
Proposed Upgrade of Island View Seawalls in the Port of Durban Construction Environmental Management Programme

Report Prepared for

Transnet National Ports Authority



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Report Prepared by



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Transnet National Ports Authority

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by PRDW Consulting Port and Coastal Engineers (PRDW) and Transnet National Port Authority (TNPA). The opinions in this Report are provided in response to a specific request from PRDW and TNPA. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Acronyms and Abbreviations

CDP	Chart Datum Port
CEMPr	Construction Environmental Management Programme
CER	Contractor's Environmental Representative
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DEA:O&C	Department of Environmental Affairs: Oceans and Coasts
EPCPD	Environmental Planning and Climate Protection Department
EO	Environmental Officer
FEL	Front End Loading
KZN	KwaZulu-Natal
KZNHA	KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997)
KZN PDA	KZN Planning and Development Act, 2008 (Act No. 6 of 2008)
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act. No. No 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PRDW	PRDW Consulting Port and Coastal Engineers
RP	Responsible Person
SDP	Supplier Development Plan
SRK	SRK Consulting (South Africa) (Pty) Ltd.
TNPA	Transnet National Ports Authority

1 Introduction

1.1 Background

The Port of Durban is the largest and best equipped container terminal in the southern hemisphere and is Africa's busiest port. Furthermore, it is South Africa's leading container, liquid bulk and vehicle port providing a variety of facilities including break bulk, a multi-purpose terminal, dry bulk, ship repair, naval facilities fishing, recreational activities and cruise liner docking. This port is of national importance as it services not only the local Durban and KwaZulu-Natal (KZN) hinterland but also Gauteng and the Southern African hinterlands.

The Port of Durban, in alignment with the National Ports Plan, has identified Island View for reconstruction and modernisation in order to address safety concerns and to sustain the national fuel import programme. The seawalls along the Island View basin are currently in a poor condition and are in desperate need of repairs and upgrading. Widening of the harbour entrance channel has resulted in increased wave energy which resulted in significant damage of the seawalls along the Island View basin. The proposed upgrades will improve the structural integrity of the seawalls and reduce the risk of damage to the infrastructure behind the seawalls. The proposed seawall upgrades are considered critical for the Island View terminals as this is a National Key Point area with Major Hazardous installations.

Transnet National Ports Authority (TNPA) has appointed PRDW Consulting Port and Coastal Engineers (PRDW) to undertake the FEL3 design to upgrade the seawalls along the Island View shoreline, including the installation of scour protection in certain areas. This Construction Environmental Management Programme (CEMPr), prepared by SRK Consulting (South Africa) (Pty) Ltd. (SRK) for PRDW, is for the construction phase of the project.

1.2 Content of the CEMPr

This CEMPr has incorporated the requirements of Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (December 2014) promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

The content of the CEMPr, according to the requirements of the EIA Regulations is detailed in Table 1-1

Table 1-1: Content of the CEMPr

Information Required in terms of the Appendix 4 of the EIA Regulations – Content of CEMPr	Reference in the CEMPr (this report)
(1) (a) details of - (i) the EAP who prepared the CEMPr; and (ii) the expertise of that EAP to prepare an CEMPr, including a curriculum vitae	Section 1.4 and CV's in Appendix A
(b) a detailed description of the aspects of the activity that are covered by the CEMPr as identified by the project description;	Section 4
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 2
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities;	Section 4

Information Required in terms of the Appendix 4 of the EIA Regulations – Content of CEMPr	Reference in the CEMPr (this report)
(iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 6
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Sections 5 and 6
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 6
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 7
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 7
(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 8
(n) any specific information that may be required by the competent authority.	Not applicable
(2) Where a government notice gazetted by the Minister provides for a generic CEMPr, such generic CEMPr as indicated in such notice will apply.	Not applicable

1.3 General Objectives and Purpose of the CEMPr

The key objective of this CEMPr is to document appropriate actions and assign responsibility for those actions, to ensure that any impacts resulting from the upgrades of the seawalls are minimised and mitigated. By its very nature, the CEMPr is a dynamic document.

The purpose of this CEMPr is to:

- Outline TNPA environmental management commitments for the site during the construction phase.
- Ensure adherence to all relevant environmental legislation.
- Act as a performance standard that activities can be audited against.
- Ensure that appropriate monitoring is undertaken.
- Ensure that environmental management measures, structures or mechanisms are taken into account during the planning of seawalls and revetment upgrades.
- Ensure that relevant environmental management measures are clearly documented and understood by all relevant parties.

- Ensure that all activities are undertaken in a way that will minimise potential negative effects on the surrounding environment and maximise possible benefits.
- Ensure that suitable organisational, record keeping and reporting structures are put in place to monitor implementation of environmental management measures during all future repairs and maintenance activities.
- Ensure that the roles and responsibilities for management of various components are clearly defined.

TNPA is responsible for ensuring adherence to the conditions detailed in the CEMPr. The project manager and contractor(s), are all bound by the CEMPr and must use this document as a guide to avoid, minimise and manage environmental impacts.

1.4 Authors of the CEMPr

The CEMPr was prepared by the Environmental Departments of SRK Durban and Cape Town. SRK commenced its practice in 1974 and has been involved in a large number of environmental studies since that time.

Table 1-2 lists the core project team. *Curricula vitae* of the individuals listed are included in Appendix A.

Table 1-2: The core project team

Name	Position	Role	Years' experience
Christopher Dalglish CEAPSA	Project partner and quality reviewer	Review and quality assurance	25 years
Sharon Jones Pr. Sci. Nat / CEAPSA	Technical reviewer	Technical advice	19 years
Philippa Burmeister Pr. Sci. Nat.	Project manager	Project management and regulatory requirements	15 years
Tamaryn Hale CEAPSA	Project coordinator and Environmental Assessment Practitioner	Project co-ordination, reporting	10 years

1.5 Assumptions and Limitations

The limitations and assumptions applicable to this CEMPr include:

- TNPA will ensure implementation of the mitigation actions stipulated in Table 6-1 of this CEMPr by the appointed Contractors by making implementation of the CEMPr a condition in the contract.
- This CEMPr applies specifically to management of the impacts associated with the upgrade of the seawalls along the Island View Basin.
- The dredged material will be placed in scour holes in the Island View Basin. In the event that the scour holes cannot be utilised the Department of Environmental Affairs: Oceans and Coasts (DEA:O&C) will need to be consulted again before proceeding with an alternative disposal method.
- It is assumed that all land based operations will take place in previously disturbed areas and that no clearance of vegetation or disturbance of greenfield sites will be required.
- It is assumed that all marine based operations will take place in previously disturbed areas and all dredging will be considered maintenance dredging i.e. No capital dredging is proposed for this project. All dredging is within the limits of the current maintenance dredging operations.

