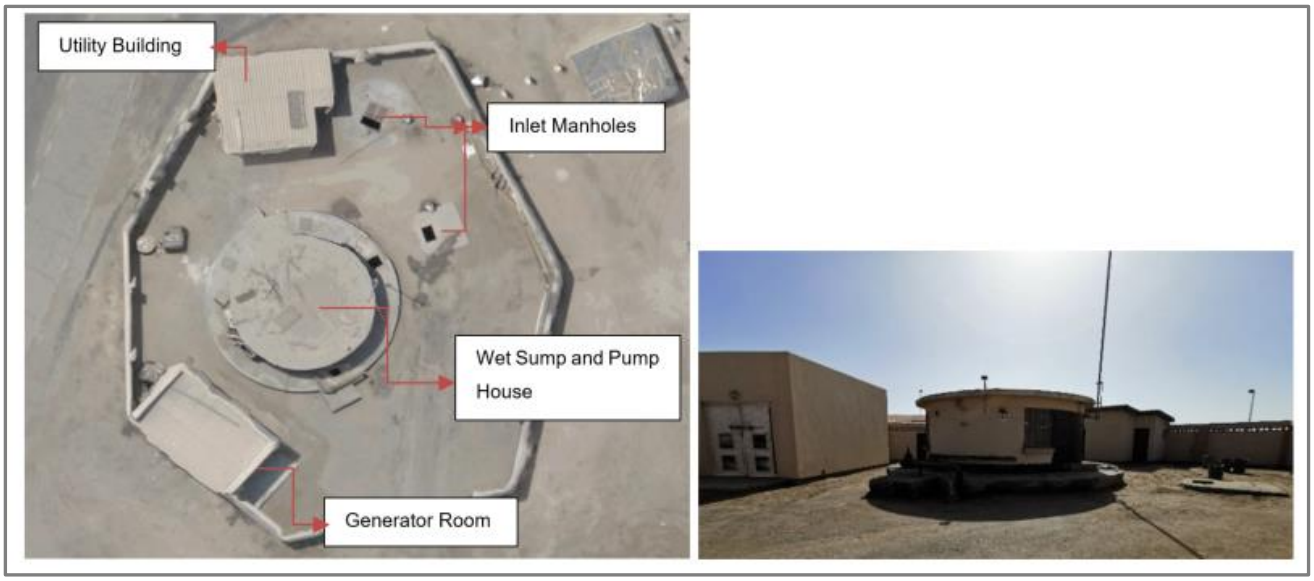

Figure 5.2. Aerial view and picture of the existing sewer pump station in Kuisebmond Walvis Bay

5.3 Design Parameters

The historical flow record of the pumping station depicted that the average daily flow ranges between **903 m³/day** and **3696 m³/day**. However, it has been noted that the daily flow fluctuates between **1500m³/day** and **3000m³/day** in most cases. The historical record also further depicted that the hourly pumping flow ranges between **96.5 m³/hr** and **262 m³/hr**.

As extracted from the Engineer's design report, the calculated current and future flows are presented in the table below:

Table 5.1 Calculated theoretical design flow

	Current Demand			Future Demand		
Design Flow	l/s	m³/min	m³/hr	l/s	m³/min	m³/hr
Average Dry Weather Flow (ADWF)	29.92	1.8	107.71	40.93	2.46	147.35
Peak Dry Weather Flow (PDWF)	59.53	3.57	214.31	92.11	5.53	331.58
Peak Wet Weather Flow (PWWF)	62.14	3.73	223.72	96.37	5.78	346.93

- The current and future average daily dry weather flow is calculated to be 107.71m³/hr (**2587 m³/day)** and 147.35m³/hr (**3536.4 m³/day)**, respectively.
- The current and future daily Peak Wet Weather flow is calculated to be **223.72 m³/hr** and **346.93 m³/hr**, respectively.
- The future demand made provision for additional 15% capacity increase due to possible densification.

- The current sewer demand was calculated considering all the single residential units as high density (500 l/day/erf), and the future demand was calculated assuming all the single residential units will be fully developed to medium density (750/day/erf).Hence, the Peak Wet Weather Flow (PWWF) of **346.93 m³/hr** is accepted as a realistic demand and the new pumpstation is designed to accommodate this capacity.

5.4 Proposed New Development

The proposed new development will consist of a new sewage pump station and rising main in Kuisebmond and these two components are discussed below in more detail.

5.4.1 Sewage Pump Station

The proposed new sewerage pump station in Kuisebmond, Walvis Bay shall be built next to the existing sewer pump station refer to Figure 5.2 an aerial view of existing sewer pump station. The new main sewer pump station will include the following infrastructure:

- Inlet work and Screening facility;
- Wet well pump station;
- Emergency storage sump;
- Motor control centre (MCC);
- Bulk electrical connection;
- Electrical cabling to the equipment;
- Standby generator with an automatic changeover panel;
- Ablution Facility and Storeroom; and a
- Boundary wall.

5.4.2 Sewer Rising Main

The existing sewer rising main, Ø300mm AC, runs between the existing Kuisebmond sewage pump station and the WWTW for a total length of 3500m. The existing pipeline is in a working condition with no operational problem being experienced at present. However, considering the pipeline being in operation for longer than 34 years coupled with the corrosive nature of the soil and the sewage characteristics, it can be realistically stated that the pipeline is reaching its end of life span. Moreover, the existing pipeline are situated in a developed area along streets and adjacent to houses and within sensitive environments, and therefore the repair and maintenance of the pipeline will be a difficult exercise once it starts to experience leaks.

Therefore, it is included in the project scope that a new sewer rising main will be constructed between the new pump station and the existing wastewater treatment works (WWTW). The proposed new rising main is Ø315 mm uPVC, Class 12 pipe with a total length of 3500m. Once the construction of the new rising main is completed, the existing the rising main will be redundant and hence the pipeline needs to be decommissioned.

Figure 5.3 below shows the position of the existing rising main and the selected route for the new rising main.

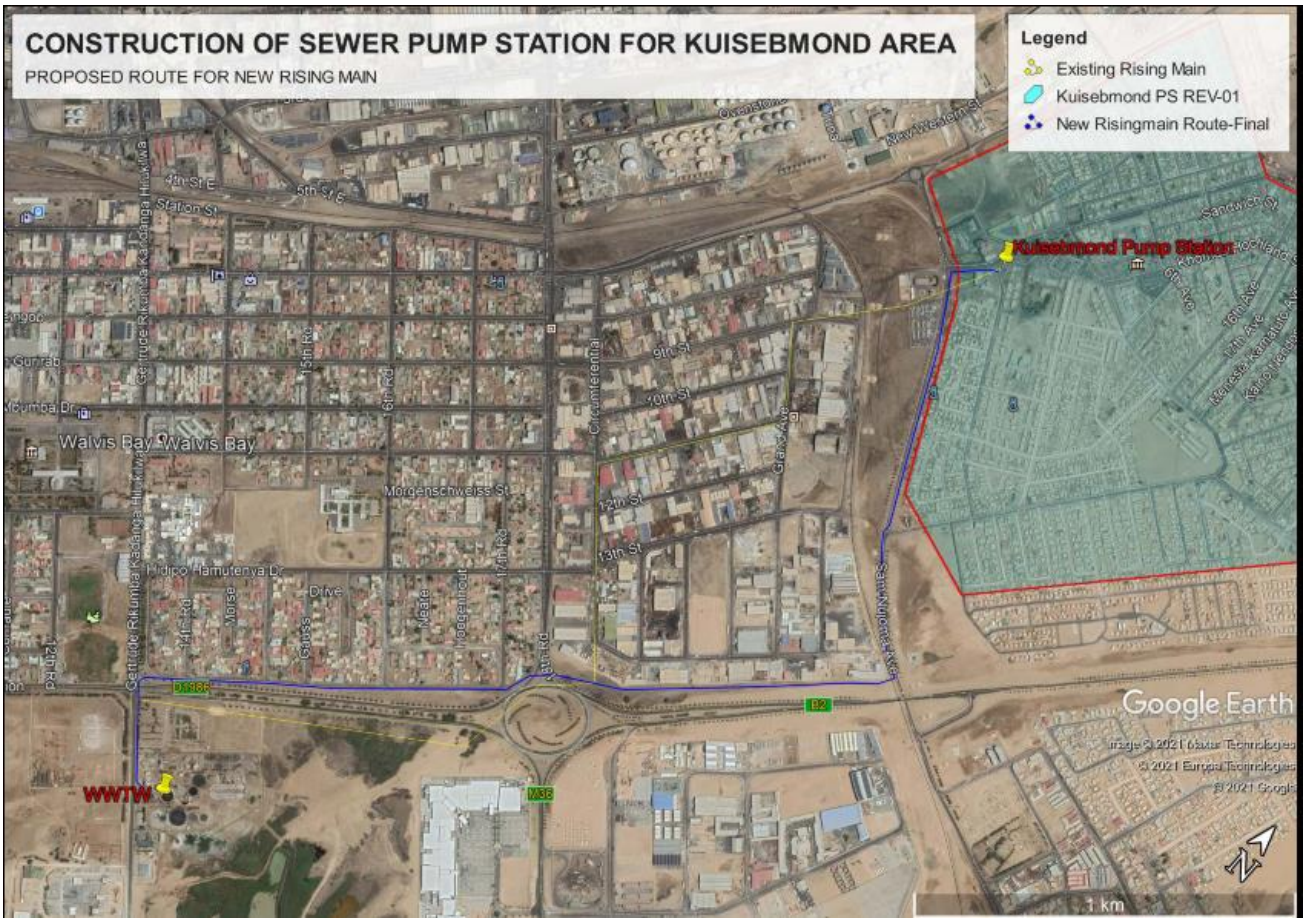

Figure 5.3. The location of the existing rising main and selected route for the new rising main.

5.5 Project Site Location and Proposed Layout

The construction of the new sewage pump station will be located at ERF 4246, corner of Nathanel Maxuilili Avenu and Franke Abraham Street, in Walvis Bay.. The Municipality of Walvis Bay is the owner of the land and currently the existing pump station occupied part of the area.

The proposed site location and layout of the new pump station is depicted in Figure 5.1 below. The existing pump station will be protected and remain operational during the construction stage and will only be decommissioned once the new pumpstation is made fully operational.

Figure 5.4. The location of the existing sewage pump station in Kuisebmond

5.6 Site Selection

The MWB completed a feasibility study on the proposed new development. The Kuisebmond gravitational collection system ends at the existing pump station. Therefore, it was the most practical in terms of technical and financial considerations based on the natural gravitational flow of the sewage system. Furthermore, the proposed site was the only available land in the vicinity of the existing collection sewer system in Kuisebmond. Finally the existing space is zone for Municipal Purposes.

The proposed rising main route had the least disturbance to private businesses, residents and traffic based on the feasibility study. The proposed rising main route has sufficient space from other service amenities and the road reserve. The proposed rising main route is easily accessible for future operations and maintenance and it has the shortest distance to the WWPT.

5.7 Project Development Phases

The overall project development process for the proposed sewage pump station and rising main will be subdivided into the following phases and it's discussed below in more detail:

- Phase 1: Design, Bid Documentation and Procurement
- Phase 2: Construction of new sewage pump station and rising main

- ❖ Phase 3: Proposed development management and maintenance (i.e. Operational phase)
- ❖ Phase 4: Decommissioning of existing sewage pump station and rising main infrastructure
- ❖ Phase 5: Decommissioning of the new sewage pump station and rising main infrastructure

5.5.1 Phase 1: Design, Bid Documentation and Procurement Process

Up on the successful completion of the detail project design and approval process, the Municipality of Walvis Bay will advertise the bid for the construction of the proposed new sewage pump station and rising main in Kuisebmond. The bid shall specify to appoint experienced contractors for the construction of the sewage pump station and rising main.

5.5.2 Phase 2: Construction Process of the sewage pump station and rising main

The phase will include the following processes:

- Construct new pump station and rising main:
- Construct re-routing of incoming pipelines and manholes:
- Connect new pump station to the new rising main:
- Test new pump station with existing station serving as backup:

During the construction phase existing access routes and already disturbed areas will be used for access to, and construction activities associated with the new sewage pump station and rising main. A temporary laydown for safe storage of equipment, fuels, lubricants, solvents, paints and construction materials will be established on site of the existing sewage pump station.

Site preparation activities for the construction of the new sewage pump station and rising main will involve:

- Surveying of the site
- Construct a visible barricade and safety warning signs at the site boundary to ensure public safety
- Portable toilets will be located in close proximity to where construction activities are being undertaken to avoid long distance driving to access them. These will be serviced regularly
- Determining mobile waste collection and storage points

Construction activities will involve:

- Excavation of the foundation of both the pump station and rising main
- Installation of the earthing system for both the proposed activity.
- Cast blinding layer of the foundation covering the earthing system.
- Placement and fixing of the reinforced steel.
- Use of generators
- Handling, storage and transportation of non-hazardous and hazardous waste
- Cast the foundation and curing period.
- Construction of the equipment room.

