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Transnet National Ports Authority

**SCOPING AND ENVIRONMENTAL IMPACT
REPORTING PROCESS FOR THE DEVELOPMENT
OF NEW BERTH 605 AND ASSOCIATED
INFRASTRUCTURE TO SUPPORT THE
CONTAINER HANDLING FACILITY, PORT OF
RICHARDS BAY, KWAZULU-NATAL**

Final Environmental Impact Report

Transnet National Ports Authority

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Final Environmental Impact Report

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
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PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT REPORT

The Draft Environmental Impact (EIR), Environmental Management Programme (EMPr) and supporting specialist studies were available for comment for 30 days from **8 April 2026 to 12 May 2026** on WSP's website and at the public places in the project area listed in the table below:

Name of Public Place	Address
WSP Website	https://www.wsp.com/en-za/services/public-documents
Richards Bay Public Library	Richards Bay Central, Richards Bay, 3900
Aquadene Public Library	4 Via Ammannia, Aquadene, Richards Bay, 3900

IN ACCORDANCE WITH REGULATION 23 OF THE EIA REGULATIONS, 2014 (AS AMENDED), THE DRAFT EIR WAS MADE AVAILABLE TO REGISTERED INTERESTED AND AFFECTED PARTIES FOR A 30-DAY REVIEW PERIOD. COMMENTS RECEIVED DURING THE REVIEW PERIOD WERE INCORPORATED INTO THIS FINAL EIR AND DOCUMENTED IN THE COMMENTS AND RESPONSES REPORT. SINCE THERE WAS NO SIGNIFICANT NEW INFORMATION OR SUBSTANTIAL AMENDMENTS TO THE DRAFT EIR, THE FINAL EIR WAS SUBMITTED TO THE DFFE FOR DECISION MAKING AND IS AVAILABLE TO I&APS FOR INFORMATION PURPOSES ONLY.

ANY COMMENTS ON THE FINAL EIR MUST BE SUBMITTED TO:

Department of Forestry, Fisheries and the Environment (DFFE)

Ms. Constance Musemburi

Email: CMusemburi@dfre.gov.za

EXECUTIVE SUMMARY

BACKGROUND AND INTRODUCTION

The Transnet National Ports Authority (TNPA) functions in terms of the National Ports Act (No.12 of 2005) in which TNPA is responsible for the provision of port services and facilities within all ports of South Africa. In its role as the master planner, the TNPA also plans to improve, develop and maintain port infrastructure. Various development opportunities were identified by TNPA across three precincts namely South Dunes, Newark and Bayvue and are reflected in the Port Development Framework Plan (PDFP) and the Port of Richards Bay Master Plan 2021 – 2035.

The Port of Richards Bay (PoRB) is one of two main dry bulk ports in South Africa. The PoRB is the largest exporter of coal in South Africa, and it serves the hinterlands of Northern KwaZulu-Natal (KZN), Gauteng and Mpumalanga. By tonnage, the port has the largest Dry Bulk Terminal in South Africa and handles approximately 54% of the country's total dry bulk cargo demand (PDFP, 2022).

The proposed Berth 605 project is also reflected in the PDFP and the PoRB Master Plan, 2021-2035. The new Berth 605 and associated infrastructure are intended to be developed adjacent to the existing Berth 600 series located in the Bayvue Precinct in the western region of the PoRB. The intention of the proposed new Berth 605 and associated infrastructure is to serve the proposed new Container Handling Facility (CHF) that is ultimately intended to increase container volumes handled at the port to stimulate economic development in the region. Only the disturbance footprint of the CHF is assessed within this Scoping and Environmental Impact Reporting (S&EIR) process, the construction and operation activities will be assessed at a later stage in an application submitted by the future CHF operator.

The proposed Berth 605 development is located within an area that has been historically modified through the development of the PoRB with a large part of the site heavily disturbed during the sand winning and land reclamation undertaken in 1975 to separate the current port basin and estuary. More recently, through previous development associated with the 600 Series Berth Basin. Historical aerial imagery confirms that the project footprint has been subjected to repeated clearing, earthworks, dredging and construction activities over a 51-year time period from 1975 to date. Existing vegetation communities and tidally influenced habitats have subsequently re-established within portions of the disturbed footprint over approximately two decades and this historical disturbance context was considered throughout the environmental assessment process.

The proposed development therefore requires Environmental Authorisation (EA), supported by a S&EIR process in accordance with the National Environmental Management Act (No. 107 of 1998) (NEMA), Environmental Impact Assessment Regulations, 2014 as amended (GNR 326) (EIA Regulations). The Draft Environmental Impact Report (DEIR) was released for public review and comment in accordance with the EIA Regulations. The public review period provided Interested and Affected Parties (I&APs), organs of state and commenting authorities with an opportunity to review the findings of the Environmental Impact Assessment process, specialist studies and the proposed mitigation measures. Comments received during the review period were recorded and considered through the Public Participation Process (PPP). All comments raised by stakeholders and competent commenting authorities were reviewed and responded to, and where applicable, the EIR, specialist

studies, Environmental Management Programme (EMPr) and Biodiversity Compensation Plan (BCP) were amended to address the issues raised.

The comments received during the review of the Draft EIR resulted primarily in refinements to specialist recommendations, mitigation measures, environmental management commitments and the BCP. The comments did not result in material changes to the proposed project location, development footprint, project scope, listed activities, alternatives assessed or the overall conclusions of the EIA. Accordingly, the amendments made between the Draft and Final EIR are not considered substantive changes to the proposed development or its assessed impacts and therefore did not necessitate the release of a revised Draft EIR for a further public review period.

This Final EIR incorporates the outcomes of the public review process and presents the final assessment of the proposed development, together with the revised specialist findings, mitigation measures, biodiversity compensation commitments and recommendations for decision-making by the Department of Forestry, Fisheries and the Environment (DFFE). The Final EIR should therefore be read together with the Comments and Responses Report (CRR), which documents how stakeholder and authority input was considered during the EIA process.

PURPOSE OF THE EIR

According to Appendix 3 (1) (1) of the EIA Regulations, the Environmental Impact Assessment (EIA) process must be undertaken in line with the approved Plan of Study (POS) for the EIA. The POS for the proposed Berth 605 project was accepted by the DFFE on 28 February 2025 as part of the FSR.

The EIA process is an interdisciplinary procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. The process identifies potential environmental impacts associated with a proposed project and management actions required to either mitigate or avoid the negative impacts or to enhance the positive impacts associated with a proposed project. In the context of this report, the purpose of the Draft EIR is to inform decision-makers and the public of the environmental consequences of the proposed project.

This EIR therefore serves as a technical tool that identifies, predicts, and analyses impacts on the physical environment, as well as social, cultural and health impacts. As such, the EIR documents the findings of the EIA phase of the S&EIR process for the proposed Berth 605 project.

NEED AND DESIRABILITY OF THE PROJECT

According to the PDFP, the PoRB aspires to be a premier dry bulk and liquid bulk port with diversification in other segments. The port desires to be a growing, effective, efficient, and integrated port by investing in infrastructure and improving terminal and supply chain efficiencies.

To achieve the goal of becoming a premier dry bulk and liquid bulk port, the PoRB must be able to accommodate for the capacity demand for the main commodities. The Berth 605 project aligns with the ultimate goal for the PoRB as it will be used as a dedicated berth for the CHF which will ensure that the other berths in the 600 series i.e. 606 to 609 are utilized as Multipurpose Terminals (MPT) and not used for the handling of containers, this will significantly improve the overall operational efficiency at the PoRB.

LOCATION

Berth 605 is located within the PoRB, King Cetshwayo District Municipality and Umhlathuze Local Municipality within the KwaZulu-Natal (KZN) Province (**Figure 1**). The approximate centre point co-ordinates for the Berth 605 project area are:

28°47'23.82"S; 32° 1'34.43"E.

