

TRANSNET NATIONAL PORTS AUTHORITY

PROPOSED WATER RETICULATION PROJECT, PORT OF DURBAN FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

DEA REFERENCE: 14/12/16/3/3/1/1882

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Purpose and basis of preparation of this Report

This PROPOSED WATER RETICULATION PROJECT, PORT OF DURBAN (Environmental Management Programme) has been prepared by WSP Environmental Proprietary Limited (WSP) on behalf and at the request of Transnet National Ports Authority (Client), to provide the Client an understanding of the Relevant Documents.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report and except where otherwise indicated in the Report.

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1 INTRODUCTION

1.1 TERMS OF REFERENCE

This Environmental Management Programme (EMPr) has been prepared in support of Transnet National Port Authority (TNPA) Environmental Authorisation (EA) application for the proposed water reticulation network upgrade project within the Port of Durban, KwaZulu-Natal. The proposed water reticulation is subject to an EA by the Department of Environmental Affairs (DEA) in terms of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA). The EMPr has been prepared in compliance with Section 19 of NEMA and Appendix 4 of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended. The EMPr will be submitted in conjunction with the Basic Assessment Report (BAR) to facilitate approval for the proposed project.

1.2 PROJECT BACKGROUND

TNPA proposes to install a new water reticulation network within the boundaries of the Port of Durban. The proposed water reticulation project will serve all areas and buildings within the Port's boundary identified as per the Assets Register as well as areas that are currently being supplied by the Transnet National Ports Authority (TNPA). Majority of the existing water reticulation network within the Port was installed during the 1950's.

It was discovered during the Front End Load (FEL) 2 study that approximately 42% of the water purchased from eThekweni Municipality is unaccounted for or lost. This translated into a loss of approximately 47 500kL of potable water per day and a cost of approximately R1 Million per month. The loss can be attributed to water leakages, pipe bursts and inaccurate meter readings. In order to reduce the unaccounted-for water (UFW) and to conserve water resources, a new water reticulation network has been proposed.

The installation of the proposed new pipe infrastructure network will:

- Eliminate the UFW;
- Improve the management of water usage as all at all take off points such as building connections, landing valves etc. will be fitted with automated meter readers (AMR);
- Allow early warnings and leak detection;
- Provide GPS co-ordinates of assets that will make tracking assets easier for the maintenance team; and
- Reduce the current number of bulk meters to two meter per zone, thus reduce the connection costs.

South Africa is rated as water scarce, so there is a need to protect this resource from threats of overuse and loss. The government has declared five of the nine provinces to be drought disaster areas during the recent water shortages in South Africa. The North West, KwaZulu-Natal, Mpumalanga, Limpopo and the Free State bear the brunt of the growing water crisis and some areas have been declared disaster stricken. The proposed project will reduce the amount of water loss within eThekweni Municipality. TNPA therefore needs to implement the installation of a new pipeline, in the Port of Durban, to responsibly manage and conserve this valuable resource.

1.3 PROJECT DESCRIPTION

1.3.1 PROJECT OVERVIEW

The proposed final layout consists of five zones (**Figure 1**) with an approximate total length of 39 835m. Each zone is independent of the others to allow for accurate water balance calculations to be performed. The horizontal alignment of the new proposed water network will follow as far as practically possible, the existing network along the quay walls. Most of the pipes along the quay walls are within service ducts or tunnels.



Figure 1: Site Locality and Layout (WSP GIS, 2017)

1.4 DESCRIPTION OF CONSTRUCTION ACTIVITIES

Pre-construction surveys were undertaken to mark the existing pipeline route. A one year period is planned for the construction phase. There are three main types of pipe installation methods for the proposed water reticulation network. The construction methodology for the pipe network is outlined below:

EXCAVATION AND PIPES IN TRENCHES

In areas of concrete hardstanding, concrete will be cut to excavate below ground level for the installation of the water pipe. The pipeline construction will use both the trenchless and trenching methods.

The majority of the existing network consists of asbestos pipes. Whilst it is envisaged leaving these pipes in the ground, should there be a pipe unmapped on the current reticulation plan, it is possible that the alignment of the new network will cross it. Trenches are likely required where there are no existing pipes and as such removal of old asbestos pipes in the ground will most likely be minimal.

Trenches will be excavated between 1 to 1.5m in depth depending on the pipe diameter and ground cover. The trench width depends on pipe size and side allowance as outlined by the South African Buildings Standards (SABS) 1200 DB. Trenches will be dewatered in some areas before the laying of the pipes because of the high water table. Earthworks for pipe trenches will be conducted as per SABS 1200DB and the laying of pipes in line with SABS 1200LB. approximately 25000m³ of soil will be excavated.

Pipe material for pipes in trenches will vary depending on circumstances. The pipe materials will be HDPE with a medium-pressure.

Open trench excavation will be applied in parallel to the existing pipelines. The old pipe will remain in the ground and only terminated after the new pipe is laid. This results in a short period of time required to transfer the connections to the new pipe. Formwork and shoring is to be used to prevent or control collapsing of material.

PIPE JACKING/HORIZONTAL DRILLING

Areas deemed to be highly built up or key operational areas in the port are not to be disturbed by means of open trench excavation, thus horizontal drilling and pipe jacking is required in these areas. This method reduces inconveniences caused by open cuts method on traffic and does not affect the road structural stability. This construction allows the installation of pipelines below the ground with minimal excavation. All trenches shall be tunnelled at a depth of minimum 1.2 m below any road surface. The Engineer may only allow exceptions through written consent only in reply to motivation from the Contractor or based on known circumstances.

This method will also be adopted for rail crossings. It would not be cost effective to uplift the rails when the trench crosses a railway, therefore rails will remain in place and propped whilst excavations are in progress. Stone is to be stockpiled in close proximity and replaced on completion of backfilling.

PIPE RACK

In zone 5, there are limitations to pipe being buried underground. Currently an existing pipe rack can accommodate the new pipe. The pipe material for pipes on racks will be stainless steel because of their exposure to sunlight as well as the corrosive sea water. The pipes will be installed to Transnet specifications in open positions on the existing pipe racks and will be secured by means of straps along defined intervals of the pipe. Installation on pipe racks may require the use of cranes.

PIPES IN SERVICE DUCTS/TUNNELS

Pipes (asbestos) that run in existing ducts and tunnels need to be removed, as space is limited. This may mean that sections may not be operational during the installation. Where possible the new pipe will be laid prior to the removal of the old pipe. It is envisaged that most of the pipes will be HDPE because HDPE pipes are flexible and can also be welded together to form a continuous pipe. A single access point will be made over the service duct and the pipe will be towed into and along the length of the tunnel, with pipes being welded at the access point as the process progresses. The pipes will be fixed at intervals to the wall of the duct by means of a clamping system.