- Permanently modify the pump station area and construct any other services including, landscaping, parking, new fencing, and other required utilities.
- Site is ready for service.

Risks associated with the construction phase

- Risk of excavation collapse at the sump – due to the substantial depth of the sump and the proximity of existing structures consideration will need to be made to prevent construction works that lead to real danger:
- Risk of excavation collapse for pipeline – as a pumping main the flexibility to limit excavation depth exist and thus mitigate against the risk of collapse. The danger of the available alignment is the existence of development along the pipeline route and thus important to manage this risk:
- Traffic disturbance – there will be disturbance to traffic during construction which will be mitigated in line with the EMP that is a product of the EIA process: and
- Disposal of excavated material – any excavation produces excess material that need to be disposed of as soon as possible. The EMP will provide guideline on how this will be undertaken such as not to negatively affect people in the town.

The Municipality of Walvis Bay expect the project completion within ten (10) months and all excess excavated material and rubble be removed from site.

Accommodation during construction phase

The construction team will stay in Walvis Bay. A maximum number of ±25 labourers will be appointed for the construction activity. Accommodation of the construction workers at site is not permitted.

Sanitation during construction

Sanitation where required will be managed by the construction contractor. Temporary site toilets will be constructed and connected to the existing sewage system or pump station.

Power supply for construction activities

Supply of power where required will be managed by the construction contractor. The contractor to apply to the relevant authorities for power connection or mobile generators will supply power for the construction phase.

Water supply for construction activities

Supply of water where required will be managed by the construction contractor. Water supply on the site is to be provided by the nearest water meter from the Municipality of Walvis Bay.

Waste Management

Waste management will be managed by the construction contractor. Relatively small quantities of waste will be generated during the construction phase. Waste will be separated at source, stored in a manner that there can be no discharge of contamination to the environment and either recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities including the Walvis Bay Landfill site or the Walvis Bay hazardous disposal facility for hazardous waste. The only hazardous waste expected (in relatively small volumes) is possible hydrocarbon spillages and associated hydrocarbon contaminated material (i.e. soil, etc.) from construction vehicles and machinery, waste paint, etc.

Removal of Temporary Infrastructure and Rehabilitation

At the completion of the construction activities of the pump station and rising main, all temporary infrastructures including but not limited to laydown area and unused waste material, mobile toilets and construction equipment must be removed from site. Where soil contamination due to hydrocarbon spillages has occurred, soils must be treated according to the EMP recommendations. Vehicle tracks and any other excavations as a result of the proposed project must be rehabilitated and waste must be managed as per EMP recommendations.

Dewatering process

The groundwater table at the site is at depths ranging between 700mm and 1100mm. Therefore, dewatering is expected to be required in deeper excavations. This can be carried out by establishing well points along the excavated trench. The water points should be extended at least 2.0m below the proposed excavation base, depending on pumping method and surrounded by a gravel filter pack to promote vertical drainage. Another method is by providing a sump in the excavation trench and the water can be pumped.

Groundwater recovered from the dewatering process must be disposed to an approved outlet (storm water) if there is any in the vicinity, in order to curb underground water back flow because the soil is very permeable.

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. However, the new rising main can be installed first, and be used to pump underground water to the wetland behind the Dunes mall. Another option is to identify an open space near the pump station to build a coffer dam to temporary store the underground water. The coffer dam option will require additional Health and Safety measures to ensure the safety of the public.

Risks associated with the dewatering phase

- Dewatering – the high-water table presents three challenges: ensuring water free working area, avoiding excessing pumping leading to excavation collapse and finally disposal of pumped water. A strategy must be developed that mitigates against all three of these risks

There are two methods to deal with the dewatered groundwater, namely to pump it into an approved coffer dam area or to construct the new rising main first so that it may be used to drain the excess groundwater (this option also requires permission from the Municipality of Walvis Bay). Currently, the most suitable option is to first construct the new rising main to allow the excess groundwater into the sewer system.

5.5.3 Phase 3: Operational phase

The operational phase includes the following processes:
- Permanently disconnect the existing pump station and rising main
- Move wastewater to higher elevations in order to allow transport by gravity flow.

Maintenance during operational phase

The Municipality of Walvis Bay will be responsible for maintenance services of the new sewage pump station and rising main, and is required to adhere to all requirements in the EMP. The sewage pump station will be maintained in accordance with the best industrial practise as established, as well as the operation and maintenance procedure. The effective maintenance of the sewage pump station is to extend the useful life of the pump station for as long as possible.

Power supply during operational phase

The use of a powerline that supplies the pump station site with electricity, independent of its length may pose a risk to the surrounding fauna in particular birds. However, the powerline at the proposed site will be buried which significantly reduces the risk to the surrounding fauna in particularly birds.

5.5.4 Phase 4: Decommissioning of existing sewage pump station and rising main infrastructure

The phase includes:

- The safe removal of all existing infrastructure not to be reused for future use of land;
- Rehabilitation of environment affected by pump station and rising main.

5.5.5 Phase 5: Decommissioning of the new sewage pump station and rising main

In the event that the new sewage pump station in Kuisebmond has reached its useful life, the Municipality of Walvis Bay must ensure that the pump station and rising main is taken down in a safe and responsible manner. The sewage pump station and rising main shall be replaced with the similar type of pump station and rising main pipeline, at least similar in function and capacity.

5.6 Alternative Assessment

The purpose of this section is to describe and assess the proposed alternatives to establish the preferred alternative. It is however important to note that the selection of a specific design for a site depends on the site conditions and in some instances it may not be technically or economically feasible to implement the preferred alternative.

No other site-specific alternatives have been investigated for the new proposed development in Kuisebmond, due to the fact that the upgrades are proposed at the existing site so as to enhance the existing functionality thereof and to minimise environmental risk related to the existing site. Further, the proposal will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint.

The site is owned by the Municipality of Walvis Bay and therefore the process does not require further negotiations with third parties for site acquisition purposes.

The proposed rising main route had the least disturbance to private businesses, residents and traffic based on the feasibility study. The proposed rising main route has sufficient space from other service amenities and the road reserve. The proposed rising main route is easily accessible for future operations and maintenance and it has the shortest distance to the WWPT.

5.7 The "No Go" Option

The option of not implementing the new proposed sewage pump station and rising main would mean that the Municipality of Walvis Bay would not be able to effectively manage sewerage to cater for the increased population demand and socio-economic growth in Kuisebmond. Therefore, continuous sewage overflow to residential properties in the community of Kuisebmond will be the result of not implementing the new proposed sewage pump station. Potential impacts on the environment would however be avoided with the construction and operation of the new sewage pump station and rising main.

The proposed project could lead to some employment opportunities in the various regions of Namibia and contribute to both Harambee and Vision 2030 objectives for infrastructure development and community upliftment in the country. In that regard, the "no-go" alternative is not the preferred alternative as it is believed that this project could positively contribute to development in Namibia especially if the potentially negative effects of the project on the receiving environments are avoided or at least minimized.

6 THE RECEIVING ENVIRONMENT

This section has been compiled with reference to the site visits by the Environmental Team; other EIAs conducted in the regional area; and use of satellite imagery.

Several site visits of the proposed project area were conducted on 18-25 March 2021.

6.1 LOCALITY, TOPOGRAPHY AND SURROUNDING LAND USE

The new proposed sewage pump station is located within the Walvis Bay Townlands in the Kuisebmond area at the Walvis Bay (Figure 6.1). The new proposed sewage pump station falls under the authority of the Municipality of the Walvis Bay and its zoning classification is a Municipal Purposes zone. The site caters for municipal wastewater management activities. The area surrounding the project site is urban residential business land use (Photo 1).

The proposed site are approximately 7 km away from the artificial bird guano platform, 2 km from the closest beach site (Independence beach), 5 km from the Walvis Bay Lagoon and 3 km from the Walvis Bay municipal waste water treatment plant's effluent ponds. These coastal habitats have ecological features that are important to birds.

The site is not situated in a catchment area of any major rivers or channels. Walvis Bay is located in the Central Western Plain of Namibia. The Kuiseb River forms the southern boundary of this landscape group, with the Namib Dune Field being present south of the Kuiseb River. The bay is formed by a peninsula commonly known as Pelican Point. On the southern part of the bay is a lagoon which used to be the mouth of the Kuiseb River.

The topography is generally flat with a local gentle downward slope in a westerly direction (Figure 6.2). Drainage is poorly developed due to the lack of rainfall <50mm/annum received in the area. A dune field is present southeast of Walvis Bay and also further to the northeast. These dunes generally migrate in a northerly direction. Further inland is the gravel plains of the central areas of the Namib Naukluft Park. Surface water around Walvis Bay is limited to the marine salt pans, lagoon and ocean as well as a man-made wetland formed as a result of the sewage treatment works.

Photo (1). View of the proposed site in Kuisebmond.