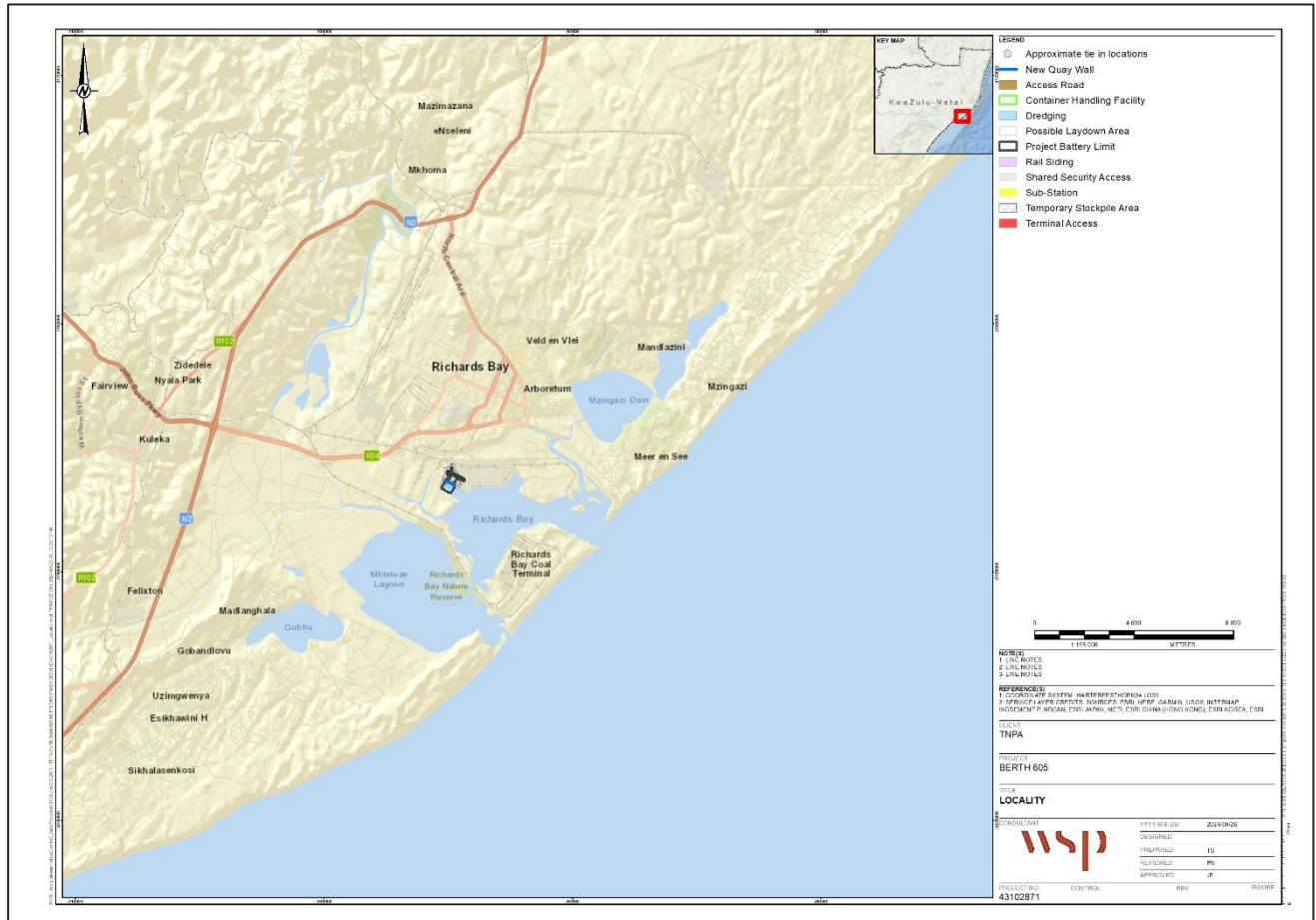


Figure 1: Locality Map of the proposed Berth 605 and associated infrastructure

SUMMARY OF PROJECT COMPONENTS

The intent of the design of the extended basin area for the proposed Berth 605 is to provide a safe area for manoeuvring and berthing of the design vessel at Berth 605. The following structures and infrastructure are deemed necessary to achieve the overall objective of the project and included in the overall design of the project and are depicted in Figure 2:

- **New berth pocket and quay wall** – A new berth pocket and quay wall is proposed. The new proposed Berth 605 quay wall will extend from the existing Berth 606 quay wall maintaining the same cope line alignment (cope level is the top of the quay wall). On the other end of Berth 605, the quay wall will stop short of Urania Road. The quay is a mass gravity structure with a concrete foundation and walls with soil backfill internally which provides a wider footprint, but a lower density will result in a stable foundation, this is aligned to the existing Berth 606 quay wall and is considered as an economical design that has been used at the PoRB and Port of Coega. The quay wall is

expected to be 366 m in length. The new quay wall is designed for a future depth of -19 m Port Chart Datum (PCD). This will ensure that the berth can be lengthened and deepened without the need for additional quay wall deepening costs.

- **End of berth basin slopes** – The Berth 605 must fit within the space between the end of the existing Berth 606 and the South Dunes Road. With a slope of 1V:3H from -14.5 PCD to the existing ground level is 60 m long, this provides a total berth length of 338.5 m from the toe of the embankment to the start of Berth 606. This will support a vessel of 315 m Length Overall (LOA). A basin width of 305 m is applied to the bottom of the basin where a proclaimed depth of at least -14.5 m PCD is to be maintained.
- **Dredging** – The new Berth 605 quay wall will be constructed to -19m PCD to allow for further Port expansion at a point in the future. For this project, the berth will be dredged to achieve a proclaimed depth of -14.5 m PCD. The design dredging depth also considers sedimentation and sounding accuracy (i.e. 0.6 m below -14.5 m PCD) providing a design depth of -15.1 m PCD. This dredge depth is consistent with the PoRB depths and the requirements of the design vessel. This approach limits the volume of dredge material requiring disposal.
- **Dredge disposal (of the basin dredged materials)** – An estimated 2 895 500 cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, with a bulking factor, it is estimated that a bulked volume of approximately 4 308 287 cubic metres will be disposed of at the offshore dump site. The concept design has assumed that a suitable licensed and permitted disposal site is available within 10 nautical miles of the entrance to the PoRB. This site will be used for the disposal of the dredged material and any other spoil material as described above. As beneficial use of material remains uncertain, it is likely that most or all the material, i.e., an estimated 4 308 287 cubic metres will need to be disposed of offshore. The existing permitted offshore site will be used for the disposal of dredged material. The difference between the actual dredged / excavated volume and the volume to be disposed at sea is because the material is loosened during handling and increases in bulk (the bulking factor).
- **Disposal of excavated material (from land-based construction activities)** – The disposal of excavated material from elsewhere within the construction footprint (excluding the berth basin) includes road, rail, construction laydown area excavation and earth wall concrete and steel components (64 900 m³) will be disposed of at a registered land-based disposal site. The material excavated from the compensation area (the new tidal pool area and scalloped shoreline as described in Section 9.3 of this report) is approximately 30 000 m³ and will be used as landform shaping and backfill within the compensation site. The excess material will be placed into the caisson pond (if timing allows) or disposed of at a registered land-based disposal site.
- **Scour protection** – The concept design evaluated the necessary scour protection to prevent excessive erosion, which will compromise the structural integrity of nearby infrastructure, such as Urania Road, or cause excessive sediment movement within the berth pocket. The movement of material within the berth is also of significant concern. The depth of the berth pocket is impacted when material erodes from one area and is deposited elsewhere in the berth pocket. Consequently, maintenance dredging will be required to maintain the required berth pocket minimum navigation depth. A revetment (sloped embankment) will be constructed on the seaward side of the Urania Road. This slope must be protected against wave and propeller action to maintain the structural integrity of the Urania Road. A riprap scour protection system has been considered.
- **New rail siding** – Based on the design throughput and the current requirement of a 50-wagon container train and 2 locomotives, it is proposed that the rail siding will consist of two rail lines that

are 370m each in length, each servicing 25 rakes. The existing Mhlathuze Yard will be used for shunting and staging purposes to service the new proposed rail siding.