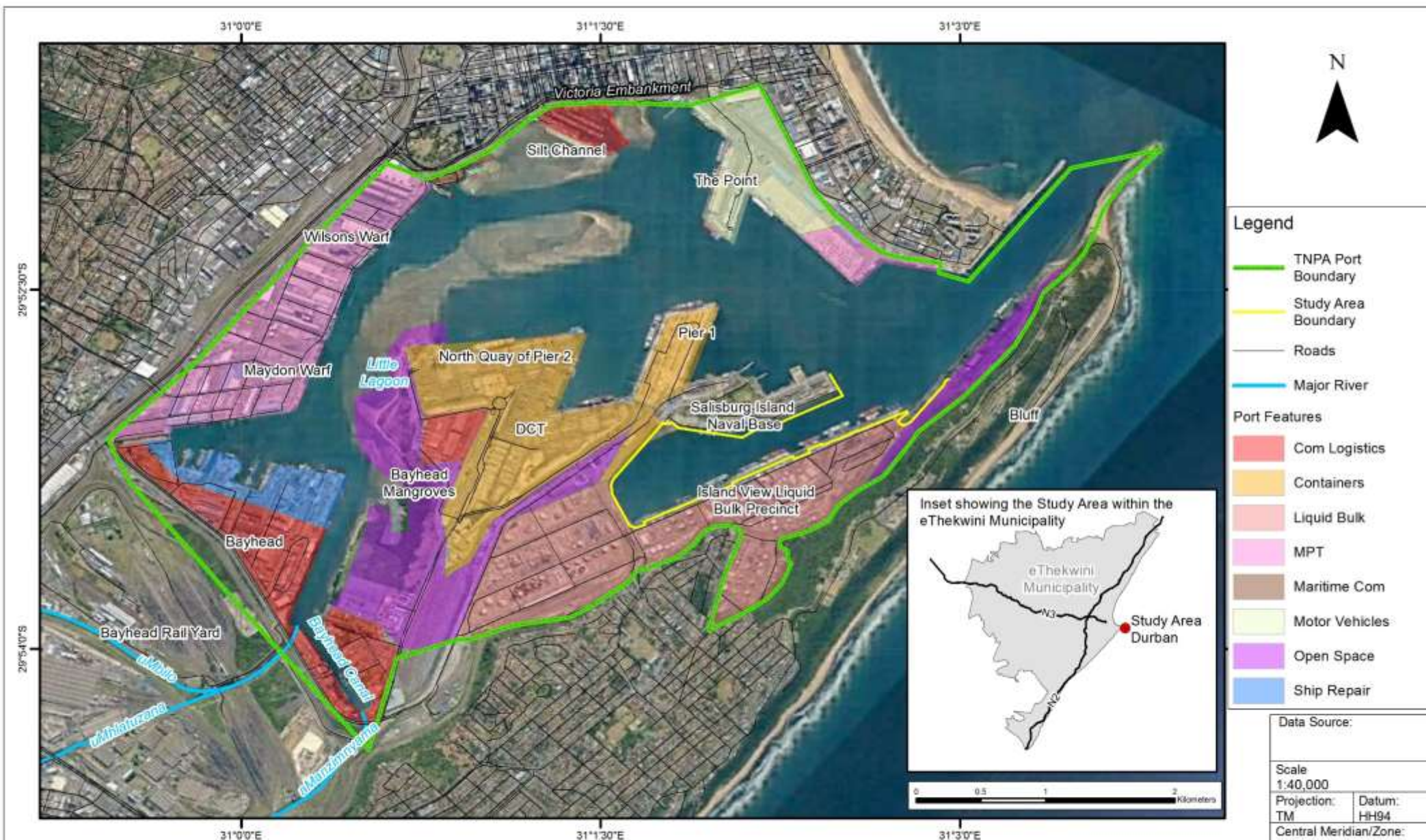
2 Scope of the CEMPr

2.1 Background

The Island View Complex (Island View), and study area for this project, is located on the southern side of the Port of Durban approximately 2.5km from the harbour mouth which is situated to the north-east. Island View stretches from the Port inner entrance channel, along the Bluff south quay walls and seawalls to the Island View quay walls and seawalls. It includes the Island View Berths 1 to 10, and extends along the causeway, past Berth 9 to Salisbury Island. The project area includes the entire shoreline around the Island View channel and turning basin. Refer to Figure 2-1 for the project area and extent of seawalls to be upgraded.

A Front End Loading (FEL) 2 Pre-Feasibility Study was undertaken by PRDW for this project, which identified the damaged seawalls and revetment areas that require immediate repair and upgrading. The FEL 2 study considered eleven (11) alternative solutions for repair and upgrading of the Island View seawalls, which were work-shopped with TNPA, following which it was unanimously agreed that rock revetments are the most appropriate, effective and the preferred method of protecting the Island View shoreline. Rock revetments are already extensively used as shoreline protection around the Island View terminal. The advantages of rock armour include; it is a very common and robust shoreline protection solution, it is cost effective when suitable rock material is available, it allows for movement and settlement, and it helps absorb wave energy.

PRDW have since been appointed to carry out the FEL 3 design and procurement documentation for the construction of the required rock revetment seawalls. This CEMPr has run concurrently with the FEL 3 design and will form part of the contract documentation for this work.



2.2 Upgrades and Extent of Development Footprint

Rock armour revetments are a common, efficient and reliable method of protecting shoreline slopes from wave attack and preventing erosion and undermining of landside infrastructure. A rock armour revetment consists of suitably sized and graded rock material designed for specific site conditions and design wave conditions expected at the site (see typical example of a rock revetment in Figure 2-2). They are robust structures that are flexible and can settle and move. Rock revetments have already been used along most of the Island View shoreline and between berths. The existing rock on these revetments is however generally too small for the increased wave conditions due to the Port entrance widening and therefore needs to be upgraded.

In certain areas between the berths, there is not sufficient space for a stable slope. Along these sections a steel sheet-pile wall will be installed to retain the bottom of the revetment slope. Scour rock will be placed seawards of the sheet-piles to prevent scour.



Figure 2-2: Example of a rock revetment

During the design stage, the areas that required repair and upgrading were identified and are shown in Figure 2-3. The scope of this project includes the full Island View shoreline slope from the crest level down to the Island view basin. Figure 2-4 shows the typical area of interest between the Island View berths. The seawalls are defined as the combined structures consisting of revetment, slope and sheet-piles (where required) together with sheet-pile scour protection. Neither the port footprint or the footprint of this developed area is expected to increase during the upgrade process. The area of the slope that is currently protected will generally extend into deeper water to prevent scour at the toe of the revetment and scour from propeller wash.

The revetment thickness will generally increase due to the larger armour rocks that are required. The landward footprint of the new revetment structure will not increase. The new revetment will however be placed over the existing seawall crest. Figure 2-5 shows a typical revetment section between the berths and one along the Salisbury Island shoreline. The typical section between the berths shows the entire slope being protected by rock with a sheet-pile helping retain the revetment toe. Scour rock will be placed on the seaward side of the sheet-pile to prevent scour and undermining of the sheet-pile.

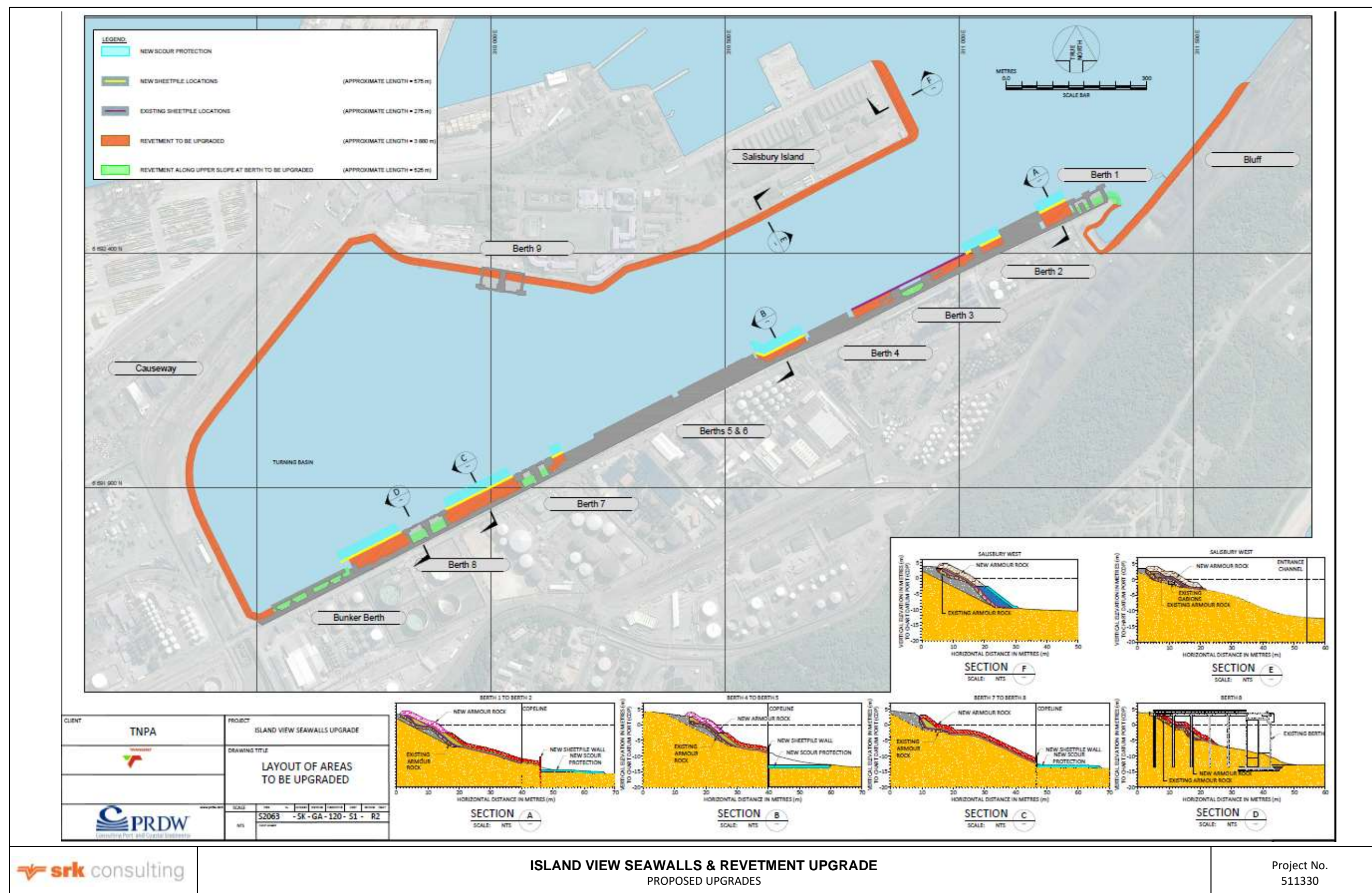


Figure 2-3: Proposed upgrades to the seawalls and revetments (refer to Appendix B for enlarged version)