1.5 AIMS AND OBJECTIVES

This EMPr is the primary document for managing potential environmental risks and opportunities during the project. It provides the framework for identifying environmental aspects and impacts, and environmental controls and processes to be implemented by the project proponent and contractors in carrying out their respective responsibilities. The EMPr serves as a live document and should be revised and updated to reflect any new information that should arise. The objectives of the EMPr are to:

- Provide effective, site-specific and implementable procedures and mitigation measures to monitor and control environmental impacts of the construction, operation and decommissioning phases, such that the related activities do not adversely impact the environment in the surrounding area.
- Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment.
- Train employees and contractors with regard to environmental obligations.
- Ensure that during the life of the project, TNPA ensures mitigation for negative impacts associated with the water reticulation upgrade work. An important component of this is the monitoring, evaluation, and communication of findings and adherence to the principle of ‘continuous improvement’.

1.6 LEGAL REQUIREMENTS

The EMPr forms part of the required documentation in support of the BA process (**Reference Number: 14/12/16/3/3/1/1882**) submitted to DEA. This EMPr has been prepared in compliance with GN. R326 of the 2014 EIA Regulations, as amended. TNPA is, like all other legal persons, bound to operate within the legal framework of the country and province.

In South Africa a multitude of legislation has developed over time, governing environmental management, promoting environmental objectives, regulating environmental exploitation or containing incidental environmentally specific norms - all of which impose legal obligations on TNPA.

It should be noted that the EMPr does not address the regulatory requirements under the Occupational Health and Safety Act (No. 85 of 1993) (OHSA); as these do not fall within the remit of the EA process. It is the responsibility of TNPA to identify and comply with the relevant regulations of the OHSA.

1.7 IDENTIFICATION OF ISSUES AND CONTROLS

Environmental issues generated by the construction and operation of the water reticulation network may affect the surrounding area; the following aspects have been identified:

- Air Emissions
- Noise Emissions
- Soil Erosion
- Groundwater Removal
- Waste Generation
- Hazardous Substances
- Estuarine Functioning Disturbance
- Increased Local Traffic
- Health and Safety
- Employment Opportunities
- Disturbance to Heritage Resources
- Water Supply and Security

The EMPr outlines the mitigation measures, controls, monitoring and reporting requirements and responsibilities required to achieve the environmental objectives and demonstrate environmental compliance within the construction

and operational phase of the proposed water reticulation network. Amendments to the EMPr will require consultation with and approval from the DEA: Legal Authorisation and Compliance Inspectorate Department.

1.8 ENVIRONMENTAL ASSESSMENT PRACTITIONER DETAILS

The details of the Environmental Assessment Practitioners (EAPs) responsible for the compilation of this document are presented in **Table 1** below:

Table 1: Details of EAP

Name of representative of the EAP	Education qualifications	EAP Experience (years)
Bathabile Msomi	BSocSc (Hons) Environmental Management, University of KwaZulu-Natal	4 years
Carla Elliott	MSocSC (Environmental Management), University of KwaZulu-Natal	11 years

2 ENVIRONMENTAL MANAGEMENT PROGRAMME

This section of the EMPr forms the core of the document and outlines specific issues related to the proposed project during the construction and operational phases and the recommended mitigation measures.

Timeframes stipulated for the implementation of the EMPr conditions have been categorised as “on-going” indicating immediate and on-going implementation following authorisation of the final EMPr. Where applicable / possible, the project specific phase has been stated for implementation.

2.1 FUNCTIONS AND RESPONSIBILITIES

TNPA and its relevant staff will be responsible for compliance with the EMPr and are liable for the implementation thereof. Roles, responsibility and authority shall be defined, documented and communicated in order to facilitate effective environmental management through implementation of the EMPr. Management shall provide resources essential to the implementation and control of the EMPr including: human resources, technology, and financial resources. TNPA shall appoint specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibility, and authority for environmental management of the project.

2.1.1 ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES

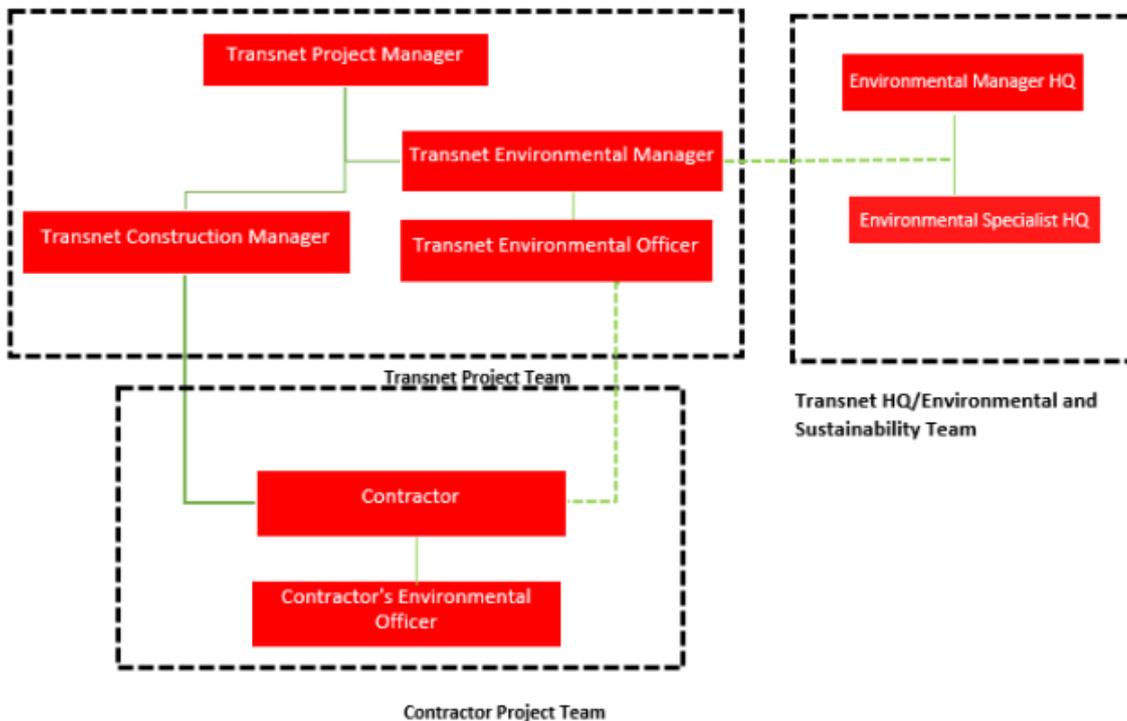


Figure 2: Typical Organogram for construction (Transnet, 2012)

2.1.2 ROLES AND RESPONSIBILITIES

Table 2 provides a high level outline of the various roles, responsibilities of the TNPA, authorities and the Environmental Control Officer (ECO). TNPA is required to ensure that the position of the appointed TNPA staff member responsible for the EMPr implementation, listed in Table 2 below, is updated within the EMPr as required.