- **New access road** – a new shared access road and vehicle access control point to the PoRB, the CHF and the adjacent vacant land surrounding the CHF is proposed. The new road will be an estimated 735 m length with a lane width of 3.7 m and a reserve width of 30 m. It will consist of two (2) lanes each direction and three (3) intersections; at Urania Road, at Ventura Road and one to the CHF. The shared access road will also have a security control facility as the road is accessible from outside of the Port's security perimeter. Street lighting will be provided for as part of the new road network extension. It must be noted that the construction of the Berth 605 and associated infrastructure will not generate significant traffic. The traffic that will be generated (as discussed in Section 2.3.8 of this report) is associated with the operation of the CHF which has been designed and will be operated by Grindrod.
- **Footprint of the CHF and apron area** – The CHF will be built and operated by the operator (Grindrod) therefore this S&EIR process only considers the disturbance footprint of the CHF and not the associated permits that it will require when operational. The total area considered is 6.75 Ha for the CHF with estimated dimensions of 270 m x 250 m. The apron area is an operational area located behind the quay wall and is used for the movement of trucks. The apron area is an estimated 33 m wide and 400 m in length.
- **Provision of electrical supply to feed the facility operations and equipment** – The preferred alternative is applicable where the required electrical demand is within the available capacity of the current existing 11 kV network. A new feed will be taken from the existing 11 kV network to provide electrical power to the new CHF and quay wall. However, while there is existing capacity on the current 11 kV network, this is limited and may not be able to provide for the full electrical demands in the future. To protect against restricting future electrical supply constraints, a new 11 kV Switching Station fed from the existing Primary Substation is proposed.
- **Water** – The concept design allows for water to be sourced from the municipal supply. There are three municipal feeds into the port, supplied by two separate municipal reservoirs. This provides adequate supply contingency, and therefore, no additional storage has been included in the system. The existing 225mm diameter water main will be extended along with the new quay wall to supply ship water along the new quay. At the end of the new quay wall extension the water main will follow Urania Road to tie into the existing 150mm diameter pipe in the vicinity of the existing gate house. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided which will consist of approximately 500 m of pipework with a diameter of 150 mm. Inside the quay wall, water will be provided to landing valves for ships and firefighting.
 - **Building water** - A new 75mm diameter pipe will branch off from the 150mm diameter water pipe to supply a metered connection for the handling facility. Any connections to new buildings will be made from the metered supply point, located on the western side of the site, just south of the Seafarers club. The CHF operator will be responsible for the water network within the facility.
 - **Ship water** - The proposed new water main line will tie into the existing 225 mm diameter asbestos cement water pipe, that is in the existing quay of Berth 606, located on the eastern side of the new Berth 605. The new pipe will be 200 mm diameter, within the new quay wall,

with 75 mm off takes to the landing valves. The 200 mm diameter pipe reduces in size to a 160 mm diameter, where the pipe exits the new quay wall and is parallel to Urania Road and will tie into the existing 150 mm diameter asbestos cement pipe north of the existing security access to complete the ring.

- Fire water - The fire water in the PoRB is off the water reticulation network. Allowance for fire-hydrants will be made where there isn't a dedicated firefighting system. This allowance is for normal hydrants outside the CHF boundary along the lengths of pipelines that will be installed to service the new quay wall extension.
- **Sewerage** – The existing sewer network has been evaluated to identify areas that require upgrades to accommodate the extension of the sewer network for the new proposed CHF. The sewerage system will allow for wastewater from new toilets, basins, baths and showers. The proposed sewer has been designed to tie into the closest existing pipe network or an existing pump station closest to the proposed CHF. Sewerage inside the CHF has been designed to accommodate for approximately 160 people. The new sewerage pipeline will have a connection point at the northwestern boundary of the CHF. It will be approximately 100 m in length and 160 mm pipe diameter. The preferred alternative involves designing a sump to accommodate the facility's sewer through gravity flow, with pumping from the sump to the existing pumpstation PS20, located north of the facility. The final sewer pipe route will be determined during the design phase.
- **Stormwater** – With the hydrological analysis complete and design flows computed, the stormwater pipes were sized. The minimum size of stormwater pipelines is 600mm diameter, which considers effective maintenance of the stormwater network. The stormwater pipe system has been designed to accommodate a 1 in 5-year storm. The proposed CHF, as well as any future development adjacent to Berth 605 will require major floods to flow overland into the bay. The area will therefore have to be designed and shaped to accommodate overland flow during a major storm, to prevent water ponding and to control flood damage to any infrastructure. Conventional catchpits, at 50m to 80m spacing, have been shown along the proposed access road. The access road stormwater is then routed in a pipe system to the bay at a slope of 0.5%. The pipeline will be approximately 360 m along the quay line and 400 m on the other side with a 900 mm pipe diameter. It will have a velocity of 0.6 m/s for self-cleaning, to prevent sand settling inside the pipe and blocking. There will also be cross drainage at the new rail siding which will be 400 m in length and 600 mm diameter. The existing network discharges into the bay through the existing quay wall.
- **Provision for temporary laydown and stockpile areas** – Areas for temporary stockpiles and laydown areas have been designated and will be further assessed as part of the project. An approximate area of 4.2 Ha, 220 m in length and 170 m wide to be used as a potential lay down area for the project (alongside the proposed CHF). In addition, two temporary stockpile areas are proposed which are split into two areas across the Harbour Arterial Road. These areas cover an area of approximately 6 Ha. The infilling of approximately 6 Ha of the basin is also being considered for stockpiling (this infilled area also forms part of the basin to be dredged).

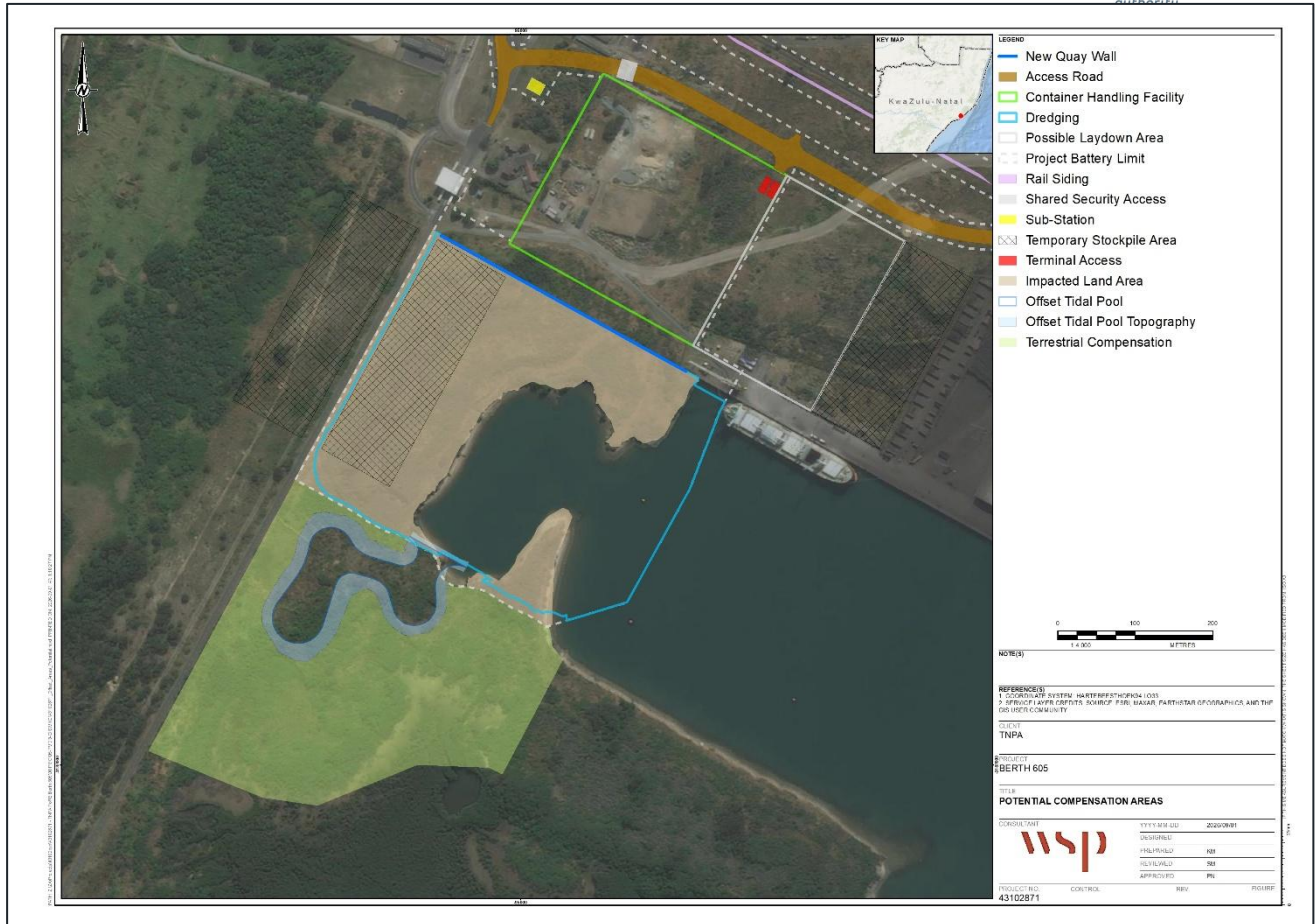


Figure 2: Layout map of the Berth 605 project components, battery limits and position of proposed biodiversity compensation area

LEGISLATIVE CONTEXT

In terms of Section 24(2) of the NEMA, the Minister may identify activities which may not commence without prior authorisation. The Minister thus published GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3), as amended, listing activities that may not commence prior to authorisation.