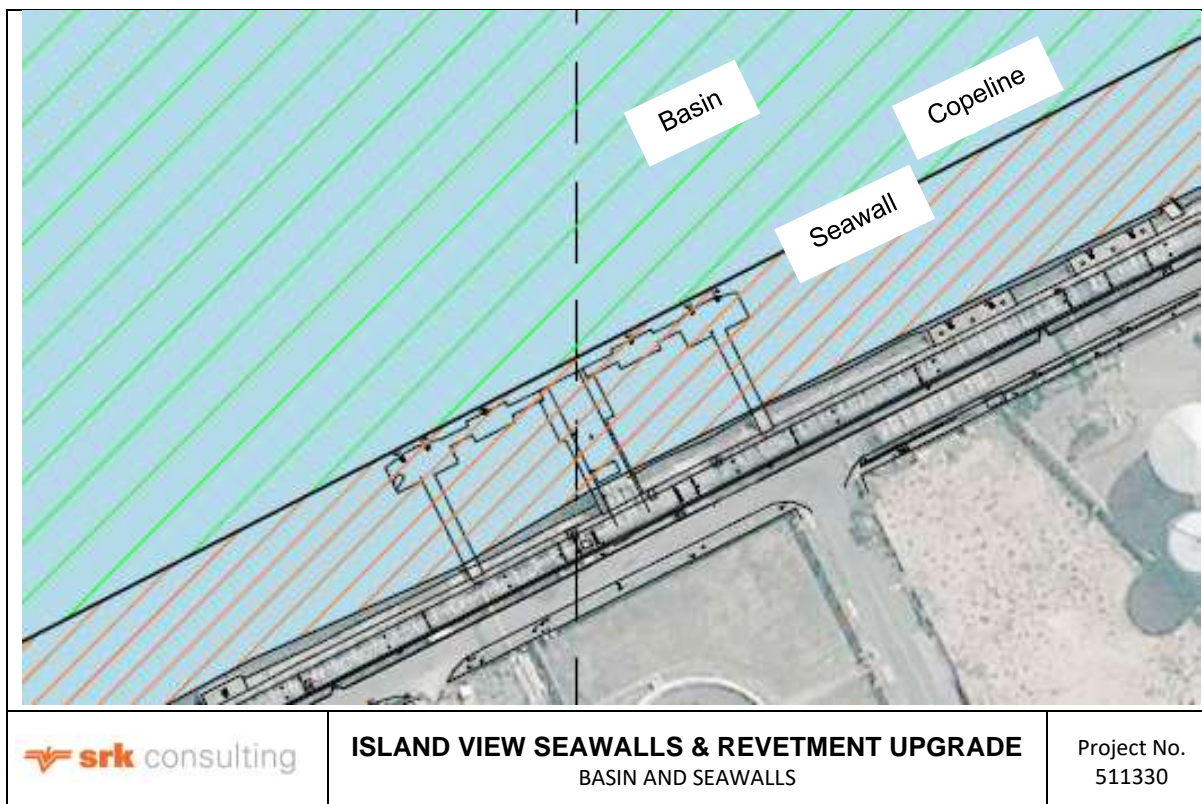


Figure 2-4: Basin and seawalls

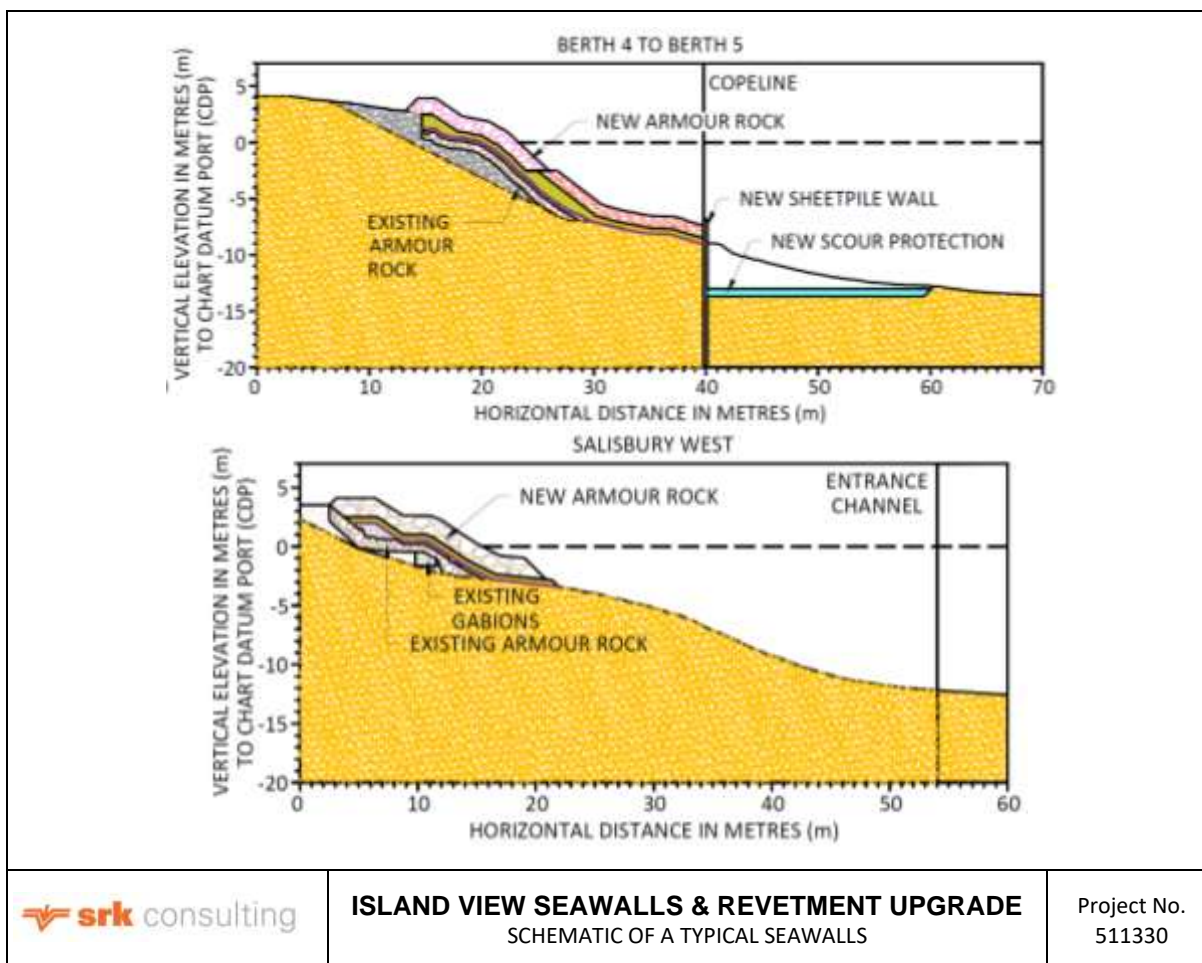


Figure 2-5: Schematic illustration of a typical revetment sections

The proposed works will all take place within the existing (developed) areas of the Port of Durban and adjacent marine environment. The presence of sensitive terrestrial and aquatic habitats within and surrounding the study area were determined based on existing datasets, the findings of which are presented in Table 2-1.

A review of existing biodiversity and conservation plans was undertaken to identify sensitive terrestrial and aquatic habitats. The review was undertaken primarily to determine whether this may have any implications with respect to permits and authorisations required, but also to inform the need for environmental management during construction. Based on a legal review and as confirmed by the national Department of Environmental Affairs (DEA) the study area does not require any Environmental Authorisation and/or permits relating to the aquatic and terrestrial habitats.