Table 2: EMPr Roles

Transnet Environmental Manager
<ul style="list-style-type: none"> – Review all reports from the Environmental Specialist/Officer, including sign off on Method Statements. – Conduct any environmental incident enquiries and identify, with support from the Project Manager, the need for corrective or remedial measures with regard to proposed works. – Ensure induction material includes project appropriate environmental issues. – Approve training programmes and other awareness initiatives. – Coordinate or facilitate internal environmental audits. – Prepare environmental monitoring protocols (if monitoring to be done by Environmental Specialist and not an outside consultant).
Transnet Project Manager
<ul style="list-style-type: none"> – Reviewing the monthly reports compiled by the Transnet Environmental Officer – Communicating directly with the Contractors – Issuing non-conformance notification to Contractors that do not comply with the requirements of the EMPr and associated requirements or documents (including EA, permits and licenses)
Transnet Environmental Officer
<ul style="list-style-type: none"> – Review updates to the EMPr. – Ensure resource allocation for implementation of the EMPr requirements. – Participate in environmental performance verification activities to verify the level of compliance with the EMPr in delivering the legal and environmental obligations. – Assess the efficacy of the EMPr and identify possible areas of improvement or amendment required within the EMPr. – Initiate external audits (as required). – Ensure implementation of the EMPr. – Ensure that the latest EMPr documents are filed and readily accessible as required. – Ensure communication of EMPr requirements to relevant personnel as required for EMPr implementation. – Maintain environmental incidents and stakeholder complaints register. – Undertake environmental system reviews, site inspections, audits and other verification activities to assure that the EMPr implementation is at an optimal level. – Report significant incidents internally and externally as required by law and the conditions of authorisation. – Investigate incidents and recommend corrective and preventative actions. – Ensure maintenance of site document control requirements. – Provide environmental training for key project personnel.
Environmental Control Officer (independent environmental consultant)
<ul style="list-style-type: none"> – Undertake compliance audits against the EMPr and conditions of the EA. – Provide support and advice to the project team, contractor and all subcontractors in the implementation of environmental management procedures and corrective actions. – Ensure that monitoring programs, which assess the performance of the EMPr, are implemented. – Assist in the investigation of incidents and non-conformances and confirm in conjunction with the Environmental Officer that corrective and preventive action is taken and is effective. – Assess the efficacy of the EMPr and identify possible areas of improvement or amendment required within the EMPr.

- Facilitate the amendment of the EMPr in conjunction with the Environmental Officer (as required).
- Prepare audit reports (and submit reports to the relevant authority as required).

Contractors, Staff and Service Providers

- Provide Method Statements setting out in detail how the management actions contained in the EMPr will be implemented.
- Regular on-site auditing to assess performance against the requirements of this EMPr.
- Completion of the appropriate training requirements as specified in the training programme.
- Implementation and maintenance of environmental management controls as set out in the project's environmental management documentation.

2.2 TRAINING

TNPA has the responsibility to ensure that all persons involved in the project are aware of, and are familiar with, the environmental requirements for the project. All project personnel, including any contractors and sub-contractors are required to receive training of a type and level of detail that is appropriate for the environmental aspects of their work. As a minimum, all personnel are required to complete the training requirements stipulated in **Table 3** below. Attendance records are required to be retained on-site.

All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and be able to assist other staff members in matters relating to the EMPr.

Table 3: Training Requirements

Training Requirement	Frequency
<p>Site Induction</p> <p>The purpose of the induction is to ensure that, as a minimum, all on-site personnel understand the EMPr in terms of:</p> <ul style="list-style-type: none"> – Key issues relating to the project. – Relevant conditions of the EA. – Location and protection of environmentally sensitive areas. – Waste management and minimisation. – Washing, refuelling and maintenance of plant and equipment. – Minimising potential impacts to air, noise and water quality. – Erosion and sediment control. – Surface and groundwater contamination. – Spill control measures. – Spill Contingency Plan – Environmental Emergency Plan. – Incident reporting procedures. – Best pollution prevention practices. – Roles and responsibility relating to environmental management. 	<ul style="list-style-type: none"> – Construction Phase: Prior to commencement of work by staff and / or contractors.
<p>Toolbox Talks</p> <p>Toolbox talks are intended to deliver specific training in an aspect of work or control including:</p> <ul style="list-style-type: none"> – Waste hierarchy, minimisation and handling procedures. – Spill kit training. – Contaminated Soils – Incident reporting procedures. 	<ul style="list-style-type: none"> – Construction Phase: weekly or as required.

<ul style="list-style-type: none"> – Best pollution prevention practices. – Erosion and sediment control. – Roles and responsibility relating to environmental management. <p><i>The Environmental Officer should identify potential areas for which ad hoc training and awareness is required to promote compliance with the EMPr. This can be done in conjunction with the ECO.</i></p>	
<p>Pre-Start Meeting To discuss the planned work and operational aspects of the tasks. Health, safety and environmental issues and controls should be discussed and understood.</p>	<ul style="list-style-type: none"> – Construction Phase: As required (prior to commencement of a shift or the commencement of a new activity)

2.3 INSPECTION AND AUDITS

External environmental audits of the EMPr must be undertaken by an independent environmental consultant or suitably qualified ECO upon commencement of the construction activities. The EA will determine the frequency of external audits, however a bi-monthly frequency is recommended.

In order to facilitate communication between the ECO, Site Manager / Environmental Officer and Contractor, it is important that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of the project team before being conveyed to the Contractor. In this way, penalties as a result of non-compliances with the EMPr may be justified as failure to comply with instruction from the highest authority.

It is recommended that a once-off post commissioning verification audit of all identified impacts be carried out.

Decommissioning Phase: This will be determined based on the operational timeframes of the water reticulation network. The onus remains with TNPA to prepare a Decommissioning EMPr to be submitted prior to decommissioning of the water reticulation network.