The regulations outlining the procedures required for authorisation are published in the EIA Regulations (GNR 326). Listing Notice 1 (GNR 327) identifies activities that require a Basic Assessment (BA) process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 (GNR 325) identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 (GNR 324) identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity.

WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed in this section are considered applicable to the development: A S&EIR process must be followed, this was confirmed by the DFFE during a pre-application meeting held on 19 September 2024 and accepted in the FSR.

The full legal context of the project is provided in Section 4 of this document.

SUMMARY OF THE SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS

The S&EIR process consists of various phases with associated timelines as defined in the EIA Regulations. The process can generally be divided into four main phases, namely; (i) an unregulated pre-application phase, (ii) an Application and Scoping Phase, (iii) an Impact Assessment Phase (**current phase**) and (iv) EA and Appeal Phase.

The main objectives of the phases can be described as follows:

- Pre-Application Phase:
 - Undertake consultation meetings with the relevant authorities to confirm the required process and general approach to be undertaken.
 - Identify stakeholders, including neighbouring landowners/residents and relevant authorities.
 - Compile a Draft Scoping Report (DSR) describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that may require further investigation in the Impact Assessment Phase.
 - Develop draft terms of reference for the specialist studies to be undertaken in the EIA Phase.
 - Inform stakeholders of the proposed project, feasible alternatives and the S&EIR process and afford them the opportunity to register and participate in the process and identify any issues and concerns associated with the proposed project.
- Application and Scoping Phase:
 - Compile and submit application forms to the Competent Authority (CA) namely the Nation Department of Forestry, Fisheries and the Environment (DFFE) and pay the relevant application fees.
 - Incorporate comments received from stakeholders during the pre-application phase into the DSR.
 - Release the DSR for a 30-day comment period to provide stakeholders with the opportunity to review as well as provide input.
 - Submit the Final Scoping Report (FSR), following the consultation period, to the relevant CA, in this case the DFFE, for acceptance/rejection.
- Impact Assessment Phase:
 - Continue to inform and obtain contributions from stakeholders, including relevant authorities, stakeholders, and the public and address their relevant issues and concerns.
 - Assess in detail the potential environmental and socio-economic impacts of the project as defined in the DSR.
 - Conduct the required specialist studies in accordance with Appendix 6 of the EIA Regulations.
 - Identify environmental and social mitigation measures to avoid and/or address the identified impacts.
 - Develop and/or amend environmental and social management plans based on the mitigation measures developed in the EIR.
 - Submit the EIR to the competent authority to undertake the decision-making process.

■ Authorisation and Appeal Phase.

- The CA to provide written notification of the decision to either grant or refuse environmental authorisation for the proposed project.
- Notify all registered stakeholders of the decision and right to appeal.

ENVIRONMENTAL BASELINE

The table below provides a summary of the baseline for the Berth 605 project area.

Table 1: Summary of the baseline environment of the Berth 605 project area

Aspect	Baseline
Climate	<p>The mean annual temperature for the province is 18.6°C, with average monthly temperatures ranging between 22.4°C (in January and February) and 13.7°C in July. A clear seasonal trend is observed, with the highest temperatures occurring during the summer months (December, January, and February) and lower temperatures during the winter months (June, July, and August).</p> <p>There is a noticeable increase in the annual mean temperature from 1991 (18.4°C) to 2022 (18.9°C), with the highest annual mean temperature recorded in 2019 (19.6°C).</p> <p>Mean annual precipitation is estimated to be 866.8mm, with most rainfall occurring between November to February, and generally conditions persisting during the months of May to August (i.e. lowest rainfall).</p> <p>The annual temperature and number of extreme events with higher rainfall during storms and fewer rain days per annum is expected to increase.</p> <p>The climate change projections for the larger project area indicate that the median annual ambient temperatures are likely to increase by 0.4-0.8°C by 2030 and 0.8-1.4°C by 2050. Very hot days are forecast to increase to up to 28 days per annum (from 7-10 currently).</p> <p>Mean annual precipitation is likely to decrease slightly (<5% change) in the short-term and then stabilises somewhat by 2050.</p>
Geology	<p>The site lies on the northeastern coast of South Africa where the Quaternary sands of the Maputaland Group cover the older underlying rocks.</p> <p>The PoRB is underlain by Cretaceous Siltstone bedrock of the St. Lucia Formation beneath younger, largely unconsolidated aeolian and estuarine deposits.</p>

Aspect	Baseline
	<p>Findings from the Geotechnical Investigation conducted by Mukuno (2025) for the Berth 605 project found that:</p> <ul style="list-style-type: none"> ■ The regional geology comprises harbour beds which comprise of sands, silts and clays of the Quaternary period which are underlain by the St. Lucia Formation Siltstone bedrock. ■ The test pits and borehole profiles indicate that the site is underlain by Harbour beds (Estuarine deposits) soils and siltstone bedrock. ■ The subsoils typically comprise of silty coarse sand, clayey sand, silty clay, sandy clay and clayey silt. ■ The upper transported horizon is generally loose to medium dense for the non-cohesive soils and stiff to very stiff for the cohesive soils. As the excavations increase in depth it was noted that the consistencies of the non-cohesive soils are becoming dense and for the cohesive soils the consistency is becoming very stiff. ■ Sidewall collapse was observed during the test pit excavation from depths below 1.25 m. ■ Groundwater seepage was intersected in all the test pits at depths of between between 1.10 m and 2.20 m below ground level.
Hydrology	<p>The Berth 605 project area is located Northeast of the Qhubu Lake and Southwest of the Mzingazi Dam in KwaZulu-Natal. The development site forms part of the Usutu-Mhlathuze Quaternary Catchment W12F with a Mean Annual Evaporation (MAE) of 1 300 mm p.a. and a Mean Annual Precipitation (MAP) of 1 285 mm p.a. The Mean Annual Runoff (MAR) for this quaternary catchment is 47.61 million m³ p.a.</p> <p>In terms of drainage patterns at this scale, the port is North-North-West of the quaternary catchment's delta (or river outlet) into the Indian Ocean.</p>
Estuarine	<p>The PoRB is classified as an estuarine bay (originally an estuarine lake). As such, it is representative of the second rarest estuarine type in South Africa. Estuarine bays are large systems (>1000 ha) characterised by a strong marine influence due to a permanent tidal connection to the sea. The only other estuarine bays in South Africa are Durban Bay in KwaZulu-Natal and Knysna Estuary in the southern Cape. The PoRB is an artificially created estuarine bay, the other two being natural. Nevertheless, based on its rarity alone the PoRB has local, regional, and national ecological and conservation importance.</p>