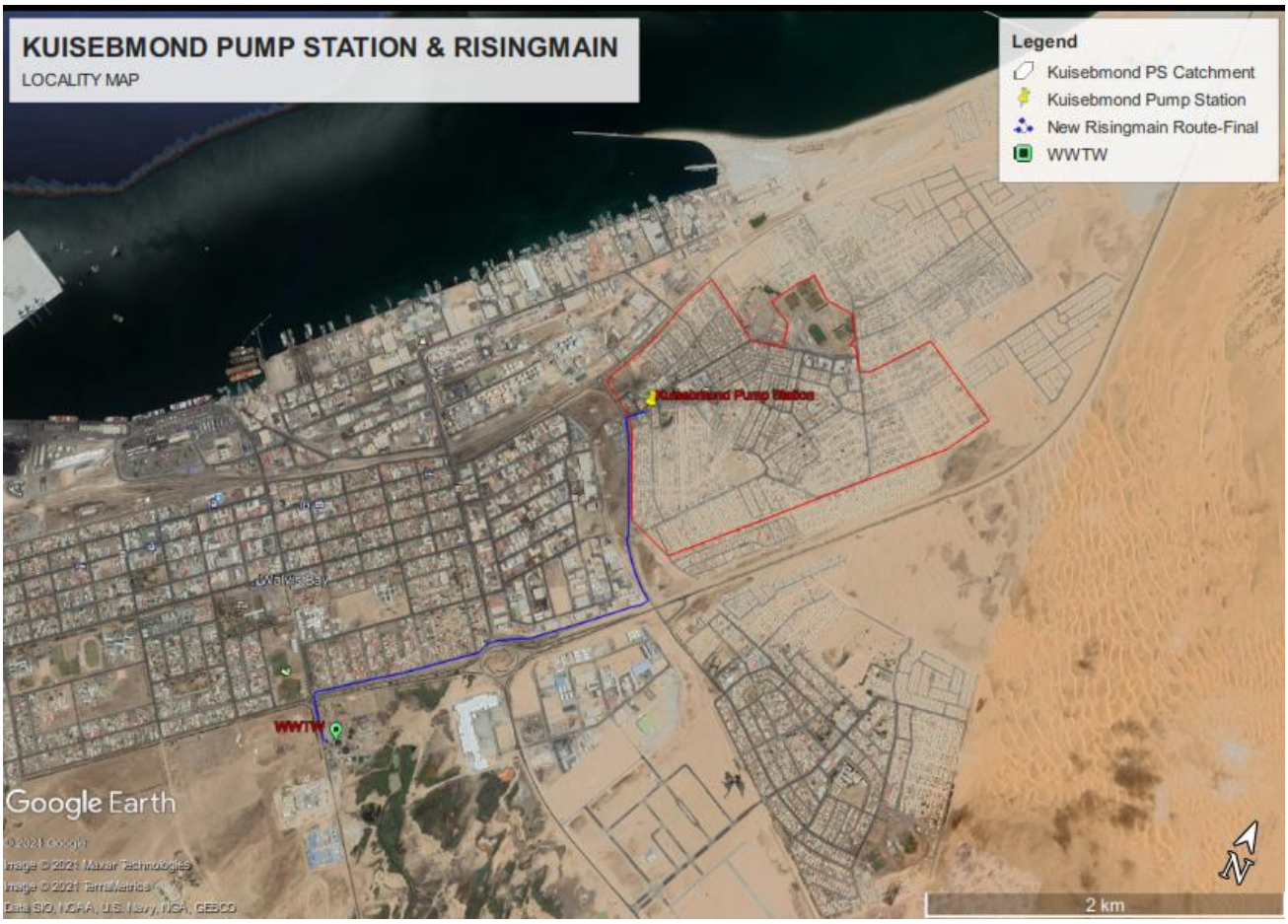

Figure 6.1. Proposed sewage pump station location in Kuisebmond

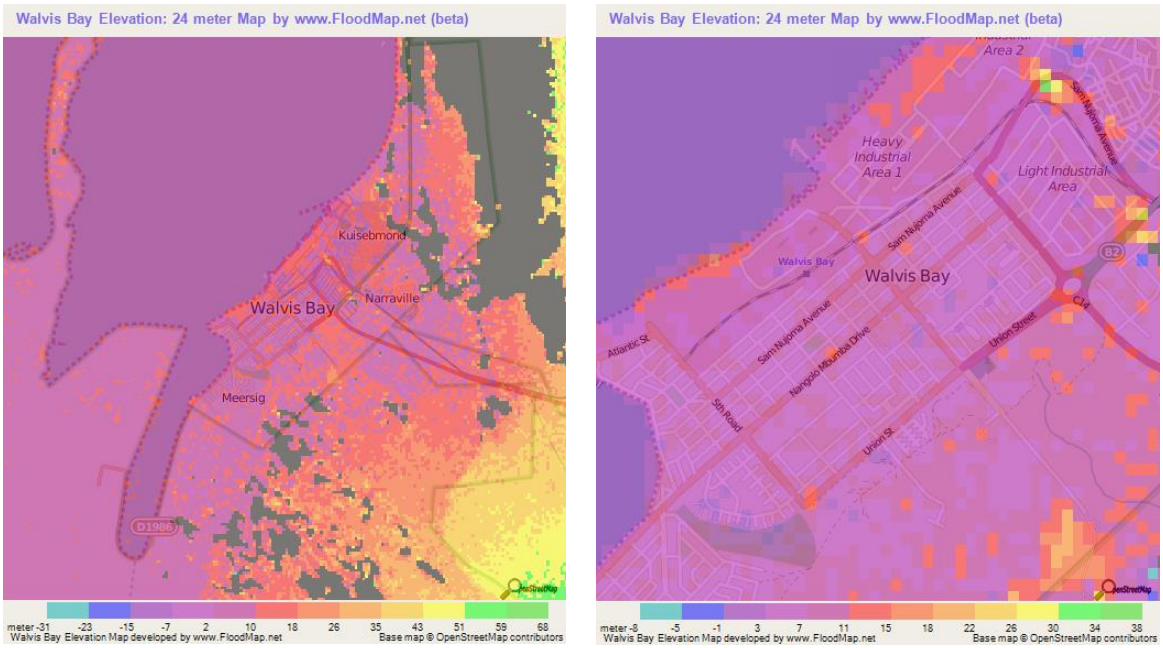

Figure 6.2. Walvis Bay elevation map (Source: https://www.floodmap.net/Elevation/ElevationMap/?gi=3359638)

Implications and Impacts

The new proposed sewage pump station and rising main site is classified as a Municipal Purposes zone by the Municipality of Walvis Bay. The classification is based on the existing sewage pump station activity. The land is owned by the Municipality of Walvis Bay and therefore does not require land use consent to construct and operate the new proposed sewage pump station.

Furthermore, flooding is not normally a concern in the area. However, sewage overflow is a concern due the demand created from the current population size and technical (mechanical, electrical and civil/structural) limits of the existing sewage pump station.

6.2 CLIMATE

Walvis Bay is situated in the most arid part of the Namib Desert. The climate is characterized by mild summers and cool winters, with average minimum and maximum temperatures ranging between 10˚C and 24˚C. The cold water Benguela system along the coast controls the coastal climate. Winds generated from the high-pressure cell over the Atlantic Ocean blow from a southerly direction when they reach the Namibian coastline. As the Namibian interior is warm (particularly in summer), localised low pressure systems are created which draws the cold southerly winds towards the inland desert areas (Mendelsohn et al. 2002).

These winds manifest themselves in the form of strong prevailing south-westerly winds, which range from an average of 20 knots (37 km/h) during winter months to as high as 60 knots (110 km/h) during the summer (Christian, 2006). Winds near Walvis Bay display two main trends namely; high velocity and frequency south to south-westerly winds in summer and high velocity, low frequency east to north-easterly winds during winter. During winter, the east winds generated over the hot Namib Desert have a strong effect on temperature, resulting in temperatures in the upper 30's degrees Celsius and tend to transport plenty of sand (Christian, 2006).

Fog is a common occurrence in the central coastal Namib, often providing the only source of water for the succulent and lichen flora in the Namib Desert. During spring and summer, the sea breezes move moisture inland, resulting in the formation of fog early and late in the day. In winter the fog is more the result of moist oceanic air blowing on shore (Mendelsohn et al. 2002).

Variation in annual rainfall is very high and most communities within this environment are dependent on regular fog occurrences. January to April is the months with the highest likelihood of rainfall. The long term mean annual rainfall for Walvis Bay is less than 20 mm per annum, with annual totals ranging from 0 mm to 100 mm. Annual evaporation in the area is fairly high and evenly spread throughout the year. Although the evaporation is reduced by fog and low mean daily temperature range, the high mean wind speed increases the evaporation considerably. With minimal rainfall, most of the waste stream is expected to dry out, rather than decomposing (Mendelsohn et al. 2002).

Table 6.1: Summary of Climate Data for Walvis Bay (Atlas of Namibia)

Precipitation (mm/a)	0-50
Variation in annual rainfall (%)	>100
Average annual evaporation (mm/a)	2800-3000
Water deficit (mm/a)	1901-2100
Temperature (°C)	18-19

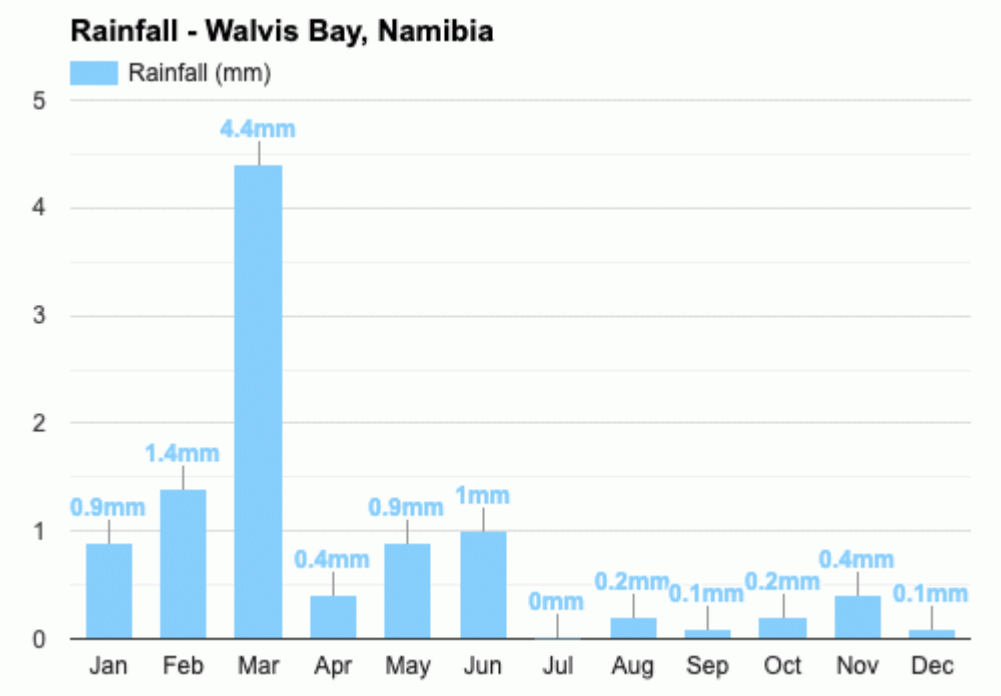

Figure 6.2. Rainfall information for the study area (source: https://www.weather-atlas.com/en/namibia/walvis-bay-climate)

Water is a scarce and valuable resource in Namibia and especially in the Namib Desert. Rainfall events are scarce and regular occurrences of fog conditions supply many desert adapted species with the water they require (Mendelsohn et al. 2002).

Implications and Impacts

Water is a scarce and valuable resource in Namibia and especially in the Namib Desert. Rainfall events are scarce and regular occurrence of fog conditions supply many desert adapted species with the water they require.

The climatic conditions at the proposed site should not pose any significant concerns related to the construction and operation of the new proposed sewage pump station and rising main. During construction windy conditions may cause excessive dust to be generated when surfaces are exposed during excavations. Flooding is not a concern.

6.3 GEOLOGY AND HYDROGEOLOGY

The geomorphological evolution of the coastal desert of Namibia dates essentially from the Jurassic-Cretaceous monoclinal folding of the southern African continental margin in response to the plate-tectonic fragmentation of Gondwanaland. Northerly dune migration is forcing the Kuiseb River in a northerly direction, with Kuiseb River paleochannels being present as far south as Sandwich Harbour. Following the breakup of West- Gondwana during the early Cretaceous (130 – 135Ma ago), continental uplift took place, enhancing erosional cutback and the formation of the Namibian Escarpment. The crystalline basement in the Erongo region is represented by rocks of Abbabis Complex and the Nosib and Swakop Groups of the Damara Sequence. A narrow pediplain formed, mainly over Damara Age rocks. The South Atlantic started filling in over the pediplain, with marine conditions established around 80 Ma ago. Towards the end of the Cretaceous (70 – 65Ma ago) a relative level surface was created, on which later deposition of sediments took place. Marine deposition took place in the parts covered by the newly formed South Atlantic Ocean, while terrestrial deposits took place on land. Further continental uplift moved the shoreline to its present position.

The project area geotechnical investigation carried out by Namibian Civil Engineering Laboratory (NCE) on behalf of Om'kumoh Consulting Engineers highlighted the following as a main characteristic of the underlying ground:

- The soil profile of the project site is identified as coastal fine to medium SAND with the consistency of very loose to loose condition.

- The CBR/MOD tests indicated that the project area in situ soil is classified as G10 Red Sand for a depth up to 200mm and G10 white Brown Sand for a depth between 200mm and 1100mm.

- The depth of groundwater table in the project area ranges between 700mm and 1100mm from the natural ground surface

- Dewatering of the dapper excavations will be required during construction/dewatering stage.

The chemical test result of samples collected from the project area indicated that in-situ soils are corrosive with soluble salt content of 456.9S/m on average and pH of 8.4.

The hydraulic conductivity of the sediments is expected to be relatively high and groundwater flow would be mainly through primary porosity. No potable groundwater source is known of in the vicinity of the site. Groundwater at the site is expected to be saline and the depth to water table at the site is expected to be less than 5 m below surface.

The Municipality of Walvis Bay currently purchase fresh/potable water from NamWater, which source water from the Kuiseb Water Supply Scheme.

Implications and Impacts
Groundwater is not utilised in the area. Groundwater is not a source of potable water and as such public water supply should not be at risk as a result of activities at the facility.

6.4 BIODIVERSITY

Walvis Bay is a tourist attraction because of the proximity of 100,000 water birds, mainly flamingos, to public areas (Simmons et al. 1998). The Walvis Bay wetland system includes the lagoon, the ephemeral Kuiseb River mouth and the Walvis Bay sewage disposal facility (Bird Paradise; Figure 6.3).

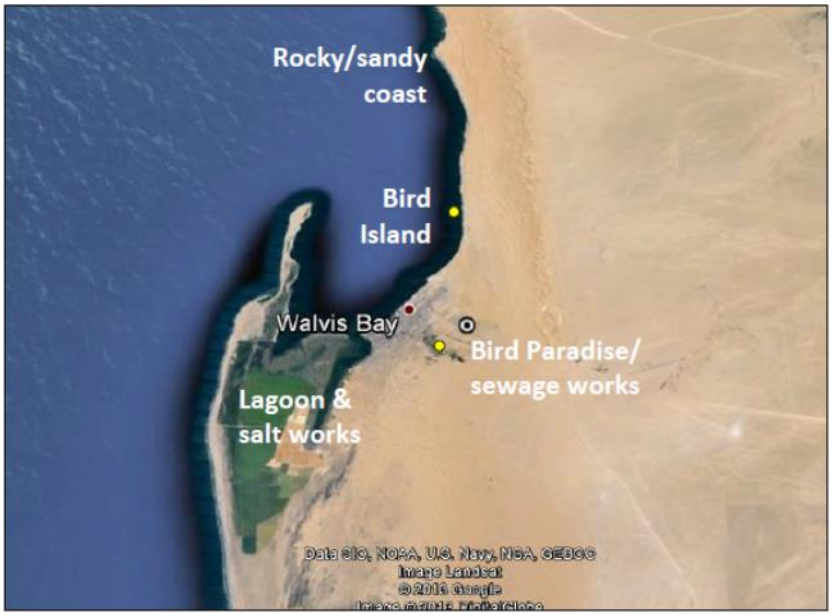

Figure 6.3. The Walvis Bay wetland system

The property is located within an urban set-up and it is an old developed area. In the urban setup, the habitat for fauna and flora is fragmented and is expected to degrade subsequently. Table 6.2 and Table 6.3 below indicate the fauna and flora found in the biome in which Walvis Bay is situated.