2.4 ENVIRONMENTAL INCIDENT MANAGEMENT AND REPORTING

The following is applicable to incident management and mitigation:

- Any incident should be reported immediately to the Environmental Officer (or otherwise designated person).
- Immediate correspondence should be taken with the Environmental Officer to determine mitigation and close-out requirements.
- All significant incidents are to be reported immediately to the relevant authority (as indicated in the EA).

Environmental incident reporting and recording should include the following information:

- Time, date and nature of the incident.
- Response and investigation undertaken.
- Actions taken and by whom.

Corrective and preventative action requests should be forwarded to the responsible person so that corrective action can be taken. Open non-conformances should only be closed on verification by the Environmental Officer / Project Manager that the corrective action has been implemented effectively in order to meet the EMPr requirements. The cause of all incidents should be investigated to determine root cause and to ensure that corrective action is able to be implemented to ensure that there is no repeat of the incident. A summary and review of incidents recorded should be included within inspection reports by the Environmental Officer and submitted to the ECO for inclusion within the ECO audit report.

2.5 PUBLIC COMPLAINTS AND ENQUIRIES

Enquiries or complaints should be received by TNPA from port users / stakeholders through the following channels:

- Contact Person: Siraj Paruk
- Telephone number: 031 361 8133
- Email: Siraj.Paruk@transnet.net

Stakeholder enquiries or complaints must be brought to the attention of the Environmental Officer who should ensure corrective action and close-out. As a minimum the following information should be recorded:

- Time, date and nature of enquiry or complaint.
- The means by which the enquiry or complaints was made.
- Personal details of the person / party lodging the enquiry or complaint (subject to privacy considerations).
- Actions taken to investigate and close-out the complaint as well as complainant feedback.

All complaints received will be investigated and a response (even if pending further investigation) will be given to the complainant within 48 hours. Any actions that cannot be managed immediately should be assigned to the appropriate personnel and will become an outstanding action. The action remains outstanding until it is closed off by the ECO.

2.6 DOCUMENT CONTROL

The Environmental Officer (construction phase) is responsible for ensuring the maintenance of relevant documentation on-site. The relevance of the documentation required will vary. The following documentation (in no particular order of importance and not exhaustive) will be pertinent at various phases of the proposed water reticulation upgrade project:

- Approved EMPr and EA and any other licences that may be required
- Construction Method Statements
- Emergency Preparedness Plan and Emergency Control Systems
- Induction and Training Records
- Asbestos Management Plan
- Occupational, Health and Safety Plan
- Stormwater Management Plan
- Waste Management Plan
- All monitoring and inspection reports
- Reports of pollution incidents, environmental non-conformances and follow-up action
- Complaints Register and follow-up action
- Minutes of management review meetings, and actions required as a result

2.7 METHOD STATEMENTS

Method Statements are written suggestions by the contractor to the ECO in response to the requirements of this EMPr, or as requested by the ECO. The contractor shall be required to prepare Method Statements for several specific construction activities and/or environmental management aspects.

The contractor shall not commence the activity for which a Method Statement is required until the ECO has approved the relevant Method Statement.

Method Statements must be submitted and accepted or rejected timeously as suggested below:

- At least 20 working days prior to date on which approval is required to the ECO
- ECO must in turn accept or reject the Method Statement within 10 working days of receipt.

Failure to submit a Method Statement may result in suspension of the activity concerned until such time as a Method Statement has been submitted and approved.

The Method Statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site;
- Start date and duration of the procedure;
- Materials, equipment and labour to be used;
- How materials, equipment and labour would be moved to and from the site, as well as on site during construction;
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure;
- Emergency procedures in case of any reasonably potential accident/incident which would occur during the procedure; and
- Compliance/non-compliance with the EMPr specification and motivation if non-compliant.

3 PROPOSED MITIGATION AND MANAGEMENT MEASURES

3.1 PLANNING PHASE

Table 4: Planning Phase

Aspect	Management Actions	Responsible Person	Timeframe
Construction Programme	<ul style="list-style-type: none"> – The Contractor is to make contact with land occupiers adjacent to the pipeline servitude / people who are directly affected by the construction activities providing the following information: <ul style="list-style-type: none"> - When construction will take place near the affected party's property; - How the Construction will affect normal activities (residence access etc.); - Details of potential high impact activities such as water cuts; and - Contact information in case of emergencies. – A record of notification must be provided to the Project Manager and ECO. – Preparation and submission of Method Statements. 	Project Manager & Contractor	Prior to construction
Site Access	<ul style="list-style-type: none"> – Only formal access points can be utilised during construction (Appendix A). 	Project Manager & Contractor	Daily
Water resources	<ul style="list-style-type: none"> – The only water source that may be used for construction activities, including concrete mixing, cleaning of equipment, etc. must be obtained from a raw water filling point which must be supplied by TNPA. 	Project Manager & Contractor	Prior to construction
Construction Camp	<ul style="list-style-type: none"> – A construction camp site plan must be prepared with a description of the site and shall show, on an appropriately-scaled map, the intended use of the site. 	Project Manager & Contractor	Daily

	<ul style="list-style-type: none"> – Specially demarcated areas must be indicated for areas to be utilised by heavy machinery. These areas must be monitored by a designated individual on site, so as to ensure sensitive areas outside of the construction area are not damaged. – No persons, other than a night-watchman / security guard, may stay overnight at the construction camp. – Disturbed areas, rather than pristine or intact landscape areas, should preferably be used for the temporary construction camp. This area must be shown on scaled map. <ul style="list-style-type: none"> – Demarcated areas for the storage of hazardous substances and refuelling must only occur outside the coastal zone (i.e. within Port boundary). 		
Ablutions	<ul style="list-style-type: none"> – At least one toilet facility must be provided for every 15 labourers. Male and female toilets must be provided and clearly identified as such. – Chemical toilets shall not be in close proximity of any water bodies. The ECO should be consulted on the location of toilet facilities. – The contractor must submit an ablution facilities maintenance procedure/plan. 	Project Manager & Contractor	Prior to construction
Waste Storage	<ul style="list-style-type: none"> – Opportunities should be determined, in consultation with waste service providers, for re-use, recycle, or disposal options. – Build a bund around waste storage area to stop overflow into stormwater system. – Temporary waste storage points on site shall be determined. 	Project Manager & Contractor	Daily
Material Stockpiles	<ul style="list-style-type: none"> – Suitable locations for the storage of stockpiles must be identified (i.e. located further than 50 meters from harbour water body or water source (Section 1 (24 and 29) of National Water Act (Act 36 of 1998)) – No stockpiling must occur within 50 m of a water course or marine environment. 	Project Manager & Contractor	Weekly
Equipment and secured storage areas	<ul style="list-style-type: none"> – All hazardous substances must be stored within a secured storage area with impervious lining and bunding. – Drip trays must be used where appropriate. – Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected. 	Project Manager & Contractor	Daily
Public and workforce safety	<ul style="list-style-type: none"> – Dedicated pathways (temporary) for pedestrians must be developed to ensure safe passage around construction activities. – The dangers associated with construction site entry and exit points and public access must be given special consideration. 	Project Manager & Contractor	Daily