Table 2-1: Presence of sensitive terrestrial and aquatic habitats

Dataset	Study Area	Surrounds
eThekweni Municipality D'MOSS	Entire aquatic area of the Port of Durban is classified as 'Estuary'	No other open space zones directly adjacent to the study area
Ezemvelo KZN Wildlife TSCP	100% transformed	Biodiversity Priority Area 1 along southern boundary of study area
SANBI National Biodiversity Assessment: Terrestrial Habitats	Entire Port of Durban and terrestrial habitats in the surrounding areas are classified as critically endangered	
National Freshwater Ecosystem Priority Area (NFEPA)	Entire Durban bay classified as a National Freshwater Ecosystem Priority Area	
1: 100 year floodlines	Outside 1: 100 year floodlines of three major rivers feeding the Durban bay	

2.3 Construction Method

The method of constructing the revetments will be a combination of land and marine based techniques. Where there is landside access, such as at the Bluff, mole and causeway, land based equipment will be used to construct a revetment along the shoreline and to approximately 20m seaward of the shore edge and to a depth of approximately - 5m CDP. Where revetments extend beyond the reach of land based equipment, marine based techniques will be used such as along Island View Berths 1 to the Bunker Berth (Figure 2-6).

The bottom of the revetments, between the berths may not extend beyond the berth cope line so as not to encroach on the navigational area. Therefore a sheet-pile is required, in a number of areas, along the base/toe of the revetment to retain and stabilise the slopes and allow for dredging the basin to the required depth up to the berth cope line. Once the sheet-piles have been installed the seaward side of them will be dredged to the advertised depth which ranges from between -10 m and -14.5 m CDP. Scour rock will be placed seawards of the sheet-piles to prevent scouring and potential compromising of the sheet-pile wall. The required dredging/excavation in front of the sheet-piles falls within the maintenance dredging tolerances depths.

For the landside construction method, roadworthy dump trucks will be used to transport filter and armour rock to areas that have road access. The rock will be placed directly onto the revetment or stockpiled adjacent to the working area for placing latter on. A land-based excavator will then be used to place and shape the revetment filter layer and armour layer. A long reach excavator will be used to reach the further and lower sections of the revetment.

All land based operations will take place in previously disturbed areas and no clearance of vegetation or disturbance of greenfield sites will be required. Similarly, all marine based operations will take place in previously disturbed areas. All dredging will be considered maintenance dredging and will be within the depths and tolerances of the current maintenance dredging operations.

The construction phase does not require or include the construction of infrastructure for utilities such as water supply, electricity or access roads. There are some existing storm water outlets along the seawalls that will be integrated into the revetment structure.

The typical construction sequence of the revetments between the Island View berths revetment will be undertaken as follows:

- a) Temporary decommissioning of the adjacent berth.
- b) Where required, install sheet-piles along the bottom of the slope, just landward of the berth cope alignment. The sheet-piles will be installed from floating plant i.e. a barge.
- c) Dredge/excavate the sandy/clayey material in front of the sheet-piles down to the required basin depth. The volume of the material that needs to be dredged/excavated is between 20,000m³ to 25,000m³ and it will be placed in the adjacent scour holes in the Island view basin.
- d) Place rack scour protection in front of the sheet-pile wall.
- e) Trim and slope profile where required and prepare the slope for the new rock revetment. The rat-proofing (grouted packed stones) are to be broken up to provide a pourous and higher friction surface.
- f) Place a geotextile on the prepared slope.
- g) Filter and armour rock will be transported to and stockpiled the on site. Rock will be loaded onto barges or hopper barges at the Westerly Berth 9 mooring dolphin. The barges will transport rock to the construction areas. The rock will be bottom dumped and profiled with excavators, alternatively an excavator will be used to unload the barge and place and profile rock on the slope. The revetment will be built up from the bottom up.

2.4 Utilisation/Disposal of Dredged Material

The volume of the material that needs to be dredged/excavated during this project is between 20,000m³ to 25,000m³. Various options for the utilisation or disposal of the dredged material were identified and considered. These include:

- Beneficial use (to fill scour holes inside the port).
- Disposal on land.
- Disposal or temporary storage in the port basin. To be removed during future Port maintenance dredging.
- Disposal at sea at TNPA's existing maintenance dredging disposal site.

It was agreed that the most efficient and beneficial use of this material will be to place it in scour holes in the Island View Basin (refer to Figure 2-6) adjacent to the works. This will help reduce the risks of slopes and/or berth structures being undermined due to the excessive scour depths adjacent to the slopes and structures. The volume of material that can be accommodated in areas A and B in Figure 2-6, below the -13.5m CDP level, is approximately 65,000 m³. This is two to three times more than the expected dredge volumes. This option was also preferred by the DEA:O&C, as this will be a beneficial use of the material and it eliminates the need for disposal and, thus, acquisition of a Dumping at Sea Permit.

Neither disposal on land nor disposal at sea were considered feasible options given the relatively small volumes of material that need to be dredged.

Based on CSIR monitoring studies during 2016 and 2017, it is anticipated that the dredge material will not be contaminated and that it is suitable for disposal in the existing Island View basin scour holes.

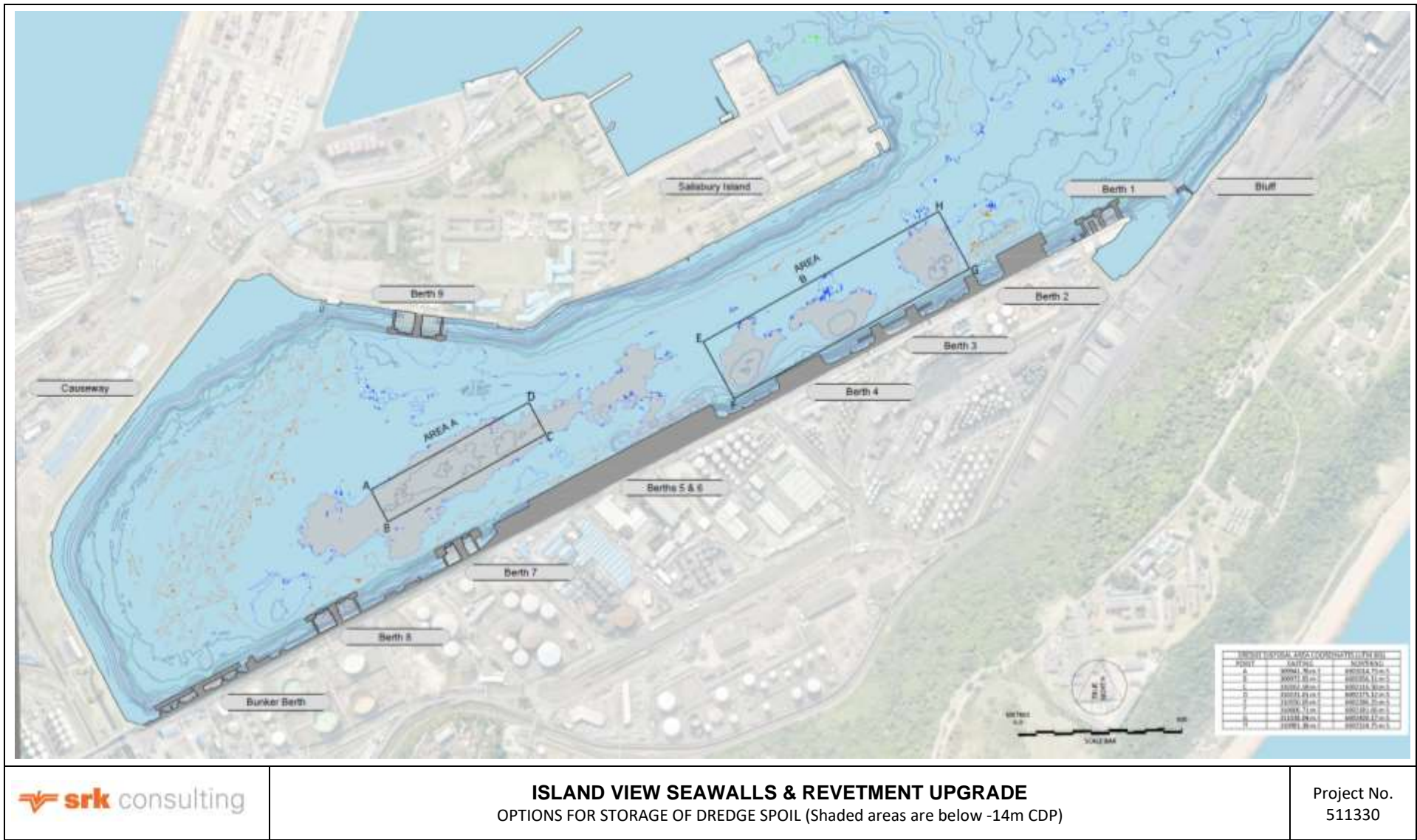


Figure 2-6: Options for the storage of dredge spoil in the Island View basin

3 Legal Framework

A legal review of the following key legislation regulating environmental matters in relation to development projects (i.e. where environmental authorisations, permits or licences may be required) was undertaken:

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the associated EIA Regulations.
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM: ICMA).
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).
- KZN Planning and Development Act, 2008 (Act No. 6 of 2008) (PDA).
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA).
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA).
- National Water Act, 1998 (Act No. 36 of 1998) (NWA).
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).
- KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997) (KZNHA).