Aspect	Baseline
	<p>The Richards Bay EFZ is approximately 5509 ha in spatial extent, comprising approximately 3543 ha (or 64%) developed and/or transformed area and approximately 1966 ha (or 36%) natural habitat, of which approximately 869 ha is open water. The habitat breakdown for the estuarine area, excluding open water, is 69.9 ha for saltmarshes, 309 ha of reeds and sedges, 171.0 ha of mangroves, 531.0 ha of sand/mudbanks, and 15 ha of swamp forest. The EFZ includes Lake Cubhu to the south-southwest and Lake Mzingazi to the north-northeast of the PoRB. The lakes were historically connected to the uMhlathuze and Richards Bay Estuary waterbody but are now disconnected by the construction of weirs or other water control measures and function as freshwater lakes. The lakes were consequently not included in the estuarine management unit for the uMhlathuze and Richards Bay Estuarine Management Plan.</p> <p>Four of the habitats that the CSIR (2005) rated in terms of their ecological importance in the PoRB, and its immediate environs are represented in the 600 Berth Basin, namely Sandbanks, Mangrove Swamps, Harbour (Marine Embayment), and Deepwater Sediment. Parts of the small tidally influenced pool inland of the Assembly Basin could possibly be regarded as representing Mudflat habitat in addition to Mangrove habitat. The most ecologically sensitive and important habitat in the Berth 605 Project footprint is the small tidally influenced pool inland of the Assembly Basin. The pool is fringed by mangrove trees, including black mangrove, a protected tree in terms of the National Forestry Act. As discussed above, there is a high diversity and abundance of fish and pelagic and benthic invertebrates in the pool.</p>
Bathymetry of the Estuary	<p>The entrance channel is maintained to a depth of -23.9 m CD offshore of the breakwaters, -21.9 m CD just inshore of the breakwaters, and -19.4 m CD along most of the navigation channel. The 700/800 Berth Basin and Richards Bay Coal Terminal Basin are generally maintained at a depth of -18.9 m CD. The 600 Berth Basin, and parts of the 700/800 Berth Basin are maintained at depths of -14.4 m CD and -14.6 m CD, respectively. The Small Craft Harbour and the approach channel to this harbour are maintained at a depth of -7.9 m CD. The Kabeljous Flats and Bhizolo/Manzanyama Canal complex are shallow water areas, as is the Mzingazi Canal and related areas (CSIR, 2025).</p>
Sediment and substrate	<p>The most recent information on sediment grain size in basin was generated in November 2024 by the</p>

Aspect	Baseline
	<p>CSIR for the purpose of a capital dredging permit application for the Berth 605 project. Detailed information on the survey is provided in a companion specialist study prepared by the CSIR (2024).</p> <p>The survey confirmed that the sediment in the deeper parts of the basin is dominated by mud, giving way to sandier sediment along the south-southeastern shore. The most significant change that has occurred in the 600 Berth Basin in recent times is the accumulation of coal fragments and coal particles in the sediment, reflecting losses into the port during the loading of coal onto vessels and via wind and surface runoff erosion from coal stockpiles near the basin. The export of coal through the basin is a relatively recent development. The dark colour of the sediment at some stations near the quay wall is assumed to reflect the accumulation of coal particles in the sediment. The sediment in parts of the basin is also characterised by sulphur balls, lost into the port during unloading from vessels.</p>
Sediment Quality	<p>The most recent information on the total organic content of sediment in the 600 Berth Basin was generated in a survey by the CSIR in November 2024 for the purpose of a capital dredging permit application for the Berth 605 project. Detailed information on the survey is provided in a companion specialist study prepared by the CSIR (CSIR, 2024). The sediment at none of the stations was enriched with particulate organic matter.</p> <p>Sediment in large parts of the 600 and 700/800 Berth Basins was not only consistently metal contaminated was also considerably more metal contaminated than sediment elsewhere in the port. In fact, sediment across most of the port was infrequently metal contaminated, but when it was the contamination was usually not nearly as severe as it was in the 600 and 700/800 Berth Basins.</p>
Water Quality	<p>The CSIR used an index to rate surface water quality in the PoRB into five categories ranging from excellent to poor. The index considers the values and concentrations for most of the water quality indicators measured in water quality surveys relative to water quality targets. In 2024, water quality in the summer and winter surveys was rated good apart from a station in the 700/800 Berth Basin in the summer survey, where the water quality was rated fair, and at Station 1 below the confluence of Bhizolo and Manzanyama Canals, where the water quality was rated marginal. Water quality at Station 1 was regularly rated fair or marginal in earlier surveys, but</p>

Aspect	Baseline
	at other stations was usually rated good or excellent in most surveys.
Tidally influenced pool	In the Berth 605 project footprint, a narrow band of white and black mangroves fringe the small tidally influenced pool inland of the Assembly Basin, while there are scattered mangrove trees in the Assembly Basin.
Wetlands and Rivers	<p>The site visit and delineation by the freshwater specialist for the Berth 605 project conducted in November/December 2024 revealed that the process of the delineation of freshwater ecosystems within the study area is complex as a result of the dynamic and unique influence of the adjacent estuary (SASS, 2025). As a result of fluctuating water levels which leads to overlapping zones of wetland and estuarine influence, sediment deposition which deposits sediment across various areas of the wetlands, causing morphological changes in the landscape and variable salinity which are an influence of the estuarine system, over-time the transitional zones between the boundary of the freshwater ecosystems and estuary overlap or lack clear boundaries. Linked to these natural dynamics, surrounding industrial activities, developed artificial drainage systems, including artificial channels/canals, historical excavations and depositions of sediments further add to the complexity of as these activities have the potential create new, unnatural boundaries.</p> <p>The specialist confirmed that there is freshwater depression wetlands present within 500 m from the project area (DWS regulated zone) however no freshwater wetlands were identified within 32 m from the project area.</p>
Terrestrial Biodiversity	<p>The Berth 605 development footprint lies predominantly within an area identified as a Critical Biodiversity Area (CBA 1 Irreplaceable) as defined by the KwaZulu-Natal Biodiversity Sector Plan (2016). The site also falls within a Key Biodiversity Area (Richards Bay Coast) of international significance and overlaps with Priority Areas for Protected Area Expansion. Importantly, these categorisations cover much of the PoRB area and adjacent estuary. The affected landscape supports Endangered and Near Threatened ecosystems, including:</p> <ul style="list-style-type: none"> ■ Mangrove Forests (Endangered), ■ Maputaland Coastal Grassland (Endangered), ■ Coastal Forest (Near Threatened), ■ Estuarine and intertidal habitats of high ecological value.

Aspect	Baseline
	Field surveys and specialist assessments confirmed the presence of numerous Species of Conservation Concern (SCC), including protected tree species, threatened flora, mammals, reptiles, amphibians, birds, and invertebrates.
Avifauna	<p>A total of 108 bird species were recorded in the general Berth 605 project area during the fieldwork for this assessment. Totals of 16 species and 100 individual birds were recorded during a waterbird count done as part of this assessment along the shoreline of the Berth 605 project area and looking out across to the Sand-spit Island and Kabeljou Flats. A total of 16 species and 170 individual waterbirds were recorded during a further waterbird count on the Sand-spit Island.</p> <p>A total of 31 Red Data bird species have been recorded in the general Berth 605 project area considering during previous studies conducted at the PoRB (refer to Table 8 of the Avifaunal Assessment, David Allan, 2025). No Red Data species were recorded in the project footprint area for the fieldwork undertaken for the Berth 605 project however, six Red Data Species were recorded in areas directly adjacent to the project Berth 605 project (these areas include the sand spit island, Kabeljou Flats and flying over the site).</p>
Terrestrial Archaeology and cultural heritage	The field survey was undertaken on 22 October 2024 by Umlando to confirm that the footprint was disturbed. The location of Berth 605 occurs on previous swamp lands. The temporary stockpiles occur in highly disturbed area that has been backfilled from the original harbour and Berth 600. No archaeological sites will occur on this section. The area for Berth 605 and the Temporary Stockpile Area is on reclaimed swamp. No archaeological sites will occur in these areas.
Marine Heritage	A Marine Heritage Assessment was conducted by Maritime Archaeology in 2025. A desktop survey of the project area revealed that the area around Richards Bay has been utilised since the Earlier Stone Age. When the harbour was originally built there was no legislation governing the impact on the environment and cultural heritage resources. The desktop survey also indicated that there is a very low probability of Maritime and Underwater Cultural Heritage Resources (MUCH) resources being found. Although there are some known shipwrecks in the vicinity of Richard's Bay, Richard's Bay was not a natural harbour like Saldanha, Cape Town, Port Elizabeth, etc. The SS Newark Castle was found in