	<ul style="list-style-type: none"> All construction workers handling chemical or hazardous substances must be trained in the use of such substances and the environmental, health and safety consequences of incidents. 		
Social Impacts	<ul style="list-style-type: none"> Access alternatives for Port users must be identified and controlled. The Contractor is to inform surrounding land users within the Port of disruptive activities at least 24 hours beforehand. This can take place by way of posters placed in appropriate positions giving the Developer's and Contractor's details, by way of notice in the local newspaper, direct letter-drop to nearby properties, or, any other method approved by the Developer. Local communities or local community organisations must be given preference in supplying services and labour to the construction activities. A roster of "temporary labour" must be kept indicating "origin" of employee. 	Project Manager & Contractor	Prior to construction

3.2 CONSTRUCTION PHASE

3.2.1 PHYSICAL ENVIRONMENT

Table 5: Change in Ambient Air Quality

Aspect	Management Actions	Responsible Person	Timeframe
Objectives:			
<ul style="list-style-type: none"> To minimise potential fugitive emissions release associated with construction activities (excavation and materials transport) 			
Excavations for pipeline replacement and movement of vehicles and machinery result in an increased release of dust. This has the potential to lead to decreased air quality and a nuisance factor to receptors	<ul style="list-style-type: none"> Dust suppression measures (e.g. spraying) to active earthwork areas, stockpiles, and road transportation of sediment bearing material should be implemented when required (i.e. during high wind conditions (>20 km/hr)). Cover and / or maintain appropriate freeboard on trucks hauling any loose material that could produce dust when travelling. Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment. 	Environmental Officer & Contractor	Construction Phase

	<ul style="list-style-type: none"> – Any complaints from the public must be logged on a complaints register, which must also document the prevailing weather conditions, likely source of dust and corrective actions. 		
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction Monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Visual inspections. 	Environmental Officer & Contractor	On-going

Table 6: Change in Ambient Noise

Aspect	Management Actions	Responsible Person	Timeframe
Objectives			
<ul style="list-style-type: none"> – To minimise disruption caused by elevated noise levels 			
Elevated noise levels (machinery, vehicles and workforce) can result in disruption to receptors where noise level increase is audible and results in a nuisance factor.	<ul style="list-style-type: none"> – Avoid noisy activities at night-time and outside of normal week working hours where possible. – Maintain vehicles and machinery in good working order; noise control kits should be fitted to machinery where practical. Replacing old equipment can reduce noise levels e.g. replacing obsolete exhaust systems and improving intake muffler systems etc. – Notify adjacent land users well ahead of time should any excessive ‘out of hours’ noise be possible. – Vehicles are to switch off engines to minimise idling time when not in use. – Vehicle and equipment maintenance reports must be kept on file. – Employees / contractors are to be provided with appropriate PPE when undertaking work in noisy environments. 	Environmental Officer & Contractor	Construction Phase
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction Monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Visual inspections. 	Environmental Officer & Contractor	On-going

	<ul style="list-style-type: none"> – Document Control with specific reference to: <ul style="list-style-type: none"> – Vehicle and equipment maintenance reports. – Complaints Register 		
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Table 7: Soil Erosion

Aspect	Management Actions	Responsible Person	Timeframe
Objectives:			
<ul style="list-style-type: none"> – To ensure adequate management of trenching and stockpiling activities to avoid erosion and sedimentation impacts during the installation of pipelines – These measures apply largely to the trenching methodology and to a lesser degree, to pipe jacking / horizontal drilling <p>[Note: these measures are not applicable to installation on pipe racks]</p>			
Excavations / trenching can increase localised soil erosion. Sediment laden stormwater has potential to lead to the deterioration of harbour water and sensitive habitats by increasing turbidity.	<u>Material Storage and Stormwater Management</u> <ul style="list-style-type: none"> – Measures must be implemented to control soil erosion including limiting the extent of work areas, management of stormwater runoff, and sediment containment structures. – Stripping of top soil should not occur during wet or windy conditions. – Trenches shall be refilled to the same level (or slightly higher, to allow for settlement) as the surrounding land surface to minimise erosion. – No stockpiling must occur within 50 m of a water course or marine environment. – Transported material must be appropriately covered to prevent spillage from the vehicle during transit. – Store any soil from construction area in stockpiles not more than 2m in height to avoid compaction. – Soil stockpiles should be protected from dirty water contact and be protected (e.g. shade cloth/vegetation) to avoid long term loss of soil. – Contractor is responsible for checking and maintaining all erosion and sediment controls. – Minimise clearing and grading - where possible, the time that areas are left exposed must be minimal. 	Environmental Officer & Contractor	Pre - construction / Construction Phase

	<ul style="list-style-type: none"> – Divert clean water around the construction site using defined drainage corridors protected against erosion and contamination. – Ensure that stormwater discharge diverted to existing stormwater infrastructure in port. - Materials, prior to removal, should be stored within the development footprint away from drainage lines. Where this is not possible, an adjacent impermeable area should be identified and managed appropriately. - Ensure separation of any contaminated soil (resulting from spillages or other contamination event) and fill material (uncontaminated material to be used for backfill) - Silt fences (or similar) should be installed around the perimeter of the storage areas for excavated and fill materials or any sediment bearing material, as well as on the harbour side perimeter of the development footprint where practical. – Sediment basins should be installed to capture any sediment run-off from excavated and fill material. Sediment captured should be returned to the source (i.e. excavated or fill material) - use containment (e.g. membranes) to eliminate cross contamination as required. – Routine inspection of stormwater mitigation measures should be undertaken on a daily basis. This should identify aspects and areas which require cleaning, repair or replacement. – Environmental Officer should monitor weather forecasts for potential heavy rainfall events. – Suitable erosion control measures must be implemented at stormwater discharge points, exposed areas and embankments. 		
<p>Monitoring and Performance Assessment</p>	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction Monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Visual inspections. – Document Control with specific reference to: <ul style="list-style-type: none"> – Stormwater Management Plan (SWMP) (Appendix B) – Construction Method Statements 	<p>Environmental Officer & Contractor</p>	<p>On-going</p>