It is highly unlikely that all the species listed for this Biome occur in the vicinity of the proposed site. Of note nearby (5 km) are the Walvis Bay Lagoon, which are the key components of the 9,000 km^2 Ramsar site (Wetland of International Importance). It is important both as an over-wintering area for Palaearctic migrant wader species as well as for African species such as Greater and Lesser Flamingos, Great White Pelican and Chestnut-Banded Plovers.

The sewerage ponds, situated about 3 km south of the study area, are regarded as sensitive wetlands. Although a manmade fresh water source, they are an attraction for pelicans and flamingos. These wetlands also support 53% of the duck and geese population in the area. The wetland is formed by the constant inflow of semi-purified water and supports extensive stands of reeds. There is a flight path for birds between the sewerage ponds and the man-made guano platform. This flight path is not near the project site.

In the coastal profile of the Erongo region (1999), the vegetation units and types of plant communities have been identified and arranged into the climatic zones that run parallel to the coast. The vegetation units are named after their dominant plant or lichen species out of >150 species that

they contain in total (Coastal profile of the Erongo region, 1999). The sewage pump station and rising main are located within the coastal zone and are arranged according to the Coastal profile of the Erongo region, 1999 into the following zones with respect to the proposed development:

The Coastal Zone comprises the coastal hummocks (the succulent shrubs *Arthraerua leubnitziae-Salsola nollothensis*), and the lichen fields of *Teloschistes capensis* and *Lecidella-Combea mollusca* with the shrub *Arthraerua leubnitziae*.

Other notable plant communities are in the:

Dune Fields between Swakopmund and Walvis Bay and south of Walvis Bay, where spiny dune grass *Stipagrostis sabulicola* and the succulent dwarf shrub *Trianthema hereroensis* dominate. Both of these can take up fog water, either through shallow roots (*S.sabulicola*; Louw & Seely, 1980), or through the leaves (*T.hereroensis*; Seely et al., 1977).

The Nara *Acanthosicyos horridus* (Cucurbitaceae) is endemic to the Namib desert, with high densities in the lower Kuiseb valley, particularly in the area some 10 km south-east of Walvis Bay in the Kuiseb Delta (Coastal profile of the Erongo region, 1999). The Nara requires ground water tapped with long roots (Coastal profile of the Erongo region, 1999). Naras grow 5-10 m high and 10-40 m in diameter. The fruits, seeds, growing tips and flowers are highly nutritious, and the canopies shelter many animals, making this a very important plant for the ecology of the Namib (Coastal profile of the Erongo region, 1999).

Vegetation of the West Erongo Region is important for its uniqueness (high degree of endemicity), and its resource potential, including medicinal. Several plant communities, particularly the coastal hummocks, the lichen fields in the coastal and foggy zones, as well as the dolerite ridges, are vulnerable to mechanical damage, e.g., by off-road vehicles, and take a very long time to recover (Coastal profile of the Erongo region, 1999) .

Microfauna is an important component of the soil (André et al., 1997). This includes disturbance to the substrata on the dunes, gravel plains, beneath rocks, in rivers and washes and on the beach. The microfauna includes such animals as mites and nematode worms. Along with the microflora and mycorrhiza (fungus), microfaunal communities are crucial for facilitating nutrient cycling and soil formation and this, in turn enables other organisms to occur at a site. The integrity of the entire microcommunity is most important and should not be overlooked when assessing damage or rehabilitation of an area.

Then table 6.2 provides all the endemic vertebrates in the western Erongo region where the proposed activities are locate (Coastal profile of the Erongo region, 1999).

Table 6.2: Endemic vertebrates in the Western Erongo Region (Coastal profile of the Erongo region, 1999)

BIRDS:			
Namib endemic birds [4] Rüppel's korhaan	**Namibian endemic birds [10]** Hartlaub's francolin	**Endangered birds [6]** White pelican *Pelecanus onocrotalus*	**Vulnerable birds [8]** Lappetfaced vulture *Torgos tracheliotus*

Eupodotis rueppellii (gravel plains & interdune plains) Dune lark *Certhilauda erythrochlamys* (dunes) Damara *tern Sterna balaenarum* Gray's lark *Ammomanes grayi* (gravel plains & interdune plains)	*Francolinus hartlaubii* Rüppel's parrot *Poicephalus ruepelli* Monteiro's hornbill *Tockus monteiri* Barecheeked babbler *Turdoides gymnogenys* Violet woodhoopoe *Phoeniculus damarensis* Herero chat *Namibornis herero* Rockrunner *Achaetops pycnopygius* Short-toed rock thrush *Monticola breviceps* Whitetailed shrike *Lanioturdus torquatus*	Pinkbacked pelican *Pelecanus rufescens (*rare vagrant) Cape gannet *Morus capensis* Crowned cormorant *Phalacrocorax coronatus* Greater flamingo *Phoenicopterus ruber* Lesser flamingo *Phoeniconaias minor*	Black eagle *Aguila verreuxii* African black oystercatcher *Haematopus moquini* Chestnutbanded plover *Charadrius pallidus* Hartlaub's gull *Larus hartlaubii* Caspian tern *Hydroprogne caspia* Swift tern *Sterna bergii* Cape eagle owl *Bubo capensis*

MAMMALS:

Namibian endemics

Angola hairy bat *Myotis seabrai*: inselbergs, Brandberg
Black mongoose *Galarella nigrita*: rocks
Golden mole *Eremitalpa granti namibensis*: dunes
Hartmann's mountain zebra *Equus zebra hartmannae*: eastern plains & inselbergs
Mountain ground squirrel *Xerus princeps*: inselbergs
Dassie rat *Petromus typicus*: inselbergs
Namib bush-tailed gerbil *Gerbillurus setzeri*: plains
Namib dune gerbil *Gerbillurus tytonis*: dunes
Namibian rock mouse *Petromyscus collinus*: inselbergs

FROGS:

Damara dwarf toad *Bufo hoeschi*: pools on inselberg [endemic]
Dombe dwarf toad *Bufo dombensis*: pools on inselberg [endemic]
Marbled rubber frog *Phrynomantus annectens*: pools on inselberg [endemic]
Tremolo pyxie *Tomopterna cryptotis*: pools in riverbed [not endemic]

REPTILES:

Namibian endemic lizards [10]	**Namibian endemic snakes [10]**	**Namibian endemic geckos [13]**
Slender blind legless skink *Typhlosaurus braini*: dunes Wedge-snouted skink *Mabuya acutilabris*: grass tufts on sand Namibian tree skink *Mabuya spilogaster*: Acacia trees in dry river courses Southern slipface lizard *Meroles anchietae*: dune slipfaces Wedge-snouted desert lizard *Meroles cuneirostris*: dune vegetation Small-scaled desert lizard *Meroles microphilodotus*: course coastal dune sand Reticulated desert lizard *Meroles*	Damara worm snake *Leptotyphlops labialis*: plains Western worm snake *Leptotyphlops occidentalis*: plains Beaked blind snake *Typhlops schinzi*: plains Namibian dwarf python *Python anchietae*: rocks & washes Namibian wolf snake *Lycophidion namibianum*: plains & washes Western keeled snake *Pythonodipsas carinata*:	Palmatogecko *Palmatogecko rangei*: dunes Banded barking gecko *Ptenopus carpi*: plains Koch's barking gecko *Ptenopus kochi*: interdune plains Coastal Namib day gecko *Rhoptropus afer*: rocks and inselbergs Lesser Namib day gecko *Rhoptropus barnardi*: rocks Damara Namib day gecko *Rhoptropus bradfieldi*: rocks and inselbergs African flat gecko *Afroedura africana*: granite outcrops Festive gecko *Narudasia festiva*: diurnal on rocks and inselbergs

reticulatus: plains Short-headed sand lizard *Pedioplanis breviceps*: plains and washes Dwarf plated *lizard Cordylosaurus subtessellatus*: near succulents on inselbergs Small-legged burrowing skink *Typhlacontias brevipes*: coastal hummocks	rocks Namibian shovel-snout Prosymna frontalis: rocks Damaraland tiger snake *Telescopus crf. semiannulatus polystictus*: trees Western spitting cobra *Naja nigricincta*: rocks, washes, trees Southern Namib sand adder *Bitis peringueyi*: dunes	Velvety gecko *Pachydactylus bicolor*: rocky outcrops Damaraland banded gecko *Pachydactylus fasciatus* Brandberg gecko *Pachydactylus gaiasensis*: shelters in sandstone, forages on sand Namib ghost gecko *Pachydactylus kochi*: rocks on sandy plain (near Cape Cross) Smooth button-scale gecko *Pachydactylus laevigatus*: rocky outcrops

Microfauna and other arthropods and snails, etc., are often overlooked in planning disturbances and rehabilitation. Although they can tolerate the apparently hostile desert conditions, they are very vulnerable to even slight disturbances (Coastal profile of the Erongo region, 1999). Not only these particular species may be threatened, but with them, also other essential ecological processes that they facilitate. The vulnerable population of Damara terns may serve as a flagship of conservation concerns as the protection of this species may also help to protect its environment and all the other less known animals (Coastal profile of the Erongo region, 1999). Although there are several venomous snakes, scorpions and spiders in the area, these can easily be avoided or moved without destroying, because some of these animals are important to the ecological functioning of the Namib (Coastal profile of the Erongo region, 1999).

Implications and Impacts
The proposed development lies within an already disturbed urban area with little biodiversity. The proposed site does not lie within birds' flight path. Thus no immediate threat to biodiversity in the area can be expected. The potential impact of sewage pump station lighting for birds flying at night exists.

6.5 CORROSION ENVIRONMENT

The site is located in a very corrosive environment associated with Walvis By which is attributed to the frequent saltladen fog, periodic winds and abundance of aggressive salts (dominantly NaCl and sulphates) in the soil. In Walvis Bay air near the ocean contains many small salt particles. Air near the ocean is salty because spray from ocean waves is constantly becoming airborne, and when those droplets of spray evaporate, they leave their dissolved salt behind, floating in the air. This causes an accelerated rusting of metals and automobile exposed to air. Furthermore, the periodic release of hydrogen sulphide (H_2S) from the ocean contributes to corrosion. The chemical test result of samples collected from the project area by the geotechnical engineer indicated that in-situ soils are corrosive with soluble salt content of 456.9S/m on average and pH of 8.4.

Implications and Impacts
The site is located in a corrosive environment. Therefore, the materials used for the construction of infrastructure must be able to withstand the corrosive environment. Regular maintenance must be conducted to maintain the integrity of the facility and prevent product loss to the environment.

6.6 VISUAL BASELINE

The visual landscape is determined by considering: landscape character, sense of place, aesthetic value, sensitivity of the visual resource and sensitive views. In this regard, the study area is considered to have an already disturbed visual landscape because the site is characterised as a Municipal Purposes zone used for sewage management service infrastructure surrounded by residential property, a church and business property.

Implications and Impacts
The landscape character of the sewage pump station and rising main is defined by developed residential and business property and infrastructure. With reference to the above mentioned and the existing infrastructure, the visual resource of the area has been largely previously disturbed with urban infrastructure and roads. The proposed project activity will involve the construction of a new sewage pump station which will be an upgrade to the existing facility to enhance the existing functionality thereof and to minimise environmental risk related to the existing site. Further, proposed pump station will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint.

The new rising main will be underground and it will blend in with the visual landscape.

6.7 SURFACE WATER AND GROUNDWATER

Areas of the Central Namib Desert usually have no surface water and little or no available groundwater. In the context of the desert environment, most surface water either evaporates or percolates rapidly into the ground. In some instances strong rainfall leads to temporary pools or flowing surface water resources. During strong rainfall events (flash floods) channels become highly erosive. Depth to the water table are found to be shallow (<1 mbs). Groundwater is mostly saline.

According to the preliminary results of the 2011 Population and Housing Census (National Planning Commission, 2012) Walvis Bay had 61,300 people. The Municipality of Walvis Bay currently purchase fresh/potable water from NamWater, which source water from the Kuiseb Water Supply Scheme. This area does not fall within a Water Control Area, but groundwater remains the property of the Government of Namibia. Groundwater in Walvis Bay is not utilized as a source of drinking water.