Aspect	Baseline
	<p>the Richards Bay channel in the 1970s, during construction of the harbour and either removed completely or partially, anecdotal evidence is contradictory. However, it is not in the area under consideration. There are no other known shipwrecks within Richards Bay. A magnetometer survey was also undertaken by Maritime Archaeology in January 2025. A magnetometer survey is a geophysical technique that measures and maps variations in the Earth's magnetic field to reveal subsurface features and structures, including buried objects, geological formations, and anomalies. Within the context of the project, the magnetometer survey was used to locate and map potential buried archaeological sites, features, and objects.</p> <p>Thirteen anomalies were noted during the survey. However, the Terrestrial HIA conducted by Umlando in 2025 states that there will be no maritime heritage in the harbour; it was all removed by dredging. A chance find protocol for maritime heritage should form part of the EMP, despite the fact that this area has been terrestrial for thousands of years.</p>
Palaeontology	<p>According to the Desktop Palaeontology Assessment undertaken for the Berth 605 project conducted in November/December 2024, the proposed site lies on the moderate to low sensitive rocks of the KwaMbonambi and Sibayi Formations (Quaternary; Maputaland Group) that might preserve marine molluscs, diatoms and peat but the site is highly disturbed.</p>
Socio economics	<p>For KZN, the Berth 605 project is a major driver of provincial development and economic integration. The PoRB's upgraded infrastructure enhances the province's connectivity to both domestic and international markets, opening opportunities for businesses to expand and access new export markets, particularly in sectors like agriculture and manufacturing. The development will stimulate economic activity in the province by boosting port-related industries such as logistics, warehousing, and distribution. Additionally, it is expected to attract investment in other infrastructure, such as roads and rail, creating a ripple effect throughout the region. The enhanced logistics capacity and improved trade routes provided by Berth 605 will also support KZN's economic planning and development strategies, including the province's industrialization initiatives.</p> <p>For the City of Umhlathuze, the Berth 605 project holds transformative potential, particularly in urban development, economic growth, and community upliftment. Umhlathuze, which includes Richards</p>

Aspect	Baseline
	<p>Bay, is already a key economic zone in South Africa due to the Port of Richards Bay, and with Berth 605, the city will solidify its position as a critical economic hub for KwaZulu-Natal and the broader region, attracting businesses and increasing investment in both public and private sectors. The project will directly impact employment, creating long-term operational jobs at the Port and stimulating job growth in local industries such as transportation, hospitality, and retail. The increased demand for housing, commercial real estate, and public services will drive urban development, leading to upgrades in infrastructure to support the growing population and business activities, including transportation, healthcare, and education. Additionally, the project could positively impact tourism, particularly in the business and corporate sector, with increased trade and investment likely to bring more visitors for business purposes, benefiting hotels, restaurants, and entertainment services in the city.</p>
Noise	<p>The existing noise climate surrounding the Berth 605 site is predominantly influenced by anthropogenic sources including shipping and port activities, industries and vehicles. With limited natural surrounding land, influences from natural sources like birds and insects are assumed to be minor. The closest identified receptor to the proposed project area is the Richards Bay Seafarers Club. The noise sources could also impact persons working within the PoRB.</p> <p>Noise levels (LAeq) at all monitoring locations were below the respective guideline rating levels. From the daytime monitoring campaign, it is evident that the current noise climate surrounding the Project site is predominantly traffic and port-related, with smaller influences from natural sources like birds and insects. Average LAeq noise levels at two (Pt 02 and Pt 05) of the five monitoring locations exceeded the guideline level for nighttime monitoring.</p>
Visual	<p>The site visit and assessment of the project area by the specialist conducted in November/December 2024 revealed that the proposed development is situated within the PoRB, the landscape character is considered industrial with numerous anthropogenic activities actively taking place, therefore the sense of place of the area is that which is associated with an industrialised area as well as that associated with a harbour– continuous movement (vehicle and human).</p>

Aspect	Baseline
Traffic	<p>7-day 24-hour traffic surveys were undertaken during October 2024 by WSP, initial analysis indicates the following vehicle volumes:</p> <ul style="list-style-type: none"> 1285 heavy vehicles enter and exits the port per day. 4406 total vehicles average per day (in and out). The heavy vehicle proportion is approximately 30% of the total vehicle volumes.

ENVIRONMENTAL IMPACT ASSESSMENT

The EIA process has found that the proposed project will involve activities which will lead to a number of direct and indirect negative impacts on the biophysical and socio-economic environment. These impacts were found to vary in terms of their consequence and probability. Positive impacts are associated with the overall local and regional economic benefit of the project which is of moderate to high significance.

The Berth 605 development footprint lies predominantly within an area identified as a Critical Biodiversity Area (CBA 1 Irreplaceable) as defined by the KwaZulu-Natal Biodiversity Sector Plan (2016), the residual negative biodiversity impacts of high significance associated with the project are those relating to the terrestrial environment. The site also falls within a Key Biodiversity Area (Richards Bay Coast) of international significance and overlaps with Priority Areas for Protected Area Expansion. Importantly, these categorisations cover much of the PoRB area and adjacent estuary.

The affected landscape supports Endangered and Near Threatened ecosystems, including:

- Mangrove Forests (Endangered)¹,
- Maputaland Coastal Grassland (Endangered),
- Coastal Forest (Near Threatened),
- Estuarine and intertidal habitats of high ecological value.

Field surveys and specialist assessments confirmed the presence of numerous Species of Conservation Concern (SCC), including protected tree species, threatened flora, mammals, reptiles, amphibians, birds, and invertebrates. The proposed Berth 605 berth basin footprint contains a depression originating from past construction activity. This area was reshaped approximately 20 years ago and connected to the operating berth basin by pipe within the zone of tidal influence. This tidally influenced pool within the project footprint has, in the absence of further disturbance, developed into a highly productive estuarine habitat supporting nursery functions for fish and crustaceans. Although the project area is located within a mapped CBA 1: Irreplaceable area and the Estuarine Functional Zone (EFZ), specialist investigations confirmed that the site is not representative of an undisturbed natural system. The footprint reflects a historically transformed environment that has undergone

¹ Although mangroves are acknowledged to become invasive within the Port of Richards Bay.

secondary ecological recovery following earlier development activities within the PoRB. This context was considered in the assessment of alternatives, impact significance and biodiversity compensation requirements.

The mitigation hierarchy entailing avoidance, minimisation, rehabilitation, and ultimately compensation for residual biodiversity impacts was applied. While project design has sought to avoid the most sensitive “no-go” areas where feasible and to minimise disturbance through construction controls and rehabilitation measures, residual impacts to biodiversity remain unavoidable due to the nature and location of the development which is an extension to the existing Berth 600 series. Residual impacts include:

- Permanent loss of high-value terrestrial habitats,
- Loss of intertidal habitats which include the tidal pool,
- Fragmentation and loss of habitat for fauna SCC,
- Direct and indirect impacts on estuarine and marine ecological functioning.

From the perspective of habitat importance for birds, the intertidal pool and associated mangrove and the loss of shoreline wading habitat within the caisson basin (a collective 960 m stretch of semi-natural shoreline within the dredge basin footprint) are of high significance and should be mitigated. This impact cannot be avoided and will result in a residual impact to birds. The avian specialist suggested that compensation may be possible directly adjacent to the project footprint. This aligns with the proposed compensation approach which entails the creation of additional shoreline and wader habitat on the southern edge of the Berth 605 basin and the recreation of a shallow intertidal pool, within which additional mangrove habitat will re-establish. If this is not feasible, or does not achieve the desired outcome, the avian specialist has suggested that shoreline rehabilitation elsewhere within the Port area could be contemplated. This does not currently form part of the compensation plan but has been included for future consideration within the PoRB, as the port expands further.

Biodiversity compensation is required to address residual impacts that remain after avoidance, minimisation and rehabilitation measures have been implemented in accordance with the mitigation hierarchy. The habitat loss requiring compensation of coastal forest (5.17 ha) and coastal grassland (3.78 ha) is 8.95 ha, in addition to which 2.06 ha of tidal pool and mangrove habitat will be lost. For estuarine impacts, particularly the loss of the tidally influenced pool, the Biodiversity Compensation Plan (WSP, 2026) strongly recommends on-site habitat creation through the excavation and tidal connection of new shallow estuarine areas, designed to replicate the ecological structure and function of the lost habitat.

The compensation approach entails the integration of new habitat creation into the Berth 605 final design. Consequently, the compensation area lies immediately to the south south-west of the proposed Berth 605 development. This site aligns strategically with conservation planning objectives. Following engagement with the Biodiversity Offset Group (BOG) and relevant commenting authorities, the BCP was revised to provide an overall compensation ratio of 1:1 for affected habitat units. A higher offset ratio could not be achieved without significantly constraining the 2052 Port Master Plan. The proposed compensation area has also been previously disturbed and consequently, in addition to its favourable geographic position adjacent to the Berth 605 site, while will benefit from additional intervention to improve habitat functionality within the compensation footprint itself.