The following conclusions were made based on the legal review:

- Based on the fact that the proposed activities take place inside an existing Port, do not increase the development footprint of the Port, and a setback for the Port has not been defined, no Environmental Authorisation is required for this project.
- Although the project requires dredging of a small volume of material to reach the advertised depth along the copeline and facilitate seawalls upgrades, and the option of disposing of the dredged material at the existing marine disposal site was considered, TNPA has taken the decision not to dump the dredged material at sea due to the small volumes, but rather utilise it in the basin. Therefore, a dumping at sea permit will not be required, as confirmed by the DEA: Oceans and Coasts (DEA:O&C) in a meeting held on 27 November 2017 (refer to Appendix C for the minutes of the meeting).
- Based on the age of some structures requiring upgrade (over 60 years) and the extent of the area to be dredged and scour holes filled, a heritage permit is required. An application to the South African Heritage Resources Agency (SAHRA) has been submitted and a decision is still pending.
- As the project area falls within Durban's Metropolitan Open Space System (D'MOSS), the eThekweni Municipality: Environmental Planning and Climate Protection Department (EPCPD) was consulted regarding the need for any additional permits or applications. The EPCPD confirmed that it had no concerns regarding the proposed project from a biodiversity perspective, but advised that TNPA would need to consult with the town planning department for building approvals.

4 Potential Impacts and Outcomes on Receiving Environment

The main environmental aspects associated with the site that require management during the proposed upgrade of the seawalls and revetments are summarised in Table 4-1. While the significance of the potential impacts of the proposed works depends largely on the sensitivity of the receiving environment (in this case a functional harbour and thus a substantially disturbed environment), there is value in understanding the nature of potential negative impacts as context for the detailed mitigation measures presented in Section 6.

Note that while the description of the potential impacts of the project presented in Table 4-1 includes impacts associated with maintenance dredging and the placement of dredged material in scour holes, management of impacts associated with these activities will be in terms of TNPA's EMP for dredging operations in the Port of Durban (refer to Appendix D for the dredging EMP) , and for consistency, additional mitigation measures associated with these activities are excluded from this CEMPr. It should further be noted that some of the key outcomes listed below have already been addressed during the project design phase, but have been included to present a comprehensive overview of the impacts considered.

Table 4-1: Potential impacts and outcomes for the proposed upgrade of the seawalls and revetments at Island View

Aspect	Potential Impact	Description of Impact at Island View	Key outcomes
Dredging and placement of dredged material	Disturbance of marine habitat within the footprint of proposed dredging and placement of sediment in scour holes	Any benthic marine biota within the footprint of (or directly adjacent to) the proposed dredging activities will be removed, disturbed or smothered. Given that the scope of works covered by this CEMPr is limited to maintenance dredging and placement of material within scour holes within the existing (previously dredged) harbour basin) it is expected that these habitats would previously have been significantly disturbed during harbour construction, previous maintenance activities and ongoing use. As such marine biodiversity is expected to be low and unlikely to include sensitive marine habitats. It should also be noted that sandy marine habitats (such as beaches) are adapted to recover quickly from disturbance since these coastal systems naturally undergo regular erosion and accretion events.	Define dredge volumes and determine dredging frequencies to inform disposal requirements
	Nutrient release and associated algal blooms	Dredging and placement of dredged material activities may release nutrients trapped in the dredged sediments, increasing nutrient levels in the water column and potentially leading to algal blooms. This may affect water quality and surrounding water users. Studies by the CSIR indicate that nutrient levels in the water in the Port varies substantially, largely due to inflows for surrounding urban areas.	Sampling and characterisation of sediments during dredging to determine safest placement of dredged material option
	Liberation of trace metals and other contaminants in dredged sediment, affecting marine life	Contaminants in sediments could be released into the water column during dredging and placement of dredged material, potentially affecting marine biota and other water users in the area. The CSIR have reported that high concentrations of metals have been found in mussels in the Island View basin, which may be indicative of high metal concentrations in the sediment. The release of contaminants into the	

Aspect	Potential Impact	Description of Impact at Island View	Key outcomes
		water column during dredging may affect water quality and surrounding water users such as Ushaka Marine World that pump water from the harbour	
	Elevated turbidity and sedimentation in surrounding habitat	Dredging and placement of dredged material will result in the suspension of sediments in the water column, with potential impacts on marine ecology or other water users in the area (e.g. aquaculture activities). In an existing harbour environment the increased turbidity and sedimentation levels will be contained inside the harbour boundaries where marine life has already been disturbed in the past, and is therefore unlikely to include sensitive marine habitats.	Monitor turbidity and sedimentation during dredging
	Visual impact of dredging activities	Dredge plumes (sediment suspended in the water column) will be visible on the surface and may have a visual impact, if viewed from an elevated location. Assuming dredging and placement of dredged material activities are relatively limited, dredge plumes are likely to be small and present for only a short period. The significance of the impact is expected to be limited given the location within an operational harbour rather than a natural landscape.	Minimise visual impacts of dredging on visual receptors
	Compromised safety of users of the harbour	The dredging activities to be undertaken will involve use of heavy machinery and may compromise the safety of other users of the harbour if not adequately communicated and managed.	Ensure the safety of users of the harbour is not compromised
	Accidental release/discharge of contaminants, such as oil during marine works	Contaminants released into the water column during marine works could affect marine biota and other water users in the area. Although the likelihood of sensitive environments/users inside the harbour are extremely low, an uncontrolled spill could spread beyond the work areas rapidly with detrimental effects outside the harbour if not adequately prevented and managed (e.g. through the implementation of an oil spill contingency plan)	
Increased noise levels	Higher noise levels during construction could adversely affecting surrounding landowners, tenants and residents	Increased noise levels may be generated by construction vehicles and equipment and dredging activities (depending on the dredging methodology). The level of disturbance experienced by surrounding communities will depend on emitted noise levels, ambient noise levels in the area, the nature of surrounding land uses as well as the proximity of sensitive receptors. Although the closest residential areas, such as Fynnlands and Ocean View are in close proximity (approximately 300 m) to the Island View basin, ambient noise levels are already likely to be high given the proximity to the port and railway line passing between the port and these communities.	Ensure noise levels are within reasonable limits.
Increased emissions	Increased emissions during construction adversely affecting air quality	Emissions from construction vehicles and, potentially, dust generated by vehicle movements or the handling of materials could affect the local air quality temporarily. The impact on surrounding communities will once again be determined by the proximity of sensitive receptors to the area in which works will be undertaken and local wind conditions.	Ensure dust management measures are in place to reduce dust emissions

Aspect	Potential Impact	Description of Impact at Island View	Key outcomes
		The closest residential areas are situated approximately 300 m from the Island View basin.	
Poor waste, effluent, waste water and hazardous material management	<p>Release/ discharge of contaminants from poor waste, effluent, and hazardous materials management during construction, affecting marine life</p> <p>Release/ discharge of contaminants from concrete/ cement spills during construction, affecting marine life</p>	Contaminants released into the water column during construction activities could affect marine biota and other water users in the area.	Ensure efficient and effective waste, effluent, waste water and hazardous materials management procedures are in place.
Protection of Heritage Resources	Loss or disturbance of cultural heritage resources	Loss or disturbance of cultural heritage resources could occur due to disturbance of material (including wrecks) of archaeological or heritage value of structures older than 60 years. The terrestrial and marine portions of the site have been significantly disturbed by previous development, and dredging operations, and it is thus extremely unlikely that any material of archaeological value would be encountered. Some of the structures to be upgraded at island View are older than 60 years.	<p>Ensure legal compliance for identified heritage resources</p> <p>Limit disturbance and damage to heritage resources identified during construction</p>
	Increased employment, income and skills development	Although the duration of repair and maintenance works is likely to be relatively short, opportunities exist for local employment, skills development and support of local industries with positive impacts on the local economy. Allowance for this is made in TNPA's SDP policy.	Encourage the use of local contractors and staff and sourcing of materials from local suppliers where relevant skills and resources are available.
General environmental management	Marine and terrestrial environmental degradation, damage and/or destruction	Lack of consideration of the potential environmental impacts of the project in the planning and construction phases could cause marine and terrestrial environmental degradation, damage and/or destruction	Ensure environmental considerations are factored into all spheres of the project

5 Roles and Responsibilities

The key role players during the upgrades are anticipated to be as follows:

- Proponent (TNPA), where relevant represented by their Implementing Agent.
- Engineer / Responsible Person (RP), who will oversee the activities of the contractors on site.
- Environmental Officer (EO). This role will be fulfilled by TNPA's environmental specialist who has oversight of all works in the harbour from an environmental perspective.
- Contractors responsible for the maintenance and repair activities.
- Any Sub-contractors hired by the contractor.