Implications and Impacts
Public water supply would not be at risk as a result of the proposed development because it is not located close the Kuiseb Water Supply Scheme. However, groundwater might spread the pollutants to nearby receptors.

6.8 DEMOGRAPHIC CHARACTERISTICS

The project area falls in the Erongo Region of Namibia for which the total population in the census of 2011 was estimated to be 150,809 (79,823 males and 70,986 females) (Namibia Statistics Agency, 2014). The Erongo Region shows promise in terms of socio-economic factors. It has one of the lowest unemployment rates of all regions in Namibia (22.6%) and only 5.1% of households in the Erongo Region is considered to be poor (Namibia Statistics Agency, 2009/2010).

Furthermore, 97% of the population is considered to be literate and 72%, the highest for any Namibian region, has education on secondary level. At local level Walvis Bay has an urban population size of 62,096 (Namibia Statistics Agency, 2014) although the current estimate is around 90,000 to 100,000.

Walvis Bay is strategically situated with direct access to principal shipping routes and therefore the town is a natural gateway for international trade. Walvis Bay Port is an import/export facility for processed fish, mining products and beef. Mining products and raw material imports/exports are on the rise with the present upheaval in the uranium industry. The area is linked to Namibia's air, rail and road network, making its seaport well situated to service Zambia, Zimbabwe, Botswana, Southern Angola and South Africa. The fishing industry is the major employer of low skilled workers on a permanent and seasonal basis. The total employment of this sector is estimated at 2% of the total Namibian workforce.

Attractions of Walvis Bay are the lagoon with its prolific bird life and variety of recreational possibilities, a desert golf course, a choice of restaurants & accommodation establishments and adventure activities such as sea kayaking, and dolphin cruises. Therefore, Walvis Bay is a key economic area and the town is very important for tourism. Walvis Bay relies heavily on telecommunication and network connection to the international markets.

Impacts and Implications

Kuisebmond have experienced tremendous population growth. Population growth is associated with a greater demand in municipal services such as water and sewage to support socio-economic growth. The community of Kuisebmond are already feeling the pressure of the population growth since there is not sufficient land available for further growth. Also the community are faced with frequent sewage overflows into residential properties.

The proposed project is aligned with the National Development Plans (NDPs) that are geared to socio-economic growth of the country. The proposed project could lead to some employment opportunities and contribute to both Harambee Prosperity Plan and Vision 2030 objectives for infrastructure development and community upliftment in the country.

The proposed sewage pump station and rising main will improve the delivery of sewage management services in Walvis Bay.

6.9 AIR QUALITY AND ODOUR

Recent studies have identified the WWTPs as potential sources of anthropogenic GHG emissions, contributing to climate change and air pollution (Campos et al. 2016). WWTPs produce carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) during the biological wastewater treatment processes and CO_2 is also emitted during the production of the energy required for the plant operation (Campos et al. 2016). The CO_2 released due to the energy demand can be directly reduced by enhancing the energy efficiency of the WWTPs. In this way both the reduction of environmental impacts and the decrease of treatment costs by enhancing the energy savings can be accomplished simultaneously (Campos et al. 2016).

With regard to each GHG source the N_2O emitted is generated by nitrification and denitrification processes used to remove nitrogenous compounds from wastewater. Its production occurs mainly in the activated sludge units (90%) while the remaining 10% comes from the grit and sludge storage tanks. In practice nitrous oxide is emitted in the WWTP predominantly in the aerobic tank (Campos et al. 2016).

With regard to CH_4 emissions, Daelman et al. 2012 found out that about 1% of the incoming chemical oxygen demand (COD) to the WWTPs was emitted as methane. This amount exceeds the amount of carbon dioxide emission that was avoided by utilizing the produced biogas in anaerobic digestion. The main sources of methane detected by these authors were related to the sludge line units where anaerobic digestion is carried out: the primary sludge thickener, the centrifuge, the exhaust gas of the cogeneration plant, the buffer tank for the digested sludge, and the storage tank for the dewatered sludge. These units contribute to around 72% of methane emissions of the WWTPs while the remaining emissions come from the biological reactors and can be mainly attributed to the CH_4 dissolved in the wastewater which is not totally removed by the biological system. Research works of Yver Kwok et al. (2015) and Oshita et al. (2014) also showed that most of the methane emissions from WWTPs are closely related to processes involved in the sludge line.

With respect to CO_2 its production is attributed to two main factors: biological treatment process and electricity consumption. In the main stream of the WWTP the organic carbon of wastewater is either incorporated into biomass or oxidized to CO_2. In the sludge line, it is converted mainly to CO_2 and CH_4 during anaerobic digestion and, finally, methane is oxidized to CO_2 during biogas combustion (Campos et al. 2016).

Collection, treatment, and storage systems are facility-specific. All facilities have some type of collection system, but the complexity will depend on the number and volume of waste water streams generated (Campos et al. 2016). As mentioned above, treatment and/or storage operations also vary in size and degree of treatment. The size and degree of treatment of waste water streams will depend on the volume and degree of contamination of the waste water and on the extent of contaminant removal desired (Campos et al. 2016).

Pump stations are usually the last collection unit before the treatment system, accepting waste water from 1 or several sewer lines. Their main function is to lift the collected waste water to a treatment and/or storage system, usually by pumping or by use of a hydraulic lift, such as a screw. Volatile organic compounds (VOCs) are emitted from waste water collection, treatment, and storage systems

through volatilization of organic compounds at the liquid surface. Emissions can occur by diffusive or convective mechanisms, or both. Diffusion occurs when organic concentrations at the water surface are much higher than ambient concentrations. The organics volatilize, or diffuse into the air, in an attempt to reach equilibrium between aqueous and vapor phases. Convection occurs when air flows over the water surface, sweeping organic vapors from the water surface into the air. The rate of volatilization relates directly to the speed of the air flow over the water surface.

The magnitude of VOC emissions depends greatly on many factors such as the physical properties of the pollutants, pollutant concentration, flow rate, the temperature of the wastewater, and the design of the individual collection and treatment units. All of these factors, as well as the general scheme used to collect and treat facility wastewater, have a major effect on VOC emissions.

In most instances, the odours associated with collection systems and primary treatment facilities are generated as a result of an anaerobic or "septic" condition. This condition occurs when oxygen transfer to the wastewater is limited such as in a force main. In the anaerobic state, the microbes present in the wastewater have no dissolved oxygen available for respiration.

This allows microbes known as "sulfate-reducing bacteria" to thrive. These bacteria utilize the sulfate ion ($SO_{4-)}$ that is naturally abundant in most waters as an oxygen source for respiration. The byproduct of this activity is hydrogen sulfide (H_2S). This byproduct has a low solubility in the wastewater and a strong, offensive, rotten-egg odour. In addition to its odour, H_2S can cause severe corrosion problems as well. Due to its low solubility in the wastewater, it is released to the atmosphere in areas such as wet wells, headworks, grit chambers and primary clarifiers. There are typically other "organic" odorous compounds, such as mercaptans and amines, present in these areas, but H_2S is the most prevalent compound.

There are many different technologies that can be applied to control odours from wastewater collection and treatment systems. These technologies can be split into two main groups: vapor-phase technologies, used to control odorous compounds in the air or gas; and liquid-phase technologies, used to control odorous compounds in the liquid wastewater itself. Vapor-phase technologies typically are used in point-source applications such as wastewater treatment plants and pump stations or for the treatment of biogas. Liquid-phase technologies typically are used in collection systems where control of both odours and corrosion are concerns and/or where multiple point odour control is an objective.

Wet air scrubbing is the most flexible and reliable technology for vapor-phase wastewater odour control. This technology can be used to treat virtually any water-soluble contaminant. In addition to hydrogen sulfide and "organic" odours, wet scrubbing is very effective for ammonia removal. In a wet air scrubber the odour contaminants are solubilized from the vapor phase into an aqueous chemical solution. The removal mechanism is purely chemical and is not subject to upsets as are biological processes. The chemical balance in the system is automatically and continuously maintained, even under changing loading conditions, minimizing the chance for odour break-through. The application of a multi-stage scrubber allows the utilization of a different chemical solution in each of the stages to efficiently use chemicals and target a wide range of contaminants for treatment.

There are other odour control technologies that are available such as Liquid Redox Technology, Biofiltration, Solid Scavengers, Carbon Adsorption, Iron Salts, Bioxide Process, Anthraquinone, Oxidizing Agents and Digester Gas Treatment.

Impacts and Implications
The proposed development will service the local wastewater catchment via a network of gravity fed drains. The flow is then pumped into the rising main running between Kuisebmond and Waste water treatment plant (WWTP). The major sources of GHG carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions are located within the WWTP. The pump station in regarded as pre-treatment. The pump station will emit volatile organic compounds (VOCs). Therefore, the GHG emissions carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions emanating from the proposed development will be minimal. However, the magnitude of VOC emissions from the pump station is unknown. Furthermore, the MWB would benefit from determining the GHG emissions footprint for the entire wastewater collection and treatment system in Walvis Bay. Air quality is governed by the Atmospheric Pollution Prevention Ordinance (11 of 1976 in Namibia). However, the ordinance does not have standards that impose stringent requirements on potential pollution. Therefore, the determination of GHG emissions from sewage pump stations by the MWB would be performed as Best Practice.
There a several odour control technologies available to reduce or eliminate odour from sewage pump stations.

6.10 INCREASED TRAFFFIC AND INFRASTRUCTURE

The traffic in the area is expected to increase slightly and it might aggravate traffic conditions during peak hours and this may result in a higher number of car accidents. The proposed site area is already a busy area with pedestrians and road traffic. Therefore, an increased traffic may cause more accidents involving pedestrians and vehicles.

Infrastructure like roads will be affected due to increased traffic. It is expected that the increase in traffic during the operational phase would mainly be from small vehicles due to the added employment created in the area.

Impacts and Implications
Some traffic related impacts are expected however mitigation measures will lessen these impacts to a large degree.

7 STAKEHOLDER CONSULTATION

7.1 Public Participation Process

Consultation with the public forms an integral component of an EIA investigation and enables I&APs e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the proposed development and to identify additional issues, which they feel should be addressed in the EIA.

Included below is a summary of the stakeholders consulted, the process that was followed, and the issues that were identified.

The public participation notices for the public meeting was advertised twice in the national newspapers: The Namibian Sun/Republikein/Algemeine Zeitung (16 & 23 March 2021) and The Namib Times (19 & 26 March 2021). Notices were also placed at strategic locations in the vicinity of the proposed development area at the existing Kuisebmond sewage pump station. The background information document (BID) were hand delivered to the neighbouring land users on the 18 March 2021 and the list of the stakeholders and I&APs who received the BID is included in Appendix D and their comments in Appendix E. The BID was emailed to the Municipality of Walvis Bay, National Housing Enterprises, Walvis Bay rural Constituency, Erongo Regional Electricity Distributor (ErongoRED), National Botanical Research Institute and Hosiana ELCRN Church.

A focus group meeting was organised with the Municipality of Walvis Bay stakeholders on 25 March 2021 at 10H00. Views, comments and opinions expressed by I&APs were noted and incorporated into this report but are also included into Appendix D and Appendix E. A list of stakeholders and I&APs who attended the meetings is also presented in Appendix C and the minutes of the meetings are presented in Appendix E.

7.2 Municipality of Walvis Bay Stakeholders

The following table (Table 7.1) provides a broad list of stakeholders that were informed about the project development and were requested to register as Interested and Affected Parties (I&APs) should they be interested and/or affected.

Table 7.1: Relevant Stakeholders

Stakeholder Groups	Organisation
Government Ministries and Parastatals	Erongo RED Municipality of Walvis Bay Erongo Regional Council National Housing Enterprise
Private company (close to the proposed pump station)	Shops at the shopping mall

Media	Namib Times Erongo/Republikein/Namibian Sun/Algemeine Zeitung
Other interested and affected parties	Neighbouring land users

The full stakeholder database for the EIA is included in Appendix C of the report.