Table 8: Groundwater Abstraction

Aspect	Management Actions	Responsible Person	Timeframe
Objectives To avoid instability risks caused by excessive groundwater removal			
Excavations in a high water table zone and dewatering activities may increase instability risks	<ul style="list-style-type: none"> – The dewatering of groundwater may only be exercised once a water use has been registered with the Department of Water and Sanitation (DWS). – DWS conditions are to be implemented. 	Project Manager	Pre - construction / Construction Phase
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Construction Method Statements – Water Use Registration / General Authorisation – Monitoring Records [e.g. amount of water removed from underground and water quality analysis results]. 	Environmental Officer & Contractor	On-going

Table 9: Waste Management

Aspect	Management Actions	Responsible Person	Timeframe
Objectives - To ensure appropriate management of any potentially contaminated material removed from trenches - To reduce generation of waste			

<p>Generation of general waste has the potential to lead to visual issues and litter entering harbour waters if not managed correctly on site</p>	<ul style="list-style-type: none"> – Minimise construction waste that requires disposal by minimising materials brought to site. – Return excess construction materials which are suitable for re-use. – Should the need for disposal of effluent arise (not planned), a permit will be required from DEA Oceans and Coasts. 		<p>Construction Phase</p>
<p>Generation of general and hazardous waste can potentially contribute to indirect environmental and social impacts at third party waste management and disposal facilities.</p>	<ul style="list-style-type: none"> – Caution must be exercised not to damage the existing sewers during construction. In the event that damage to existing sewer occurs, the Waste Water Networks Branch must be contacted as soon as possible. The person to contact is Gabriel Motlal or Yoliswa Khumalo on 031-3118136 and 031-3118315 respectively. – Waste should be stored in separate and secure skips / containers depending on management options. – General waste should be stored within waste skips within a designated area with consideration to stormwater management. Waste skips should be covered to prevent windblown waste. – Working areas are to be cleared of litter on a daily basis. No litter / waste may be buried or burnt on-site. – All waste must be disposed of at a registered landfill site and proof of disposal to be supplied by removal contractor and kept on file. 		
<p>Removal of contaminated material and asbestos during excavation and pipeline removal has the potential to lead to secondary impact of further contamination if not properly managed</p>	<ul style="list-style-type: none"> – Asbestos specialist must be appointed for the handling of removed asbestos material and waste. – Should excavated spoil material outside the know contamination area (i.e. Zone 5) show visible signs of contamination, construction work is to stop and a land remediation and ground engineering specialist appointed to assess material. – Excavated material within known contaminated area (i.e. Zone 5) is to be profiled as per the Waste Classification and Management Regulations (GNR 634 of 2013) and handled as per the National Norms and Standards for Disposal of Waste to Landfill (GN. R636 of 2013) before landfill disposal. – The removed material is not suitable for reuse as fill material. – Waste must be collected by a licensed collection contractor for disposal at appropriate landfill sites. – Proof of disposal is to be received and filed. 	<p>Environmental Officer & Contractor</p>	<p>Construction Phase</p>

	<ul style="list-style-type: none"> – MSDS or SDS for all hazardous wastes must be available on site. – Personnel involved in the handling of hazardous waste must be provided with the necessary PPE as stipulated in the MSDS or SDS. – Discharge of waste from temporary chemical toilets into the environment is strictly prohibited. 		
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Construction Method Statements – Safe Disposal Certificates – Spoil Management Plan – MSDS and SDS – Proof of Training 	Environmental Officer & Contractor	On-going

Table 10: Hazardous Substances and Contamination

Aspect	Management Actions	Responsible Person	Timeframe
Objectives			
<ul style="list-style-type: none"> – To manage any potentially contaminated stormwater – To ensure that soil and water resources are adequately protected 			
Accidental spills can lead to contamination resulting in a deterioration of groundwater and harbour water quality. Reduced quality has the potential to affect sensitive habitats, flora and fauna.	<u>Above Ground Storage and Handling of Hazardous Substances</u> <ul style="list-style-type: none"> – Where possible, storage of hazardous substances should be undertaken using TNPA's existing infrastructure. – Storage of all hazardous materials (oils, fuels etc.) should be undertaken within impermeable bunded, ventilated and covered storage areas, capable of containing 110% of total volume. – All storage containers are to be labelled, sealed and stored in accordance with MSDS requirements. – Use drip trays on vehicles and machinery that are prone to oil leaks. 	Environmental Officer & Contractor	Construction Phase

- Regular inspection and maintenance of equipment.
- Any mixing of concrete must take place on an impermeable surface.
- Impound all water used to clean cement mixing equipment in a designated area (pollution dam) and do not discharge into the harbour water.
- In the event that soil is contaminated during construction, works are to stop and an investigation for removal / remediation initiated.
- Adequate ablutions (such as chemical toilets) must be located away from water resources. Preferably, existing facilities should be utilised to remove the requirement for on-site chemical toilets.
- Access to chemical storage areas must be controlled, and located outside 1:100 floodline and riparian zones.

Spill and Incident Management

- Spill and response equipment must be accessible on-site **at all times**.
- Cover the spill with absorbent material.
- Dispose of the clean-up material in line with MSDS requirements of spilled material.
- Staff handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures.
- Personnel involved in the handling of hazardous waste must be provided with the necessary PPE as stipulated in the MSDS.
- Any contaminated soil must be removed to depth of contamination and stored in a skip until it can be disposed with existing hazardous waste stream.
- Method statements and contingency / emergency response plans should be prepared for management of hazardous materials on-site.
- **Authorities (DWS and eThekweni Water and Sanitation) must be notified should a spillage occur (minor or major) and possible remedial actions discussed.**
 - DWS tel: 031 336 2810 / 031 336 2742
 - eThekweni Water and Sanitation tel: 080 13 13 013.
 - DEA: Oceans and Coasts tel: 012 819 2445
- **Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.**

Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Construction Method Statements – Safe Disposal Certificates – MSDS and SDS – Spill Prevention and Emergency Response Plan – Vehicle and equipment maintenance / inspection reports – Visual inspection 	Environmental Officer & Contractor	On-going
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3.2.2 BIOTIC ENVIRONMENT