The anticipated management structure (organogram) is presented in Figure 5-1 and shows the proposed lines of communication for the duration of the construction phase of the project. TNPA retains overall responsibility for maintenance and the implementation of the CEMPr.

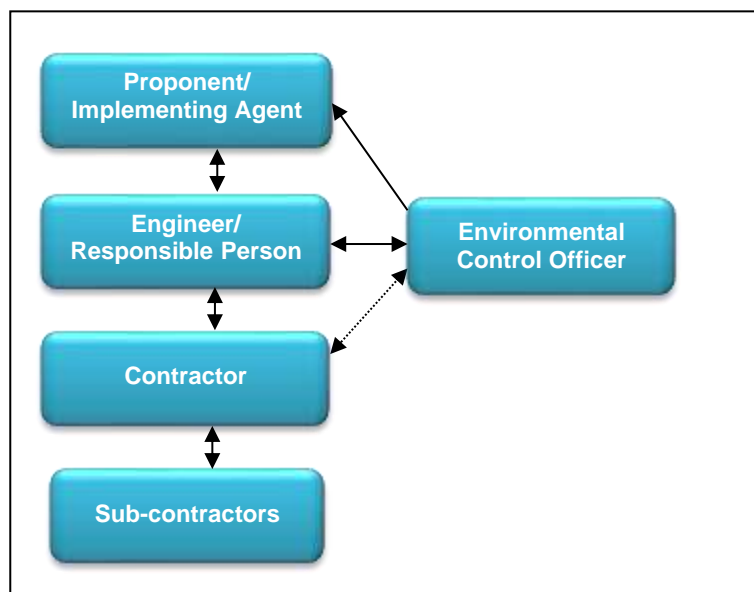


Figure 5-1: Reporting structure

Key roles and responsibilities with respect to the implementation of the CEMPr are outlined below.

Responsible agent	Roles / responsibilities
Proponent (TNPA)	<p>TNPA (through their Implementing Agent if applicable) has overall responsibility for management of upgrade activities. In terms of environmental management, the Proponent will:</p> <ul style="list-style-type: none"> • Appoint suitably experienced Engineers, if required, who will be responsible for the overall management of activities on site. • Identify any activities not covered by the scope of this CEMPr, and determine the need for, and where required, obtain relevant authorisations. • Ensure that the Engineers are aware of the requirements of the CEMPr, implement the CEMPr and monitor the Contractor's activities on site. • Ensure that the Contractor is aware of and contractually bound to the provisions of this CEMPr by including the relevant environmental management requirements in tender and contract documents, as appropriate. • Appoint/designate a suitably qualified and experienced EO/internal environmental specialists to oversee environmental management of the required works. • Ensure that the Contractor remedies environmental problems timeously and to the satisfaction of the Engineer and authorities (when necessary). • Notify the authorities should problems not be remedied timeously.

Responsible agent	Roles / responsibilities
Engineer/ Responsible Person	<p>TNPA will appoint suitably qualified Engineers, who in turn will designate a responsible person (RP) to oversee activities of the Contractor. This role will be fulfilled by the Resident Engineer. The RP shall:</p> <ul style="list-style-type: none"> • Ensure that the Contractor is duly informed of the CEMPr and associated responsibilities and implications of this CEMPr prior to commencement of site activities. • Identify the need for, and request/provide Method Statements for future maintenance and repair works. • Monitor the Contractor's activities with regard to the requirements outlined in the CEMPr. • Report any environmental emergencies/concerns to the TNPA immediately. • Ensure that any non-compliance is remedied timeously and to the satisfaction of the relevant authorities.
Environmental Officer	<p>The EO shall be a suitably qualified/experienced individual designated by TNPA to have environmental oversight for the duration of repair or maintenance works. The EO shall:</p> <ul style="list-style-type: none"> • Request Method Statements from the Contractor prior to the start of relevant activities, where required, and approve these (as appropriate) without causing undue delay. • Monitor, review and verify compliance with the CEMPr by the main Contractor, as well as any sub-contractors and specialist contractors. • Undertake site inspections at least twice a month to assess compliance with the CEMPr. • Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with TNPA, the RP and the Contractor, as required. • Compile a checklist highlighting areas of non-compliance following each EO inspection. • Ensure follow-up and resolution of all non-compliances. • Provide feedback for continual improvement in environmental performance. • Respond to changes in project implementation or unanticipated activities which are not addressed in the CEMPr, and which could potentially have environmental impacts, and advise TNPA, the RP and Contractor as required. • Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.
Contractor	<p>The Contractor will be required to appoint or designate a Contractor's Environmental Representative (CER) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor, the EO and the RP. The CER shall:</p> <ul style="list-style-type: none"> • Ensure that all activities on site are undertaken in accordance with the CEMPr and/or an approved Method Statement. • Monitor the Contractor's activities with regard to the requirements outlined in the CEMPr. • Ensure that all employees and Sub-contractors comply with the CEMPr. • Immediately notify the RP and EO of any non-compliance with the CEMPr, or any other issues of environmental concern. • Ensure that non-compliance is remedied timeously and to the satisfaction of the RP and EO. • The Contractor has a duty to demonstrate respect and care for the environment. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the CEMPr, environmental regulations and relevant legislation.
Sub-contractors	<p>All Sub-contractors will be required to:</p> <ul style="list-style-type: none"> • Ensure that all employees are duly and timeously informed of the CEMPr and associated responsibilities and implications of this CEMPr. • Ensure that all activities on site are undertaken in accordance with the CEMPr. • Monitor employees' activities with regard to the requirements outlined in the CEMPr.

Responsible agent	Roles / responsibilities
	<ul style="list-style-type: none">• Immediately notify the RP and EO of any non-compliance with the CEMPr, or any other issues of environmental concern.• Ensure that non-compliance is remedied timeously and to the satisfaction of the RP and EO.• The Sub-contractor has a duty to demonstrate respect and care for the environment. The Sub-contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the CEMPr, environmental regulations and relevant legislation, resulting from their presence on site.

6 Environmental Management and Mitigation Measures (Actions)

The environmental management and mitigation actions that must be implemented to achieve the outcomes identified in Section 4, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are detailed in Table 6-1. Note that environmental management requirements for dredging and the placement of dredged material into scour holes will be as per TNPA's EMP for dredging operations in the Port of Durban and detailed mitigation measures are thus not provided below.

Table 6-1: Environmental management and mitigation actions that must be implemented for the planning and construction phases to ensure the desired outcomes are achieved

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure procedures are in place to manage a potential oil spill during dredging and disposal.	1.	Update any relevant oil spill contingency plan or develop a new oil spill contingency plan to be implemented in the event of an oil spill during marine construction. (See Appendix E)	Contractor	Prior to dredging activities	Submission of oil spill contingency plan to EO for approval or comment	Approved oil spill contingency plan
	2.	Include the use of physical containment or recovery equipment including a variety of booms, barriers, and skimmers, as well as natural and synthetic sorbent materials in the case of a spill, as well as the use of sorbent materials in the final stages of clean up.				
Ensure noise levels are within reasonable limits	3.	Limit noisy activities to day-time from Monday to Friday or in accordance with relevant municipal bylaws, if applicable, where sensitive receptors are located close to the proposed works.	Contractor	Throughout activities	Site inspections	Number of registered complaints
	4.	Comply with the applicable municipal and / or industry noise regulations.				
	5.	Notify adjacent residents before particularly noisy activities will take place.				
	6.	Maintain (offsite) all generators, vehicles and other equipment in good working order to minimise exhaust fumes and excess noise.				
	7.	If complaints regarding noise are received, investigate potential noise reduction measures such as mufflers on equipment.				