7.3 Consultation Process

Table 7.2 sets out the steps that were followed as part of the consultation process:

Table 7.2: The Consultation Process

TASK	**DESCRIPTION**	**DATE**
Notification – regulatory authorities and IAPs		
Application/Notification to MET	Om'kumoh Consulting Engineers submit the Application	April 2021
I&AP identification	A project specific stakeholder database was developed. This database is updated as and when required. A copy of the IAP database is attached in Appendix C.	March 2021
Site Notices	Site notices were placed at the closest area to site where visible for residents or interested parties at the existing Kuisebmond pump station, NHE, shopping centre and hand delivered to neighbouring land users in Kuisebmond. Photos of the site notices are attached in Appendix B.	18 March 2021
Newspaper Advertisements	Block advertisements were placed as follows: • The Namib Times (19 and 26 March 2021) • The Erongo/Namibian Sun/Republikein/Algemeine Zeitung (16 and 23 March 2021) Copies of the advertisements are attached in Appendix B	March 2021
TASK	**DESCRIPTION**	**DATE**
Focus Group Meetings and Submission of comments		
Focus group meetings, Consultations	Several consultations were made with the IAPs. This includes meetings, telephonic conversations and emails in correspondence to the IAPs.	March 2021

	Focus group meetings were held with key stakeholders and interested and affected as follows: • Municipality of Walvis Bay stakeholders on 25 March 2021 at 10H00 • At site with the neighbouring I&APs in Kuisebmond at 10h00 on 18 March 2021 to inform I&APs of the EIA process • At site with the neighbouring I&APs in Kuisebmond at 10h00 on 25 March 2021 to record their issues and comments. The same project information was presented/shared at all discussions. A site visit of the proposed project area was conducted on the 18 March 2021 accompanied by the specialist team and the Municipality of Walvis Bay.	
Comments and Responses	Minutes of the meetings and all comments received during the meetings, by email are attached in Appendix E. A Summary of issues and response report is attached in Appendix D. The IAPs that are illegally occupants in shacks were provided with the hard copies of the Issues and Response Table on 13 April 2021. A hard copy of the scoping report was made available at the public library in Kuisebmond for IAPs to review on 13 April 2021.	March & April 2021
Review of draft Scoping Report		
I&APs and authorities (excluding MET) review of Scoping Report and EMP	Copies of the main Scoping Report (excluding appendices were sent via email to all parties who registered or showed an interest in this EIA process. The IAPs that are illegally occupants in shacks were provided with the hard copies of the Issues and Response Table on 13 April 2021. A hard copy of the scoping report was made available at the public library in Kuisebmond for IAPs to review on 13 April 2021. Authorities and IAPs had 7 days to review the Scoping Report and Submit comments in writing Om'kumoh Consulting Engineers. The closing date for comments was 20 April 2021. There were no comments raised during the review period.	April 2021
MET review of the Scoping Report and EMP	A copy of the final Scoping Report and EMP was delivered to MET on completion of the public review process.	April 2021

7.4 Summary of Issues Raised

All issues that have been raised to date by authorities and I&APs are provided in Appendix D to the Scoping Report. Issues raised pertain to:

- Removal/relocation of the illegal houses/shacks currently on the site
- Noise pollution
- Air pollution
- Access control
- Groundwater pollution
- Biodiversity
- EMP compliance process

Response to the issues and comments received from the IAPs are provided for in Appendix D.

8 IDENTIFICATION AND DESCRIPTION OF ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS

Table 8.1 provides a summary of the environmental aspects and the potential impacts associated with the proposed construction of the new sewage pump station and rising main.

The relevance of the potential impacts is presented in Table 8.1 below to determine if certain aspects require further assessment. In Section 10, aspects that required further detail were evaluated by using existing baseline information, management and mitigation measures required to minimise or prevent the potential impacts

Table 8.1: Potential environmental aspects and impacts associated with the construction of the new sewage pump station and rising main

ACTIVITY	ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	RELEVANCE (INITIAL SCREENING OF POTENTIAL IMPACT)
Construction of new sewage pump station (i.e. construction workers, movement of vehicles, excavation, etc.)	Site Clearance	Physical disturbance of the site	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. The powerline that feeds the pump station and rising main are to be buried that will further significantly reduce the risk to fauna and flora. 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. The rising main footprint is small because construction will be done in sections to avoid disturbance to fauna, flora and traffic activity. These potential impacts of site clearance are further assessed in Section 9.

Construction	Health, Safety and Security	Health, Safety and Security	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. This aspect will be evaluated with further detail in Section 10. Furthermore, management and mitigation measures for contractors are provided in the EMP in Section 9.
Construction	Noise Pollution	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 noise producing activities. Therefore, construction activities should be between 7H00 and 17H00 daily. Construction activities are anticipated to last approximately for 10 months. The potential impacts on noise are further assessed in Section 9.
Construction	Dewatering Process	Handling and disposal of underground water	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 underground water that has to be disposed of in a suitable manner. High salinity may disrupt natural decomposition processes that occur in sewage treatment works. The potential impact of the dewatering process is further assessed in Section 9.
Construction	Air Quality and Odour Control	Air Quality and Odour Control	During the construction phase, the air pollution will primarily be generated from the operation of construction equipment. The impacts of air pollution from construction activities at the site will be minimal.

Construction	Dust Pollution	Dust Pollution from construction activities	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. The potential dust pollution is further assessed in Section 9.
Construction	General waste management and disposal	General waste production and ablution facilities	The generation of waste at the construction site needs to be well managed and has the potential to cause an impact on the environment. However, waste production and disposal can be effectively controlled with sufficient measures in place. The issue of waste management and ablution facilities will be assessed further in Section 9, however, the management and mitigation measures for contractors relating to waste management are stipulated in the EMP (Section 10)
Construction	Increased Traffic Impact	Increased Traffic Impact	The proposed site area is already a busy area with pedestrians and road traffic. Therefore, an increased traffic may cause more accidents involving 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. The traffic impact will be assessed further in Section 9, however, the management and mitigation measures for contractors relating to waste management are stipulated in the EMP (Section 10)

Construction	Soil, Groundwater and Surface water Contamination	Soil Pollution, Surface water and Groundwater Pollution	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. Due to the small scale of the proposed construction activity in the area, hydrocarbon waste emissions can be effectively managed. This aspect is further assessed in this report (Section 9). The management and mitigation for containing and clean-up measures relating to hydrocarbon spillages can be easily mitigated through implementation of the mitigation measures presented in the EMP (Section 10).
Construction	Archaeological Sites/Resources	Discovery of heritage/ archaeological sites	The project area has been largely previously disturbed and there are no known sites of heritage significance. These issues will be further evaluated in this report (Section 9). However, there is always the possibility of unearthing resources of heritage significance during construction activities and management and mitigation measures are included in the EMP (Section 10).
Construction	Socio-economic (Employment)	Positive impact – Employment	The magnitude of the proposed activity is on a small scale. A maximum of ±25 temporary job opportunities will be created to unskilled, semi-skilled and skilled workers during the construction phase. The Municipality of Walvis Bay will appoint a suitable contractor to perform the construction activities. The construction activities will largely be conducted by construction heavy equipment and vehicles that will require trained operators.
Operational	Sewage pump station and rising main	Sewerage management and services to community	The Kuisebmond community will benefit from the proposed new development. The proposed development is required due to increasing population demand and socio-economic growth. Currently, the community of Kuisebmond experiences frequent sewage overflow to residential properties due to frequent infrastructural breakdowns of the

			sewage pump station. Further assessment is done in Section 9.
Operational	Air Quality and Odour	Air Quality and Odour control	The major sources of GHG carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) emissions are located within the WWTP. The pump station in 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 are expected to be minimal. However, the magnitude of VOC emissions from the pump station is unknown. Furthermore, it will be more beneficial to determine the GHG emissions and VOCs for the entire wastewater collection and treatment system in Walvis Bay. There a several odour control technologies available to reduce or eliminate odour from sewage pump stations. Further assessment is done in Section 9.
Operational	Biodiversity	Flora and fauna mortalities through collisions with sewage pump station infrastructure	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. Flora will have little to no impact because of the disturbance to the existing facility. Fauna and flora impacts are further assessed in Section 9.
Operational	Corrosion	Corrosive Impact	Walvis Bay is well known for its extreme corrosive environment. Materials used for the construction of infrastructure must be able to withstand the corrosive environment. Regular maintenance must be conducted to maintain the integrity of the facility and prevent product loss to the environment. Further assessment is done in Section 9.

Operational	Waste Production	Waste Production Impact	Walvis Bay experiences strong winds and it carries domestic waste which must be cleaned up and disposed of regularly. The site must have a boundary wall that will be able to keep waste out of the site.
Operational	Visual impact	Visual impact on tourism and recreation	The site is located in an urban environment. The site has been largely previously disturbed with urban infrastructure and roads. The proposed project activity will involve the construction of a new sewage pump station which will be an upgrade to the existing facility to enhance the existing functionality thereof and to minimise environmental risk related to the existing site. Further, proposed pump station will not require any additional development to encroach beyond the boundaries of the current site, thereby limiting the development footprint. The new rising main will be underground and it will blend in with the visual landscape. Therefore, the visual impact has been further evaluated in Section 10.
Operational	Traffic Impact	Traffic Impact	Traffic impacts are only expected when there is maintenance and excavations required at the proposed site. Therefore the traffic impact has been provided with management and mitigation measures to alleviate the impact in Section 10.

9 ASSESSMENT OF IMPACTS

The purpose of this section is to assess and identify the most pertinent environmental impacts by describing certain quantifiable aspects of these impacts and to provide possible mitigation measures to minimise the magnitude of the impacts that would be expected from the construction, operations and decommissioning of the proposed new sewage pump station and rising main in Kuisebmond.

The following potential impacts on the environment during construction, operation and decommissioning activities have been identified for this project and grouped as below. The numerous aspects of each will be discussed under each impact.

- General Socio-Economic impacts
- Site clearance activities
- Biodiversity (Flora and Fauna Mortalities)
- Removal/relocation of illegal houses/shacks
- Health, Safety and Security
- Handling and disposal of underground water during dewatering process
- Air quality and Odour control
- Noise Pollution
- Dust
- Traffic Impact
- Waste Management
- Soil and Groundwater pollution
- Heritage Impacts (Archaeology)
- Visual Impacts
- Sewage overflow

Table 10.1 Criteria for Impact Evaluation

Risk Event	**Description of the risk that may lead to an impact**
Nature of Impact	Reviews the type of effect that the Development have on the relevant component of the environment and includes **"what is affected and how?"**
Status (+ or -)	**Positive** – environment overall will benefit from the impact **Negative** – environment will be adversely affected by the impact **Neutral** – environment overall will not be affected
Extent	**Site specific** (on site) **Sub-local** (limited to within 1 km of the site) **Local** (limited to within 15 km of the site) **Regional** (limited to within the borders of Erongo Region) **National** (limited to within the borders of Namibia) **International** (extending beyond Namibia's borders)
Duration	**Very Short** (days, < 3 days) **Short** (days, 3 days to less than a year)

	Medium (months, 1 – 5 year) **Long** (years, 5 -20 years) **Permanent** (>20 years – life of the development)
Intensity	**No lasting effect** (No environmental functions and processes are affected) **Minor effects** (The environmental functions, but in modified manner) **Moderate effects** (Environmental functions and processes are altered to such extent that they temporarily cease) **Serious effects** (where environmental functions and processes are altered such that they permanently cease and/or exceed legal standards/requirements)
Probability	Refers to the probability that a specific impact will happen following a risk event. **Improbable** (low likelihood) **Probable** (distinct possibility) **Highly probable** (most likely) **Definite** (impact will occur regardless of prevention measures)
Prevention	Measures to reduce the probability of an impact occurring
Significance (no mitigation	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design.) **Medium** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)
Mitigation	Description of possible mitigation measures
Significance (with mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all.) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design.) **Medium** (Impact of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation.) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.)
Confidence Level	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. **Low** (based on the availability of specialist knowledge and other information) **Medium** (based on the availability of specialist knowledge and other information) **High** (based on the availability of specialist knowledge and other information)

10.1 CONSTRUCTION IMPACT ASSESSMENT

Potential effects on the environment during the installation activities of the proposed sewage pump station and rising main are expected to be low. Some dust might be generated during the process. Increased noise levels can be expected. Some solid waste will be generated during the construction and its removal will be the responsibility of the contractor. The most significant potential impact identified in the construction phase is the removal/relocation of illegal houses/shacks onsite, noise pollution and air pollution and odour and health and safety of the public. However, these potential impacts must be mitigated through very strict work protocols. Duration of these impacts will be short lived.

Potential impacts on the environment and their mitigation measures during these activities of the proposed sewage pump station and rising main are found in Table 10.2 to Table 10.11

Table 10.2 Construction Phase – Socio-Economic (Skills, Technology and Development)

Risk Event	**Enhanced skills and technology transfer to Walvis Bay and subsequent promotion of economic development.**
Nature of Impact	People need skills to perform their jobs. The technology to do something is often not found locally. Development of people and technology are key to economic development.
Status (+ or -)	**Positive**
Extent	**Local** (Skills upliftment limited to developing Walvis Bay); **National** (Technology to benefit whole country in the long term)
Duration	Duration of construction phase is **short** but learnt skills and development are **permanent**
Intensity	**Minor effects**
Probability	**Probable** skills and technology transfer. Economic development is **highly probable**.