Table 11: Estuarine Functioning

Aspect	Management Actions	Responsible Person	Timeframe
Objectives: - To conserve or protect estuarine habitats and ecological functioning			
Marine ecological disturbance is an indirect impact to the following: <ul style="list-style-type: none"> – Soil erosion and sedimentation – Contamination of surface and groundwater in the events of hazardous material spills. 	<ul style="list-style-type: none"> – See Mitigation Measures in Table 8. – Water containing waste must not be discharged into the natural environment. – Proof of safe disposal of waste water must be kept on record. 	Environmental Officer & Contractor	Construction Phase

Construction activities adjacent Bayhead Mangroves can result in direct disturbance to ecosystem functioning (including habitat provision) through sedimentation and smothering; and even loss	– An ecological specialist is to delineate a boundary for protection of mangrove forest at the Bayhead area before construction commences.	Project Manager	Pre-Construction
	<ul style="list-style-type: none"> – Vehicular access may only take place along the designated access roads. – All activities including stockpiles and storage of machinery and materials are to remain within the working area to be located outside sensitive environments. – Construction machinery must remain within the project footprint to minimise any unplanned loss or damage to adjacent areas of mangroves. – Monitor Bayhead Mangrove area on a bi-monthly basis throughout construction phase (estimated 1 year) to confirm no visible loss in the stand cover. 	Environmental Officer & Contractor	Construction
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Mangrove Buffer Area Delineation – Approved site layout for laydown area 	Environmental Officer & Contractor ECO	On-going

3.2.3 SOCIAL ENVIRONMENT

Table 12: Traffic

Aspect	Management Actions	Responsible Person	Timeframe
Objectives			
– To prevent congestion from occurring particularly during peak times.			
Increase in traffic may lead to sporadic temporary congestion at site access points. Public safety risks may	<ul style="list-style-type: none"> – All contractor drivers are required to hold valid licenses and be able to demonstrate technical training for respective class of vehicle. – Heavy duty vehicles and abnormal loads are to avoid arrival at the port during peak traffic times viz. 07h00 – 09h00 and 16h00 – 18h00, where practical. 	Environmental Officer & Contractor	Construction Phase

also arise (BAT Centre only).	<ul style="list-style-type: none"> – Speed limits must be adhered to. – Signage must be placed at relevant points along the access roads to caution pedestrians of the movement of construction vehicles and machinery into the construction site. – All members of the construction workforce working on the site or near the roads must be provided with the appropriate high visibility clothing to ensure that can be seen by motorists. – Construction activities must not obstruct access to existing roads. – Ensure vehicles and machinery are well maintained. – Public access routes (e.g. Bat Centre) to be well signed and managed. 		
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). 	Environmental Officer & Contractor	On-going

Table 13: Health and Safety Impacts

Aspect	Management Actions	Responsible Person	Timeframe
Objectives			
<ul style="list-style-type: none"> - To minimise potential health risks to the nearest receptors during the construction phase. 			

<p>Disturbance of soils may contribute to airborne particulate loads, including asbestos fibres that could become inhaled either by site workers or Port staff / users.</p>	<ul style="list-style-type: none"> – The handling and disposal of Asbestos must be undertaken in compliance with the Asbestos Regulations, 2001 under the Occupational Health and Safety Act, 1993 (Act no. 85 of 1993). – An appointment of an approved asbestos inspection authority to undertake an assessment of the structure is required and specialist recommendations to be adhered to (possibly update of EMPr). – Appointment of a registered contractor to remove and dispose of the asbestos. – Application must be made to the DWS for permission to dispose asbestos at any site. – TNPA to ensure that all employees are adequately and comprehensively informed and trained, on both practical aspects and theoretical knowledge with regard to: <ul style="list-style-type: none"> – The precautions to be taken by the employee to protect him or herself against the health risks associated with the exposure. – Safe working procedures regarding the use, handling, processing, and storage of any material containing asbestos. – Ensure that a First Aid Kit is available on site; and in the event of an emergency, the emergency procedure must be followed and the relevant emergency services must be contacted. 	<p>Environmental Officer</p> <p>Contractor</p> <p>HSE Officer</p>	<p>Pre-construction and Construction Phase</p>
<p>Potential inhalation of vapours and generation of ground gas during sub-surface work at Island View leading to health and explosion risks.</p>	<ul style="list-style-type: none"> – Appropriate protection from various contaminants within both soils and groundwater located in various positions across the Island View Complex must be confirmed. – Such protection may involve isolating pipelines from contaminated media or utilisation of alternative pipeline construction materials, and should be suitable for the impacts present. 	<p>Project Manager</p> <p>Contractor</p> <p>HSE Officer</p>	<p>Pre-construction and Construction Phase</p>
<p>Monitoring and Performance Assessment</p>	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Construction Method Statements 	<p>Environmental Officer & Contractor</p>	<p>Ongoing</p>

	<ul style="list-style-type: none"> – Asbestos Management Plan – Health and Safety Plan 		
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Table 14: Employment

Aspect	Management Actions	Responsible Person	Timeframe
Objective:			
<ul style="list-style-type: none"> – Promote employment and economic development opportunities at a local level as far as possible. 			
Increased local employment with an estimated 300-350 site staff required.	<ul style="list-style-type: none"> – Tender processes must include the prioritisation of local businesses contractors and labour throughout the construction phase, where feasible. – Implement a transparent process of contracting staff, following pre-established and accepted criteria. 	Project Manager	Pre-Construction and Construction Phase
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Tender processes to demonstrate promotion and prioritisation of local contractors and labour (through advertisements, identification of local contractors etc.). 	Project Manager	Prior to appointment of employees and Contractors

Table 15: Disturbances to Heritage Resources

Aspect	Management Actions	Responsible Person	Timeframe
Objectives			
<ul style="list-style-type: none"> – Ensure the identification and protection of any heritage or archaeological resources. 			