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure dust management measures are in place to reduce dust emissions	8.	Avoid activities that may generate dust (e.g. handling or stockpiling of material) during particularly windy conditions i.e when there is a visible dust plume.	Contractor	Throughout activities	Keep record of incidents and complaints Observation of dust plumes	Number of incidents and complaints
	9.	If dust emissions are a problem then cover stockpiles with shade cloth or similar material to prevent windblown dust.				
Ensure efficient and effective waste management procedures are in place	10.	Ensure that no litter and debris reaches the marine environment during construction activities. Should this occur, remove such waste/litter from the marine environment immediately.	Contractor	Throughout activities	Visual inspection of waste collection areas Visual inspection of construction areas (litter) Check waste disposal slips	Presence of litter Availability of rubbish bins Frequency at which rubbish bins are emptied
	11.	Train all staff of the effects of debris and litter in the marine environment and appropriate disposal procedures.				
	12.	Ensure that waste material is not placed where it may be exposed to storm water.				
	13.	Prevent littering by staff at work sites by providing bins or waste bags in sufficient locations.				
	14.	Provide separate bins/waste bags for hazardous / polluting materials and mark these clearly.				
	15.	Remove hazardous / polluting materials from the site at regular intervals and dispose of these materials at a licensed waste disposal facility with a Class appropriate to the type of waste being disposed of.				
	16.	Prohibit any burning or burying of waste on site or at sea.				
	17.	Where existing waste in the surrounding area is not well managed, this should be recorded by the Contractor and reported to relevant TNPA official to ensure that it is addressed in terms of TNPA's Operational Management Plan for the harbour and does not become the responsibility of the Contractor.				

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure efficient and effective effluent and waste water management procedures are in place	18.	Prevent discharge of any pollutants, such as cement, concrete, lime, chemicals, and hydrocarbons into watercourses or the sea.	Contractor	Throughout activities	Visual inspections	Containment of all potentially polluted run-off.
	19.	Direct run-off from areas with a high risk of accidental releases of oil or hazardous materials (e.g. fuelling or fuel transfer locations, truck washing bays, concrete swills etc.) into containment basins or conservancy tanks and dispose of contaminated water at an approved (hazardous) waste disposal site.				Register of suitable disposal of contaminated water from containment basins.
	20.	Prevent illegal washing out of containers in or discharge of wash water or any other contaminated water for the site into water bodies (including stormwater systems, rivers/streams and the sea).				Register of suitable disposal of hopper and spud barge waste.
	21.	Do not dispose of any material of any kind in the sea at any time and under any circumstances. Any person that is deemed to have authorised, supervised, instructed, permitted or carried out such an act, shall be permanently removed from site.				
	22.	All waste and effluent from the hopper and spud barges to be appropriately disposed on land.				
Ensure all concrete/ cement required on site is appropriately managed to avoid/ minimise spillages	23.	Batch cement (where unavoidable on site) in a bunded area on mortar boards and not directly on the ground (unless in a paved area and approved by the EO).	Contractor	Throughout activities	Visual inspection and approval by EO.	Number of incidents of batching outside bunded area
	24.	Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste.				Contamination of water and soil
	25.	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.				Visible litter / waste on site
	26.	Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.				Register of disposal of excess material.

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure efficient and effective hazardous materials management procedures are in place	27.	Locate temporary hazardous material storage facilities on an impermeable surface as far as practically possible from the water's edge.	Contractor	Throughout activities	Visual inspection of hazardous materials handling and storage areas	Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials Number of spills of hazardous materials, including waste materials Cost of cleaning up spills Evidence of contamination and leaks
	28.	Ensure that contaminants (including cement) are not placed directly on the ground (e.g. mix cement on plastic sheeting) to prevent runoff reaching the marine environment.				
	29.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.				
	30.	Avoid unnecessary use and transport of hazardous substances.				
	31.	Keep Material Safety Data Sheets (MSDS) for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
Follow appropriate procedures to ensure identified heritage resources are protected	32.	Submit permit applications to SAHRA via South African Heritage Resources Information System (SAHRIS) for any proposed works to structures known or suspected to be older than 60 years, and for any disturbance of maritime or underwater cultural heritage resources.	TNPA	Prior to commencement of construction activities	Submission on SAHRIS portal	Permit from SAHRA to commence with works
Limit disturbance and damage to heritage resources identified during construction	33.	Report all exposed marine/terrestrial heritage resources to SAHRA. Heritage resources uncovered/disturbed must not be disturbed further until advice has been obtained from the relevant heritage authority on how they should be dealt with.	Contractor and RP	When potential remains exposed	Photographs of find. Visual inspections of excavations.	Records of correspondence
	34.	Ensure that all Contractors and Sub-contractors are made aware of the potential existence of heritage resources (terrestrial and marine), and are instructed on the correct procedure for preserving the integrity thereof.	Contractor/EO	Before construction activities commence	Attendance registers of awareness sessions.	Register of all workers that completed the awareness session
Development of local contractors and staff	35.	Encourage the use of local contractors and staff and sourcing of materials from local suppliers where relevant skills and resources are available.	Contractor	Before construction activities commence	-	-

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure that adequate resources are allocated to environmental management by the Contractor	36.	Include the CEMPr in all tender documents.	TNPA	Prior to call for tenders	TNPA to check tender documents and contract	Incorporated in tender documents
Ensure construction methods are legally compliant	37.	Screen all proposed works (Method Statements for future works) and confirm that no NEMA listed activities or the need for any other authorisations are triggered by the works proposed.	EO	Prior to approval of Method Statement(s)	Method Statement	Approved method statement
	38.	Notify the local authority of the proposed works and confirm the applicability of any bylaws which may affect the works.	TNPA /EO	Prior to the start of activities	Communication with local authority	Confirmation from local authority
Monitor and ensure compliance with the CEMPr	39.	Appoint/designate a suitable EO prior to the start of upgrade and repair activities.	TNPA	Prior to the start of activities	Appointment of EO	Appointment of EO
Ensure appropriate management of environmental records are maintained	40.	Ensure the Environmental Method Statements are approved and filed on site.	Contractor and ECO	Before relevant construction activities commence	Internal Audit	Approved Method Statements signed and filed.
	41.	Maintain a copy of the CEMPr and any other environmental authorisations/permits/licences on site.	Contractor	Duration of maintenance activities	Internal Audit	Approved documents available on site.
	42.	Maintain a complaints register for all complaints/suggestions, The register must list: <ul style="list-style-type: none"> Complainant name and contact details; Date complaint was lodged; Person who recorded the complaint; Nature of the complaint; Actions taken to investigate the complaint and outcome of the investigation; Action taken to remedy the situation; and Date on which feedback was provided to complainant. 	EO	Throughout activities	Inspect complaints register	Availability of register on site Designated person to maintain register Complaints logged Complaints followed up and closed out

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
Ensure all staff are trained and aware of the environmental requirements for the project	43.	Provide environmental awareness training to all personnel on site. Training should include (but not necessarily be limited to) discussion of: <ul style="list-style-type: none"> Potential impact of waste and effluent on the marine environment; Suitable disposal of waste and effluent; Key measures in the CEMPr relevant to workers' activities; and How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names. 	Contractor and EO	On site establishment and ongoing	Check training attendance register	Register of workers that completed environmental training Compliance of Contractor with the CEMPr
Ensure the site is established with sufficient and appropriate access control	44.	Submit a method statement for site establishment for approval by the EOC at least two weeks prior to the start of activities.	Contractor	Prior to commencement of maintenance activities and ongoing	Method Statement Visual inspections of site	Approved Method Statement Register of illegal entries Site boundaries demarcated and demarcation maintained Signage in place No vegetation cleared or disturbed (excluding grassed areas and weeds).
	45.	Demarcate site boundaries upon establishment and ensure that plant, labour and materials remain within site boundaries.				
	46.	Do not clear any vegetation and do not place any plant/materials on vegetation (excluding grassed areas).				
	47.	Designate any locally sensitive areas beyond the boundary of the site as "No go" areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the "No go" area at any time without the express permission of the EO.				
	48.	Place signage in suitable locations to warn members of the public of maintenance activities taking place and to limit access to work areas that may pose a safety risk.				
Maintain good housekeeping practices throughout	49.	Clean up any spills immediately.	Contractor	Throughout activities	Visually inspect areas inside and	Number of contaminations noted on site
	50.	Regularly inspect all equipment and machinery for leaks or damage.				