Table 10.3 Construction Phase – Socio-Economic (Employment)

Risk Event	**Employment**
Nature of Impact	The construction of the new sewage pump station requires contractors who in turn provides employment.
Status (+ or -)	**Positive**
Extent	**Local** (Skills upliftment limited to developing Walvis Bay); **National** (Technology to benefit whole country in the long term)
Duration	Duration of construction phase is **short** but learnt skills and development are **permanent**
Intensity	**Moderate Effects** In a positive sense, development will improve the quality of life of the people benefiting directly (employees) and indirectly (end users).
Probability	D**efinite** skills and technology transfer. Economic development is **definite**. Employment is **highly probable** if the project goes ahead.

Table 10.4 Construction Phase – Socio-Economic (HIV/AIDS, In-migration, Informal Settlements and Property Prices)

Risk Event	**Increased spread of HIV/AIDS; Increased influx to Walvis Bay; Increased informal settlement and associated problems.**
Nature of Impact	Developments attract people who seek work. This in turn can increase the extent of informal settlements and its associated problems. It is expected that an existing local contractor would be used for the construction phase. A limited impact of this nature is therefore expected.
Status (+ or -)	**Negative**
Extent	HIV/AIDS, in-migration and informal settlement affects the local and national community. Reduced property prices affect individual properties and the extent is local.
Duration	Duration of construction phase is **short** but impacts may range from **long** to **permanent**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	Appointing reputable contractors who implement educational program on HIV/AIDS for all the staff is imperative. Restricted employment for local people only should be practiced. Deviations from this practice should be justified appropriately. Training of local people should be considered from the start. These measures will reduce the influx of newcomers to the town and thereby reduce growth in the informal settlement and maintain property prices.
Significance (no mitigation)	**Low**
Mitigation	Prevention as discussed above is the best mitigation.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.5 Construction Phase - Ecological impact during site clearance activities

Risk Event	**Ecological impact during site clearance activities**
Nature of Impact	During the construction phase of a project a certain amount of disturbance to birds, as well as habitat destruction and modification, may take place. However, the project area is relatively small and therefore not vulnerable to disturbance and habitat destruction, especially when chicks are being raised. This impact will mostly be due to site clearance activities during construction, which includes vehicular activities and noise potentially interrupting the birds' feeding, roosting and nesting sites.
Status (+ or -)	**Negative**
Extent	**Site Specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Improbable**

Prevention	• Proactively reduce the chances of disturbance of birds, especially breeding birds; deter poaching
Significance (no mitigation)	**Low**
Mitigation	• 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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.6 Construction Phase – Impact on Existing Infrastructure and Underground Utilities

Risk Event	**Damage to existing infrastructure like power lines, pipelines, sewers roads, and nearby properties**
Nature of Impact	Damage to existing infrastructure like power lines, pipelines, sewers roads, and nearby properties
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	The contractor must determine exactly where amenities and pipelines are situated before construction commence (utility clearance e.g. ground penetrating radar surveys).
Significance (no mitigation)	**Low**
Mitigation	Appointing qualified and reputable contractors is essential. The contractor must determine exactly where amenities and pipelines are situated before construction commence (utility clearance e.g. ground penetrating radar surveys). Liaison with the Municipality and suppliers of services is essential.
Significance (with mitigation)	**Low**

Confidence Level	**High**

Table 10.7 Construction Phase – Air Quality and Odour Impacts

Risk Event	**Air quality and odour impact at the site**
Nature of Impact	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 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 temporary thus the impact will be minimal.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Definitive**
Prevention	NA
Significance (no mitigation)	**Medium**
Mitigation	The construction phase of the sewage pump station must be kept to a minimum 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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.8 Construction Phase – Removal of illegal houses/shacks

Risk Event	**Removal of illegal houses/shacks and relocation of illegal occupants**
Nature of Impact	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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Definitive**

Prevention	Before the construction phase commences the Municipality of Walvis Bay and residents illegally occupying houses/shacks at the site should reach an agreement to remove the illegal shacks and to relocate the occupants as to commence construction.
Significance (no mitigation	**High**
Mitigation	Before the construction phase commences the Municipality of Walvis Bay and residents illegally occupying houses/shacks at the site should reach an agreement to remove the illegal shacks and to relocate the occupants to ensure the commencement of construction phase.
Significance (with mitigation)	**Low**
Confidence Level	**Medium**

Table 10.9 Construction Phase - Health, Safety and Security

Risk Event	**Health, Safety and Security**
Nature of Impact	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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Highly Probable**
Prevention	Contractor should provide a barricade and warning signs around the perimeter of the site. This is to ensure the safety and security of the public and to avoid public trespassing. 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: ➢ 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
Significance (no mitigation	**Low**
Mitigation	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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.10 Construction Phase - Noise Pollution

Risk Event	**Noise Pollution from construction activities**
Nature of Impact	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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Moderate effects**
Probability	**Probable**
Prevention	There will be minor increases in the ambient noise level and it will be limited to the site. Nevertheless, noise will occur and therefore mitigation measures must be recommended. Construction are recommended during daytime from 7h00 to 17h00.
Significance (no mitigation	**Medium**
Mitigation	The Walvis Bay Municipality has no regulations with regard to noise levels. 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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.11 Construction Phase - Dust Pollution

Risk Event	**Dust Pollution from construction activities**
Nature of Impact	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. 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.
Status (+ or -)	**Negative**
Extent	**Site specific** - will most probably pose a nuisance to personnel related to the construction of the Development and to neighbouring properties.
Duration	**Short**
Intensity	**Moderate effects**
Probability	**Probable**
Prevention	Regular dust suppression, if required, during times of strong winds should prevent dust impacts successfully.
Significance (no mitigation	**Medium**
Mitigation	➢ 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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.12 Construction Phase - Waste Production and Ablution Facilities

Risk Event	**Waste Production and Ablution facilities during construction**
Nature of Impact	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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Moderate effects**
Probability	**Probable**
Prevention	The proposed construction of pump station and rising main will produce waste in the form of waste from used materials. Mitigation procedures will lessen the impact of waste.
Significance	**Medium**

(no mitigation	
Mitigation	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. Due to the nature of some hazardous materials they should be disposed of in an appropriate way at an appropriately classified waste disposal facility. Make use of the Material Safety Data Sheets available from suppliers if the user is not sure how to dispose of the substance. Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained. A mobile chemical ablution facility should be made available to anybody working at the site. The ratio of the number of these ablution 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. Waste from this mentioned ablution facility needs to be appropriately disposed of at such a dedicated local authority facility.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.13 Construction Phase – Soil and Groundwater Contamination

Risk Event	**Soil, groundwater and surface water contamination**
Nature of Impact	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 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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Medium**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	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.
Significance (no mitigation	**Medium**
Mitigation	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite. 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 actions taken to contain it.

	Baseline soil and groundwater sampling at the proposed development site are required. This must be carried out prior to construction.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.14 Construction Phase - Heritage Impact

Risk Event	**The discovery of archaeologically or culturally important sites**
Nature of 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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	**N/A**
Significance (no mitigation	**Low**
Mitigation	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.
Significance (with mitigation)	**Low**
Confidence Level	**High** (based on the availability of specialist knowledge and other information)

Table 10.15 Construction Phase – Sewage overflow

Risk Event	**The overflow of sewage during the construction of the new sewage pump station**
Nature of Impact	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.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Medium**
Intensity	**Moderate effects**

Probability	**Probable**
Prevention	The construction of the new sewage pump station in Kuisebmond will be an upgrade in sewage handling capacity and technical capabilities.
Significance (no mitigation	**High**
Mitigation	The construction of the new sewage pump station in Kuisebmond will be an upgrade in sewage handling capacity and technical capabilities.
Significance (with mitigation)	**Low**
Confidence Level	**High** (based on the availability of specialist knowledge and other information)

Table 10.16 Construction Phase – Handling and disposal of underground water during the dewatering process

Risk Event	**Handling and disposal of underground water during the dewatering process**
Nature of Impact	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 underground water that has to be disposed of in a suitable manner.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Medium**
Intensity	**Moderate effects**
Probability	**Probable**
Prevention	Underground water will be encountered and possible impacts should be mitigated.
Significance (no mitigation	**High**
Mitigation	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. However, the new rising main can be installed first, and be used to pump underground water to the wetland behind the Dunes mall. Another option is to identify an open space near the pump station to build a coffer dam to temporary store the underground water. The coffer dam option will require additional Health and Safety measures to ensure the safety of the public.
Significance (with mitigation)	**Low**
Confidence Level	**High** (based on the availability of specialist knowledge and other information)

Table 10.17 Construction Phase – Traffic Impact

Risk Event	**Increased traffic impact**
Nature of Impact	The proposed site area is already a busy area with pedestrians and road traffic. Therefore, an increased traffic may cause more accidents involving 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.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Short**
Intensity	**Moderate effects**
Probability	**Definite**
Prevention	The impact cannot be prevented and mitigation is recommended.
Significance (no mitigation	**High**
Mitigation	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 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. Excavations and pipeline construction must be done in sections. Each section must be covered before the next section is initiated.
Significance (with mitigation)	**Low**
Confidence Level	**High** (based on the availability of specialist knowledge and other information)

10.2 OPERATIONAL PHASE IMPACT ASSESSMENT

During the operational phase of the proposed new sewage pump station and rising main will improve sewage management. The most significant potential impacts during the operational phase are the air quality and odour impacts and corrosion. Specific impacts identified, associated with the operational phase, are summarised in Table 10.12 to Table 10.15.

Table 10.18 Operational Phases – Sewage pump station and rising main infrastructure and services

Risk Event	**Sewage pump station and rising main infrastructure and services**
Nature of Impact	The proposed sewage pump station and rising main will aid in securing sewage infrastructure and services to the community. The Kuisebmond community will benefit from the proposed new sewage pump station and rising main. The pump station and rising main is required due to increasing population demand and socio-economic growth. Currently, the community of Kuisebmond experiences frequent sewage overflow to residential properties due to frequent infrastructural breakdowns of the sewage pump

	station.
Status (+ or -)	**Positive** – environment overall will benefit from the impact
Extent	**Local** (Skills upliftment limited to developing Walvis Bay); **National** (Technology to benefit whole country in the long term)
Duration	**Long** (years, 5 -20 years)
Intensity	**Moderate effects** - In a positive sense, the project will improve the quality of life of the people benefiting directly (community) as they have access to secure fixed telecommunications and wireless coverage.
Probability	**Definite** (A definite secure in fixed telecommunications and wireless coverage will ensue).

Table 10.19 Operational Phase – Air quality and Odour Impacts

Risk Event	**Air quality and Odour Impacts**
Nature of Impact	The major sources of GHG carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) emissions are located within the WWTP. The pump station in 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. There a several odour control technologies available to reduce or eliminate odour from sewage pump stations.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Permanent**
Intensity	**Moderate effects**
Probability	**Definite**
Prevention	Install odour control technologies at the sewage pump station.
Significance (no mitigation	**Medium**
Mitigation	GHG and VOCs emissions from waste water collection and treatment processes are unknown in Walvis Bay. Therefore, emission factors can be calculated to determine the extent of GHG and VOC emissions for the Walvis Bay wastewater treatment system.
Significance (with mitigation)	**Low**
Confidence	**High**

Level	

Table 10.20 Operational Phase – Flora and Fauna Mortalities

Risk Event	**Flora and Fauna Mortalities**
Nature of Impact	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. Flora will have little to no impact because of the disturbance to the existing facility.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent** – for as long as the development is operational
Intensity	**Minor effects**
Probability	**Probable**
Prevention	Observe and report on faunal mortalities especially bird collisions in the monitoring report. 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.
Significance (no mitigation	**Low**
Mitigation	Monitoring and reporting of bird mortalities should be reported especially if it is on the Red Data species list such as the Greater Flamingo (Vulnerable), Lesser Flamingo (Vulnerable and Globally Threatened) and Great White Pelican (Vulnerable). 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
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.21 Operational Phase – Damage to Infrastructure due to the Corrosive Environment

Risk Event	**Damage to Infrastructure due to the Corrosive Environment**
Nature of Impact	Walvis Bay is well known for its extreme corrosive environment. Bird droppings do accelerate corrosion.
Status (+ or -)	**Negative**
Extent	**Site specific**

Duration	**Permanent**
Intensity	**Moderate Effects**
Probability	**Highly Probable**
Prevention	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.
Significance (no mitigation	**Medium**
Mitigation	Regular inspections and maintenance of the new sewage pump station and rising main is required to detect and repair any possible damage.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.22 Operation Phase – Waste Production