<p>Linear excavation works has the potential to uncover and disturb unknown heritage resources within the sub-surface.</p>	<ul style="list-style-type: none"> – Ensure that employees and contractors are aware of requirements for heritage resource protection and communicate any findings immediately. – In the event that items of potential heritage or archaeological importance are discovered, activities should be halted, AMAFA should be notified immediately: <ul style="list-style-type: none"> – Contact details for Amafa aKwaZulu Natali are as follows: 195 Langalibalele Street Pietermaritzburg, 3201 Tel 033-3946543 – Any potential “chance finds” of heritage objects must be logged in the site incident register. – Should the contractor be unsure of the any of the above aspects, the ECO should be contacted immediately. 	<p>Environmental Officer & Contractor</p>	<p>Construction Phase</p>
<p>Monitoring and Performance Assessment</p>	<ul style="list-style-type: none"> – Environmental training (as per Section 2.2). – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Visual inspections – Document Control with specific reference to: <ul style="list-style-type: none"> – Proof of training of chance find procedures 	<p>Environmental Officer & Contractor</p>	<p>On-going monthly</p>

Table 16: Water Supply

Aspect	Management Actions	Responsible Person	Timeframe
<p>Objectives</p> <ul style="list-style-type: none"> – Ensure maintained access to water for Port users 			

Switching water supply from old to new system - may result in disruption of water supply to TNPA and Port tenants.	<ul style="list-style-type: none"> – Early Notification of surrounding land users of possible water interruptions. – Provision of temporary water supply for Port operations when required (i.e. potential water disruption when switching supply across networks) – Maintenance of a complaints register. 	Environmental Officer & Contractor	Construction Phase
Monitoring and Performance Assessment	<ul style="list-style-type: none"> – Construction monitoring (as per Section 2.3). – Environmental incident reporting and recording (as per Section 2.4). – Document Control with specific reference to: <ul style="list-style-type: none"> – Complaints Register. 	Environmental Officer & Contractor	On-going monthly

3.3 OPERATIONAL PHASE

3.3.1 PHYSICAL ENVIRONMENT

Table 17: Hazardous Substances and Contamination

Aspect	Management Actions	Responsible Person	Timeframe
Objectives:			
Ensure potable water quality is maintained to avoid health risks			
Diffusion of soil contaminants into new pipeline at Island View complex has the potential to cause health impacts to water users	<ul style="list-style-type: none"> – Trenches to accommodate new pipeline within the Island View Complex are required to be lined with an additional layer (gravel / geo synthetic material) to ensure potentially contaminated soil (hydrocarbons) does not come in direct contact with the pipeline. – Possibly re-specification of pipe material based on ground conditions involving additional advice from both the island view tenants and pipe manufacturers should be sought to ascertain which material is best used to avoid impacts from soil contaminants (i.e. resistant to hydrocarbons), and areas of known high contamination within which this needs to be applied. Consideration must also be given to the joints and whether these are equally impermeable. 	Project Manager	Prior to construction

Monitoring and Performance Assessment	– Proof of Municipality acceptance of proposed approach to lining trenches	Project Manager	Prior to construction
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3.3.2 SOCIAL ENVIRONMENT

Table 18: Health and Safety

Aspect	Management Actions	Responsible Person	Timeframe
Objectives:			
– Ensure potable water quality is maintained to avoid health risks			
Public health risk to water users due to unsuitable pipeline installation at Island View (known contamination)	<ul style="list-style-type: none"> – Trenches to accommodate new pipeline within the Island View Complex are required to be lined with an additional layer (gravel / geo synthetic material) to ensure potentially contaminated soil (hydrocarbons) does not come in direct contact with the pipeline. – Possibly re-specification of pipe material based on ground conditions involving additional advice from both the IVCF and pipe manufacturers should be sought to ascertain which material is best used to avoid impacts from soil contaminants (i.e. resistant to hydrocarbons), and areas of known high contamination within which this needs to be applied. Consideration must also be given to the joints and whether these are equally impermeable. 	Project Manager	Prior to construction
Monitoring and Performance Assessment	– Proof of Municipality acceptance of proposed approach to lining trenches	Project Manager	Prior to construction

3.4 DECOMMISSIONING PHASE

Given the extended time period expected before the decommissioning phase, it is recommended that the requirements for the decommissioning mitigation measures be revised and updated where necessary to reflect current site conditions and statutory requirements.

The generic aspects and impacts proposed in **Table 19** and are not considered exhaustive. The onus remains with TNPA (or appropriate responsible party to be confirmed with the DEA) to prepare a revised Decommissioning EMPr to be submitted prior to decommissioning. The following aspects and issues should be considered *inter alia*:

Table 19: Decommissioning Phase

Aspect	Potential Issues and Impacts
Air Quality	<ul style="list-style-type: none"> – Decommissioning phase activities may potentially generate dust from a number of sources.
Noise	<ul style="list-style-type: none"> – Noise can be generated from a variety of decommissioning sources, which could result in the increase of the ambient noise levels at the fence-line.
Solid Waste	<ul style="list-style-type: none"> – Waste generation from the decommissioning activities (e.g. concrete, scrap metal, removed pipelines, waste building material, residual hydrocarbon / chemical material / containers) may result in localised soil and /or stormwater contamination. Off-site entrainment of contamination stormwater could potentially enter the Port. – Presence of potentially contaminated land and infrastructure requiring classification and development of disposal requirements.
Traffic Generation	<ul style="list-style-type: none"> – Increased traffic due to removal of material from the site with associated impacts including <i>inter alia</i> additional traffic congestion, and safety impacts to port users.
Hazardous Substances	<ul style="list-style-type: none"> – Accidental spills resulting from removal / decommissioning of infrastructure may cause potential impacts to human and / or environmental health.

4 CONCLUSIONS

In terms of NEMA, everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally responsible manner. Furthermore, in terms of NEMA, the cost to repair any environmental damage shall be borne by the person responsible for the damage.

By means of effectively implementing the recommended actions and mitigation measures referred to in this document at the correct timeframes listed, the maximum protection of social, physical and biotic environment will be realised. An appointed ECO will need to monitor the site throughout the construction and decommissioning phase to ensure that the required environmental controls are in place and working effectively.

APPENDIX

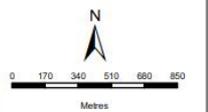
A SITE ACCESS





TRANSNET NATIONAL PORTS AUTHORITY
ACCESS ROADS

- Legend**
- Proposed Pipeline Network
 - Roads
 - M4



DATA SOURCE:
SOUTH AFRICAN DEPARTMENT OF RURAL DEVELOPMENT AND LAND REFORM;
CHIEF DIRECTORATE: NATIONAL GEO-SPATIAL INFORMATION

PROJECTION: WGS 31 HARTREEBESHOEK 94

PROJECT TITLE:
PROPOSED WATER RETICULATION AND BILLING PROJECT

PROJECT NO: 47831

SCALE: 1:25,509 AT A4 DATE: 14/10/2016

DRAWN BY: SABELO DUBE FIGURE NO: A6

REVIEWED BY: BATHABELE MSONI



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APPENDIX

B STORMWATER MANAGEMENT PLAN



APPENDIX