The revised compensation area incorporates terrestrial, estuarine and shoreline habitat compensation measures and has been specifically designed to address residual impacts associated with the proposed development. The compensation area will be secured through a conservation servitude and excluded from future port development planning. The BCP further includes long-term ecological monitoring, adaptive management, habitat rehabilitation and invasive species control measures to ensure that the ecological objectives of the compensation area are achieved and maintained over the long term.

Freshwater specialist investigations confirmed that no direct impacts to freshwater wetlands will occur as a result of the proposed development. Freshwater wetland systems identified within the wider study area are located outside of the direct disturbance footprint and are protected through existing buffers and infrastructure constraints. Consequently, freshwater ecosystem losses were not included within biodiversity compensation calculations.

Notwithstanding the above, mitigation measures have been developed for identified impacts where applicable and are presented within the EMPr. The mitigation measures are necessary to ensure that the project is planned, constructed and operated in an environmentally responsible manner. It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

It is the opinion of WSP that the information contained in this document is sufficient for the DFFE to make an informed decision regarding the Environmental Authorisation (EA) application for the proposed Berth 605 development. The findings of the S&EIR process and supporting specialist investigations indicate that, although the project will result in residual biodiversity impacts, these impacts can be managed to acceptable levels through implementation of the EMPr, specialist recommendations and the revised BCP. The revised BCP incorporates habitat-specific compensation measures, achieves an overall 1:1 compensation ratio and includes long-term protection of the compensation area through a conservation servitude. Based on the historically disturbed nature of the site, the mitigation hierarchy applied during project development, and the implementation of compensation measures, the proposed development is not considered fatally flawed from a biodiversity, freshwater, estuarine or marine ecology perspective. It is therefore the opinion of the EAP that the project can proceed subject to the implementation of all recommended mitigation, compensation and monitoring measures and any conditions contained within the EA.

The table below is a summary of the impacts associated with the proposed Berth 605 project.

Table 2: Summary of the impact assessment of the Berth 605 project

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Air Quality	Impact on air quality during construction	C	Negative	Moderate	Low
	Impact on air quality during operation	O	Negative	Moderate	Moderate
Climate	Increase in extreme weather events	C	Negative	Low	Low

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	Impact on personnel health and safety	C	Negative	Moderate	Low
	Impact on construction activities and personnel safety	C	Negative	Low	Low
	Impact of costal erosion and storm surges on the project	C	Negative	Moderate	Moderate
	Impact of heavy rainfall and dredging	C	Negative	Low	Low
	GHG emissions during the construction phase	C	Negative	Moderate	Low
	Impact of temperature increases and frequency of hot days	O	Negative	Moderate	Moderate
	Impact of extreme weather events on personnel safety	O	Negative	Moderate	Low
	Impact of increased rainfall intensity and extreme precipitation days	O	Negative	Moderate	Low
	Impact of storm surges on the sewerage system and infrastructure at the Berth 605	O	Negative	Moderate	Low
	Impact of precipitation events on the stormwater system	O	Negative	Moderate	Low
	Impact of increased number and magnitude of high intensity events on the Berth 605 project structures	O	Negative	Moderate	Low
	GHG emissions of the project during operation	O	Negative	Moderate	Low
Geotechnical	Impact of geohazards on the project	C/O	No Impact		
	Impact of shallow rock during the construction of the quay wall	C	Positive	High	High
	Impact of shallow rock associated with disposal of the dredged material	C	Positive	High	High
	Impacts associated with the operational phase	O	N/A	No Impact	

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Hydrology	Impact of inadequate stormwater management during construction	C	Negative	Moderate	Low
	Impact of inadequate stormwater management during operation	O	Negative	Moderate	Low
Marine/Estuarine	Loss in aquatic ecological function and productivity due to the physical disturbance, injury, and displacement of benthic biological resources by dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity due to a deterioration in water quality related to increased suspended sediment concentrations and related turbidity during dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity in subtidal habitats due to the deposition of sediment resuspended by dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity in intertidal habitats due to the deposition of sediment resuspended by dredging	C	Negative	Moderate	Low
Marine/Estuarine	Remobilisation of oxygen depleting substances from sediment/soil during dredging	C	Negative	Low	Low
Marine/Estuarine	Nutrient remobilisation from sediment/soil during dredging	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of noxious substances from sediment/soil during dredging	C	Negative	Very Low	Very Low
Marine/Estuarine	Bioaccumulation and biomagnification of noxious chemicals remobilised from sediment by biological resources	C	Negative	Very Low	Very Low
Marine/Estuarine	Ecological impacts due to a deterioration in water quality related to increased suspended sediment concentrations during dredged material disposal	C	Negative	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Marine/Estuarine	Remobilisation of oxygen depleting substances from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of nutrients from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of noxious substances from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Deterioration in sediment quality on the dredged spoil disposal site due to the disposal of contaminated dredged material	C	Negative	Very Low	Very Low
Marine/Estuarine	Smothering and disturbance of benthic biological resources by disposed dredged material	C	Negative	Moderate	Moderate
Marine/Estuarine	Change in hydrodynamic conditions due to accumulation of dredged material at dredged spoil disposal site	C	Negative	Moderate	Moderate
Marine/Estuarine	Bioaccumulation and biomagnification of noxious chemicals in disposed dredged material by biological resources	C	Negative	Very Low	Very Low
Marine/Estuarine	Loss of tidally influenced pool and related ecological value and productivity (without creating a similar environment south southwest of the existing pool)	O	Negative	High	High
Marine/Estuarine	Loss of tidally influenced pool and related ecological value and productivity (with creating a similar environment south southwest of the existing pool)	O	Negative	Very Low	Very Low
Marine/Estuarine	Ecological effects of a change in hydrodynamic functioning in the port	O	Negative	Very Low	Very Low
Marine/Estuarine	Ecological effects of increased need for maintenance dredging and dredged sediment disposal	O	Negative	Low	Low

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Marine/Estuarine	Gain in intertidal and subtidal sediment habitat	O	Positive	Low	Low
Marine/Estuarine	Gain in hard substrate habitat	O	Positive	Low	Low
Marine/Estuarine	Gain in open water habitat	O	Positive	Low	Low
Marine/Estuarine	Increased load of contaminants introduced into the port by surface runoff	O	Negative	Moderate	Moderate
Marine/Estuarine	Introduction of artificial light to port aquatic environment	C	Negative	Moderate	Low
Dredging and dredge disposal	Visual impacts of dredging plumes in the surface waters within the port	Negligible			
Wave climate and shoreline change	Impact on breakwater stability	Negligible			
Wave climate and shoreline change	Impacts of dredge spoil disposal on the central areas of the Southern Beach (Mhlathuze estuary mouth to the south breakwater)	C/O	Negative	Moderate	Low
Wetlands and rivers	Impacts on wetlands outside of the Berth 605 project footprint	C/O	Negative	Moderate	Low
Terrestrial Biodiversity	Direct Loss and disturbance of natural habitat and associated flora SCC	C	Negative	Very High	High
	Establishment and spread of AIPs	C	Negative	High	Moderate
	Injury and mortality of reptile fauna SCC	C	Negative	High	High
	Loss and fragmentation of faunal habitat	C	Negative	Very High	High
	Indirect loss and disturbance of natural habitat and associated flora SCC	C	Negative	Moderate	Low
	Injury and mortality of fauna SCC due to traffic	O	Negative	Moderate	Low
Avifauna	Transformation of the terrestrial avifaunal habitat	C/O	Negative	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	Transformation of mangrove patch and associated intertidal mudflat (tidal pool)	C/O	Negative	High	Moderate
	Transformation of the semi natural shoreline	C/O	Negative	High	Moderate
	Disturbance to the sandspit island	C/O	Negative	Very Low	Very Low
	Disturbance to the Kabeljou Flats	C/O	Negative	Very Low	Very Low
Archaeology and Cultural Heritage	Potential impact on terrestrial and marine heritage resources	C	No Impact		
	Potential impact on terrestrial palaeontological resources	C	Negative	Very Low	Very Low
Visual	Potential visual impacts	C	Negative	Very Low	Very Low
Noise	Potential impact on sensitive receptors during construction	C	Negative	Low	Very Low
	Potential impact on sensitive receptors during operation	O	Negative	Low	Very Low
Waste and Chemical Pollution	Potential impacts of improper waste management during construction	C	Negative	High	Low
	Potential impacts of spills during operation	O	Negative	High	Low
Social Impacts	Influx of job seekers	C	Negative	Moderate	Low
	Access constraints to fishermen and port users during construction	C	Negative	Very Low	Very Low
	Temporary disruption of business activities at the PoRB	C	Negative	Moderate	Low
	Temporary stimulation of the regional and local economy	C	Positive	High	Very High
	Temporary creation of employment	C	Positive	Moderate	High
	Temporary increase in household income	C	Positive	Moderate	Moderate
	Temporary increase in production	C	Positive	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	Employment and business opportunities	O	Positive	Moderate	Moderate
	Regional economic development	O	Positive	High	N/A
	Improved trade competitiveness	O	Positive	High	N/A
	Government Revenue Increase	O	Positive	Moderate	N/A
Traffic	Increased traffic at and surrounding the project area	C	Negative	Low	Low
Cumulative Impacts					
Avifauna	Transformation of terrestrial avifauna habitat	N/A	Negative	Moderate	Moderate
	Transformation of mangrove patch and associated intertidal mudflat	N/A	Negative	High	Moderate
	Transformation of the semi-natural shoreline	N/A	Negative	High	Moderate
	Disturbance to the sand spit island	N/A	Negative	Low	Low
	Disturbance to the Kabeljou Flats	N/A	Negative	Low	Low
Socio-economic	Enhanced trade competitiveness	N/A	Positive	Moderate	Moderate
	Strengthened supply chain networks	N/A	Positive	Moderate	Moderate
Noise	Cumulative noise impacts	N/A	Negative	Very Low	Very Low
Terrestrial Biodiversity	Cumulative impacts on terrestrial biodiversity	N/A	Negative	Very High	Moderate