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
the construction phase	51.	Repair any defects as soon as possible. In the case of leaks, ensure that the leaking water or effluent is captured and not released into the environment.			outside the plant for pollution	
	52.	Keep the site clean, especially during the rainy season when pollutants can wash into the sea with the storm-water.				
Response to environmental pollution	53.	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	Contractor	Throughout activities	Maintain register of pollution events and response Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning	Number of incidents Time activities stopped Number of recurring incidents Availability and completeness of register
	54.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the marine environment.				
	55.	Repair faulty equipment as soon as possible.				
	56.	Treat hydrocarbon spills, e.g. during refuelling, with adequate absorbent material, which then needs to be disposed of at a suitable landfill.				
	57.	In the event of equipment, litter and debris entering the sea, remove these immediately.				
	58.	Notify the relevant authorities within one day of an environmental pollution event. As a minimum, inform the following parties: <ul style="list-style-type: none"> • TNPA, • EO; and • DEA. 				
Ensure the site is cleared of all construction materials prior to leaving the site	59.	Remove all equipment, vehicles, equipment, waste and surplus materials (rock armour), site office facilities, temporary fencing and other items from the site.	Contractor	Once activities are complete	Visual inspection of site Keep record of rehabilitation measures	Records of waste disposal State of areas on and surrounding the site Site Closure Audit report
	60.	Clean up and remove any spills and contaminated soil in the appropriate manner.				
	61.	Do not bury discarded materials on site or on any other land not designated for this purpose.				

Outcome	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods	Performance Indicators
	62.	Rehabilitate all areas affected by the works to at least the same condition as was present prior to activities commencing.				
	63.	Compile and submit the Site Closure Audit report to TNPA				

7 CEMPr Compliance Monitoring

The auditing and monitoring requirements to ensure implementation of the management and mitigation actions in Section 6 are detailed in the sub-sections to follow.

7.1 Monitoring Programme

The key to a successful CEMPr is appropriate performance monitoring and review to ensure effective functioning of the CEMPr and to identify and implement corrective measures in a timely manner. In the event where omissions and/or non-compliances are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

Table 7-1: Performance monitoring method

Project phase	Monitoring method	Monitoring frequency	Reporting frequency
Planning, design, pre-construction	A pre-construction audit must be undertaken and a checklist prepared by the EO and submitted to TNPA prior to the start of construction. The report must document any non-compliance to be addressed prior to commencement and must include the Final Site Layout Plan.	Once off	Once off
Construction	Monthly audits must be undertaken by the EO during construction. An audit checklist must be completed by the EO after each audit and submitted to TNPA.	Monthly	Monthly
Post-construction	A post-construction audit must be undertaken and a report prepared by the EO and submitted to TNPA immediately after completion of construction. The document should identify any non-compliance to be addressed prior to the contractor vacating the site.	Once off	Once off

7.2 Method Statements

A Method Statement is a document setting out specific details regarding the plant, materials, labour and method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by the Contractor to the RP and the EO.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities, and for the RP and EO to confirm that these meet the requirements of the CEMPr and acceptable environmental practice. This allows the CEMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to amend stipulations in the CEMPr, if approved by the EO. It also provides a reference point to detect deviations from the agreed approach to an activity and allows for the proposed approach and methods for undertaking future maintenance and repair activities to be clearly documented and agreed on prior to commencement.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities.
- Procedural requirements and steps.
- Management responsibilities.
- Material and equipment requirements.
- Transportation of equipment to and from site.
- Method for moving equipment / material while on site.
- How and where material will be stored.

- Emergency response approaches, particularly related to spill containment and clean-up.
- Response to compliance / non-conformance with the requirements of the CEMPr.
- Any other information deemed necessary by the RP.
- Dredging.
- Placement of dredge spoil.

Detailed method statements may also be requested by the EO for certain aspects of the works proposed. The following list provides examples of Method Statements that may be requested from the Contractor:

- Environmental awareness.
- Material and equipment storage and delivery.
- Fuel storage, dispensing and fuel spills.
- Waste management.
- Management of contaminated water.
- Cement batching.
- Any others considered relevant by the EO or RP.

The Method Statements will be submitted by the Contractor to the RP and EO not less than 14 days prior to the intended date of commencement of an activity. The RP and EO shall accept / reject the Method Statement within 7 calendar days. An activity covered by a Method Statement shall not commence until the RP and EO have accepted such method and once accepted, the Contractor shall abide by the relevant Method Statement.

7.3 Environmental Records and Reports

Environmental records and reports required are listed in Table 7-2.

Table 7-2: Reports required during construction phase

Report	Frequency	From	To
Environmental Checklist	Daily (Weekly)	CER	RP (& EO)
Environmental Compliance Report	Monthly	EO	TNPA & RP
Site Closure Audit	End of Contract	EO	TNPA

7.3.1 Environmental Checklist

The CER will undertake daily site inspections to check on the implementation of the CEMPr by the Contractor and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to the RP at the end of each inspection. This checklist should be discussed between the CER and the RP during the initial site inspection, and agreement reached on the preferred format and content.

The checklists will be submitted to the EO on a weekly basis, however any issues of environmental concern should be reported to the EO immediately.

7.3.2 Environmental Compliance Report

The EO will undertake monthly site inspections to check on the implementation of the CEMPr by the Contractor and complete an Environmental Compliance/Progress Checklist Report after each inspection, detailing any environmental issues, non-compliance and corrective actions to be implemented. Environmental Compliance Reports will be submitted to the RP and TNPA.

7.3.3 Site Closure Audit

The EO will undertake a final site closure audit on completion of the upgrades. The purpose of this is to confirm compliance with all site closure requirements identified by the EO, and that the site has been left in an environmentally suitable condition. If outstanding environmental requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The Site Closure Audit report must be submitted to TNPA for record purposes.

7.4 Corrective Action

Corrective action is a critical component of the implementation–review–corrective action–implementation (or plan-do-check-act) cycle and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring by the CER and EO indicates non-conformance with the CEMPr or approved Method Statements, the RP will formally notify the Contractor through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the Contractor will be required to produce a Corrective Action Plan, which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the EO for approval prior to implementation. Once it has been approved, the corrective action must be carried out within the time limits stipulated in the Corrective Action Request.

Additional monitoring by the CER, EO and RP will then be required to confirm the success or failure of the corrective action.

8 Environmental Awareness Training

An Environmental Awareness Programme is considered a necessary part of the CEMPr for the Project. Training of the appropriate construction personnel will help ensure that all environmental regulations and requirements are followed as defined in the relevant Method Statement to be prepared by the Contractor.

Objectives of environmental awareness training are:

- Environmental Management – protecting the environment from the effects of construction by making personnel aware of sensitive environmental resources.
- Regulatory compliance – complying with requirements contained in project – specific permit conditions, also complying with requirements in regional and local regulations.
- Problem recognition and communication – training personnel to recognise potential environmental problems, i.e. spills, and communicate the problem to the proper person for solution.
- Liability control – non-compliance with regulatory requirements can lead to personal and corporate liability.

All individuals on the Project construction site will need to have a minimum awareness of environmental requirements and responsibilities. However, not all need to have the same degree of awareness.

The Contractor shall keep a record of all the environmental related training of the personnel.

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Appendix A: Curricula Vitae of Authors of the CEMPr

Appendix B: Figure Illustrating the Proposed Upgrades to the Seawalls and Revetments

Appendix C: Minutes of meeting with DEA:O&C

Appendix D: Dredging EMP

Appendix E: Guidelines for Development of an Oil Spill Contingency Plan

Guidelines for development of an Oil Spill Contingency Plan

A plan for action needs to be prepared in anticipation of a spill of a marine contaminant, such as oil. Contingency plans are essential because they establish practical plans of action for all types of spills so that, when spills do occur, a quick response can minimize the damage. Site or project specific oil spill contingency plans must be aligned with any local oil spill contingency plans and must be submitted to Coastal Pollution Management for approval.

The first step in developing a plan is to learn as much about the area as possible.

- Contingency plans normally include the following:
 - Identification of authority and a chain of command in the case of a spill;
 - A list of persons and organizations that must be immediately informed of a spill;
 - An inventory of available trained spill personnel and spill response equipment;
 - A list of actions that must be taken (in order of priority);
 - A communication network to coordinate response;
 - Probable oil movement patterns under different weather conditions; and
 - Sensitivity maps and other technical data.
- In developing the contingency plan, the following must be taken into consideration:
 - Important or sensitive physical and biological resources within or near the area, such as marshes, unusual flora (plant life) and wildlife resources such as fish, shellfish, marine mammals and birds;
 - Important habitat areas required by particular species for spawning, feeding or migration;
 - Tides, currents and local climatic conditions, such as wind and severe weather patterns;
 - Shoreline characteristics; and
 - Proximity to roads, trained response personnel, oil spill clean-up equipment, etc

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