Risk Event	**Waste Production**
Nature of Impact	Walvis Bay experiences strong winds and it carries domestic waste which must be cleaned up and disposed of regularly.
Status (+ or -)	**Negative**
Extent	**Sub-local**
Duration	**Medium**
Intensity	**Minor effects**
Probability	**Possible**
Prevention	A wall barrier to prevent domestic waste blown by the wind from the premises. Waste to be clean-up and disposed of regularly at the landfill site. Waste management should be practised at all times.
Significance (no mitigation	**Medium**
Mitigation	Waste to be clean-up and disposed of regularly at the landfill site. Waste to be clean-up and disposed of regularly at the landfill site. Waste management should be practised at all times.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.23 Operation Phase – Visual Impact

Risk Event	**Visual Impact of sewage pump station and rising main on tourism and recreation**
Nature of Impact	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. The new rising main will be underground and it will blend in with the visual landscape.
Status (+ or -)	**Neutral**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**Minor effects**
Probability	**Improbable**
Prevention	**N/A**
Significance (no mitigation	**Low**
Mitigation	The new sewage pump station should blend in with the existing infrastructure.
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.24 Operation Phase – Sewage overflow

Risk Event	**Sewage overflow due to new sewage pump station and rising main**
Nature of Impact	Eventually the new sewage pump station and rising main will near its end of life cycle. This is associated with breakdown and constant delays in maintenance which leads to sewage overflow in the community of Kuisebmond.
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Permanent**
Intensity	**Minor effects**
Probability	**Definite**
Prevention	Frequent maintenance of the new sewage pump station can significantly increase its operational life
Significance (no mitigation	**Low**
Mitigation	Frequent maintenance of the new sewage pump station can significantly increase its operational life. However, the new sewage pump station will have to be decommissioned.
Significance (with mitigation)	**Low**
Confidence	**High**

Level	

Table 10.25 Operation Phase – Traffic Impact

Risk Event	**Traffic Impact**
Nature of Impact	Traffic impacts are only expected when there is maintenance and excavations required at the proposed development.
Status (+ or -)	**Negative**
Extent	**Local**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Probable**
Prevention	Mitigation of the impacts is recommended.
Significance (no mitigation	**Low**
Mitigation	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 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. 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 amount of time that traffic will be disrupted
Significance (with mitigation)	**Low**
Confidence Level	**High**

Table 10.26 Operation Phase – Groundwater and soil contamination

Risk Event	**Groundwater and soil contamination**
Nature of Impact	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 neighbouring receptors and may create an impact on underground utilities (i.e. fresh water supply to buildings, sewerage system).
Status (+ or -)	**Negative**
Extent	**Site specific**
Duration	**Short**
Intensity	**Minor effects**
Probability	**Improbable**

Prevention	A Baseline soil and groundwater sampling along the pipeline routes is required prior to construction. The following measures must be employed to prevent spillage into surface water drainage channels and groundwater sources: • 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. • Proper training of operators must be conducted on a regular basis.
Significance (no mitigation	**Medium**
Mitigation	The following measures must be employed to prevent spillage into groundwater sources: • 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.
Significance (with mitigation)	**Low**
Confidence Level	**High**

10.3 DECOMMISSIONING PHASE IMPACT ASSESSMENT

The impacts associated with this phase will include noise, dust, waste production, soil pollution and health, safety and security. Guidelines for sewage pump station and rising main removal must be followed to reduce the risk of health and safety. Rubble and scrap waste will be created as structures are dismantled. These should be contained and disposed of at an approved waste facility and not dumped in the surrounding areas. The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the Development.

10 ENVIRONMENTAL MANAGEMENT PLAN

10.1 OBJECTIVES OF THE EMP

The Municipality of Walvis Bay requires an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) for the proposed new sewage pump station at Kuisebmond area (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.

10.2. THE EMP

10.2.1 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.

10.2.2 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 10.1 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.	Appoint a contractor and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, subcontractors, employees and all personnel who will be present on site.	During operations.	Contracts on file.	Proponent, Contractor
Management	Establish a management system to implement and monitor Health, Safety and Environment.	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 Adequate protection and indemnity insurance cover for incidents; Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergencies.	During Planning phase.	Documentation on file Personal Protection Equipment (PPE) on site. Document the operational procedures. Signage related to restricted areas, dangerous areas, and PPE requirements on site. Emergency response material on site.	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

Activity	**Objective**	**Action**	**Timing**	**Proof of Compliance**	**Responsible Body**
Reporting	To establish a reporting system to report on monitoring aspects of construction, operation and decommissioning as outlined in the EMP	Establish a reporting system to report 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.	Throughout all phases	Monitoring Reports.	Proponent; 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 10.2 Construction Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Ecological Impact	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. 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. The rising main footprint is small because construction will be done in sections to avoid disturbance to fauna, flora and traffic activity.	• 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.	• 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	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	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.	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.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Health, Safety and Security	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. 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.	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 comply to the following: ➢ 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.	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. 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. 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.	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	➢ 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
	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.	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. ➢ 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.	Any traffic issues complaints received should be recorded in the monitoring report together with steps taken to mitigate the impacts. All traffic information and reporting must be included in a final report once construction finishes and the sites are handed over to the Applicant	
Handling and disposal of wastewater during the dewatering process	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.	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. 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.	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. Minutes of the meeting with the Municipality of Walvis Bay must be kept on file. A record of the volume of waste water removed must be kept together with information on treatment and disposal. All information and reporting to be included in a final report once construction finishes and the sites are handed over to the Applicant.	Proponent and Contractor

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.	➢ 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.	Maps and location information of existing underground amenities must be kept on file. 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	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.	The Walvis Bay Municipality has no regulations with regard to noise levels. 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. Construction activities must be during daytime from 7h00 to 17h00.	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	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. 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.	➢ 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.	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. Due to the nature of some hazardous materials they should be disposed of in an appropriate way at an appropriately classified waste disposal facility. Make use of the Material Safety Data Sheets available from suppliers if the user is not sure how to dispose of the substance. Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained. A mobile chemical ablution facility should be made available to anybody working at the site. The ratio of the number of these ablution 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. .	Regular visual inspection. Waste from this mentioned ablution facility needs to be appropriately disposed of at such a dedicated local authority facility regularly. Hazardous waste disposal receipts should be kept on file.	Contractor
Soil and groundwater contamination	Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep	Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring.	Mitigation measures for handling and storage of hydrocarbon and hazardous materials onsite and offsite.	Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	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.	All vehicles and machinery to be used on site should be inspected regularly for oil leaks. Under no circumstances should any hydrocarbon product in access 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. Manually concrete mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained.	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.	
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.	Construction personnel must be informed of the possibility of finding historical artefacts and be instructed to report any such findings without delay. 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.	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 opportunities will be created	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
	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.	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. 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.	Summary report based on all other impacts and monitoring must be created to give an overall assessment of the impact of this construction phase. This will assist in future applications for clearance certificates for sewage infrastructure.	Proponent, Contractor

Table 10.3 Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Flora and fauna mortalities	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. Flora will have little to no impact because of the disturbance to the existing facility.	Build the sewage pump station and rising main but observe and report on faunal mortalities especially bird collisions in the monitoring report. 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 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.	A record should be kept of any extraordinary fauna sightings or encounters on site. 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). All flora and fauna related information to be compiled in a Monitoring report.	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.	Regular inspections and maintenance of the pump station and rising main is required to detect and repair any possible damage. Keep a maintenance record.	Proponent
Traffic Impact	Traffic impacts are only expected when there is maintenance and excavations required at the proposed development.	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 traffic flow along the affected route is minimally	Any traffic complaints received should be recorded in the monitoring report and corrective action taken noted.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		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. 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.		
Health , Safety and Security	During maintenance of the proposed development worker may be exposed to several health and safety risks.	An integrated health and safety management system acts as a monitoring tool and mitigating tool. The monitoring tools are elaborated upon in the EMP. Typical mitigating measures within the health and safety management systems are:- • 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 (CO2), methane (CH4), and nitrous oxide (N2O) emissions are	GHG and VOCs emissions from waste water collection and treatment processes are unknown in Walvis Bay. Therefore, emission factors can be calculated to determine the extent of GHG and	Regular monitoring of the effectiveness of odour control technologies at the sewage pump station.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	located within the WWTP. The pump station in 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. There a several odour control technologies available to reduce or eliminate odour from sewage pump stations.	VOC emissions for the Walvis Bay wastewater treatment system. Install odour control technologies to eliminate bad odours at the pump station.	Odour control technology must be regularly inspected and inspection records must be kept. Complaints regarding odour to be registered in the complaints register and to be investigated and managed in accordance with an incident reporting procedure	
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 neighbouring receptors and	A Baseline soil and groundwater sampling along the pipeline routes is required prior to construction. The following measures must be employed to prevent spillage into surface water drainage channels and groundwater sources: • Spillage control procedures must be in place	A report should be compiled every 6 months of all spills or leakages reported. The report should contain the following information: • Spill location • Date and duration of spill • Product spilled	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	may create an impact on underground utilities (i.e. fresh water supply to buildings, sewerage system).	• 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. Proper training of operators must be conducted on a regular basis. The following measures must be employed to prevent spillage into groundwater sources: • 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.	• 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.	A wall barrier must be built to prevent domestic waste blown by the wind from the premises. Waste to be clean-up and disposed of regularly at the landfill site. Waste management should be practised at all times. Waste management should be practised at all times. Dry waste is at risk of increasing the dust /litter impact so should be removed regularly.	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. Waste disposal inventory kept.	Proponent
Sewage overflow	Eventually the new sewage pump station and rising main will near its end of life cycle. This is associated with breakdown and constant	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
	delays in maintenance which leads to sewage overflow in the community of Kuisebmond.			
Visual Impact	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. The new rising main will be underground and it will blend in with the visual landscape.	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.	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. Provide any information on maintenance or complaints in the monitoring report	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	Mitigation and monitoring of all impacts must be conducted and its effectiveness monitored. Results of such monitoring must be used to adapt or modify mitigation measures.	**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. This will assist in future applications for clearance certificates for electricity supply operations.	Proponent

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

Table 10.4 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.	To reduce the amount of waste, all re-usable materials, and other equipment must be removed to another site or sold as scrap. Those items that cannot be used again must be scrapped in the appropriate manner. Rehabilitation, if necessary, is to be done using funds designated for the purpose.	Regular visual inspection. A register of waste produced and disposal methods should be maintained.	Proponent, Contractor
Ecological Impact	Operations spanning many years may create new habitat for fauna and flora. Upon decommissioning these habitats will be destroyed	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. 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. 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.	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
	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.		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.	
Health, Safety and Security	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.	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: ➢ 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	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. 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.	Proponent, Contractor

11 CONCLUSION AND RECOMMENDATION

The Municipality of Walvis Bay (Project Proponent) is the municipal service provider (water, sewerage and land) in the town of Walvis Bay. The existing Kuisebmond pump station and rising main is at least 34 years old, well beyond the 15-year useful life for the mechanical and electrical components and approaching the design life of the concrete structure. The facility is in an extremely poor condition and the equipment has degraded to the extent that the systems require extensive maintenance to ensure functionality and reliability. Therefore, the pump station needs replacement to provide safe and reliable operation and to accommodate the full sewer load through the system.

Impacts can generally be mitigated, however it is recommended that before construction can commence the Municipality of Walvis Bay should reach an agreement with the illegal shack occupants at the proposed site which is municipal property. The illegal occupants are concerned because they do not have a place to relocate to. Kuisebmond do not have sufficient vacant land available for relocation purposes. The Municipality of Walvis Bay is currently in discussions with various stakeholders within and outside the organisation in order to provide the best possible outcome with regards to the removal of illegal shacks and the relocation of illegal occupants from the site.

The impact assessment consequently demonstrated that the potential negative environmental impacts can all be mitigated to be within acceptable levels. The most significant impacts 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.

The accompanying EMP implemented for the construction, future operation and possible decommissioning shall ensure the minimization of impacts related to the Development. The EMP should be used as an on-site reference document for the construction and operation of the Development. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The development of a Health, Safety, Security and Environment Management System, which should be used in conjunction with the Environmental Management Plan would further strengthen the Applicant's commitment to responsible operating procedures. Operators and responsible personnel of the Development must be taught the contents of these documents.

Provided that the recommended mitigation measures are successfully implemented, there is no environmental reason not to issue an environmental clearance certificate for the proposed new sewage pump station and rising main in Kuisebmond, Walvis Bay.

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Appendix A: Environmental Practitioners CV

Appendix B: Proof of public notices, BID & newspaper adverts

Appendix C: IAPs

Appendix D: IAPs Issues/Comments and Response Table

Appendix E: Public presentation

Appendix F: MWB Meeting Minutes

Appendix G: Proposed development design plans