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SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS FOR THE DEVELOPMENT OF NEW BERTH 605 AND ASSOCIATED INFRASTRUCTURE TO SUPPORT THE CONTAINER HANDLING FACILITY, PORT OF RICHARDS BAY, KWAZULU-NATAL | WSP

Project No.: 43102871 | Our Ref No.: DFFE REFERENCE NO: 14/12/16/3/3/2/2809

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ABBREVIATIONS

Abbreviation	Definition
BPEO	Best Practicable Environmental Option
CA	Competent Authority
CARA	The Conservation of Agricultural Resources Act (No. 43 of 1983)
CBA	Critical Biodiversity Areas
CD	Chart Datum
CHF	Container Handling Facility
CRR	Comments and Responses Report
CV	Curriculum Vitae
DBT	Dry Bulk Terminal
DFFE	Department of Forestry, Fisheries and the Environment
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners of South Africa
EHS	Environmental Health and Safety
EIA Regulations	Environmental Impact Assessment Regulations, 2014, as amended (GNR 326)
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
ESAs	Ecological Support Areas

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Abbreviation	Definition
ESMP	Environmental Social and Management Plan
FSR	Final Scoping Report
GA	General Authorisation
GHG	Greenhouse Gases
Ha	Hectares
HIA	Heritage Impact Assessment
ICMA	National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008)
IFC	International Finance Corporation
KPA	Key Priority Area
MPT	Multi-purpose terminal
MUCH	Maritime and Underwater Cultural Heritage Resources
NDP	National Development Plan of 2030
NEMBA	National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)
NEMA	National Environmental Management Act (No. 107 of 1998)
NFA	National Forest Act (Act 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	The National Heritage Resource Act (No. 25 of 1999)
NWA	The National Water Act (No. 36 of 1998)
ONAs	Other Natural Areas
PDFP	Port Development Framework Plan
PoS	Plan of Study
PoRB	Port of Richards Bay
PPP	Public Participation Process
RBIDZ	Richards Bay Industrial Development Zone

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Abbreviation	Definition
SABAP2	Southern African Bird Atlas Project 2
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEZ	Special Economic Zones
SEI	Site Ecological Importance
SER	Stakeholder Engagement Report
S&EIR	Scoping and Environmental Impact Reporting
SST	Sea Surface Temperature
SR	Scoping Report
TNPA	Transnet National Ports Authority
WBG	World Bank Group
WUL	Water Use License
WULA	Water Use License Application

UNITS OF MEASUREMENT

Abbreviation	Definition
CD	Chart Datum
Ha	Hectares
kV	Kilovolt
km	Kilometre
m	metre
m ³	Cubic metres
mm	millimetre
MV	Medium voltage
sqm	Square metres
TEU	Twenty-foot equivalents

GLOSSARY

Term	Definition
Berth	A berth is a designated location in a port or harbour used for mooring vessels when they are not at sea.
Competent Authority	The department responsible for processing and assessing the application, in this case it is the DFFE.
Chart Datum	A chart datum is the water level surface serving as origin of depths displayed on a nautical chart and for reporting and predicting tide heights.
Cope line	The interface between land and water.
Critical Biodiversity Areas	The competent authority in respect of the activities listed in this part of the Notice is the competent authority in the province in which the activity is to be undertaken.
Dredging	Dredging is the excavation of material from a water environment such as a lake, river or harbour.
EIA Regulations	These Regulations regulate procedures and criteria as contemplated in Chapter 5 of the National Environmental Management Act for the submission, processing, consideration and decision of applications for environmental authorization of activities and for related matters.
Estuarine Functional Zone	The EFZ is defined as the area that not only encapsulates the estuary waterbody, but also the supporting physical and biological processes necessary for estuarine function and health.
Twenty-Foot Equivalent Units	TEU is a general unit of cargo capacity, often used for container ships and container ports. It is based on the volume of a 20-foot-long (6.1 m) intermodal container
Quay Wall	A quay wall is an earth retaining structure which is used to dock floating vessels and transfer goods.

1 INTRODUCTION

The TNPA functions in terms of the National Ports Act (No.12 of 2005) in which TNPA is responsible for the provision of port services and facilities within all ports of South Africa. In its role as the master planner, the TNPA also plans to improve, develop and maintain port infrastructure. Various development opportunities were identified by TNPA across three precincts namely South Dunes, Newark and Bayvue and are reflected in the PDPF and the PoRB Master Plan 2021 – 2035.

The PoRB is one of two main dry bulk ports in South Africa. The PoRB is the largest exporter of coal in South Africa, and it serves the hinterlands of Northern KwaZulu-Natal (KZN), Gauteng and Mpumalanga. By tonnage, the port has the largest Dry Bulk Terminal in South Africa and handles approximately 54% of the country's total dry bulk cargo demand (PDPF, 2022).

The proposed Berth 605 project is also reflected in the PDPF and the PoRB Master Plan, 2021-2035. The new berth and associated infrastructure are intended to be developed adjacent to the existing Berth 600 series located in the Bayvue Precinct in the western region of the PoRB and are depicted in **Figure 2-1**.

The intention of the proposed new Berth 605 and associated infrastructure is to serve the proposed new CHF that is ultimately intended to increase container volumes handled at the port to stimulate economic development in the region. Only the disturbance footprint of the CHF is assessed within this &EIR process, the construction and operation activities will be assessed at a later stage in an application submitted by the CHF operator.

The proposed Berth 605 development is located within an area that has been historically modified through the development of the PoRB and, more specifically, through previous development associated with the 600 Series Berth Basin. Historical aerial imagery confirms that the project footprint has been subjected to clearing, earthworks, dredging and construction activities over time. Existing vegetation communities and tidally influenced habitats have subsequently re-established within portions of the disturbed footprint over approximately two decades and this historical disturbance context was considered throughout the environmental assessment process.

The proposed development therefore requires Environmental Authorisation (EA), supported by a S&EIR process in accordance with the National Environmental Management Act (No. 107 of 1998) (NEMA), Environmental Impact Assessment Regulations, 2014 as amended (GNR 326) (EIA Regulations).

The DEIR was released for public review and comment in accordance with the EIA Regulations. The public review period provided I&APs, organs of state and commenting authorities with an opportunity to review the findings of the Environmental Impact Assessment process, specialist studies and the proposed mitigation measures. Comments received during the review period were recorded and considered through the

PPP. All comments raised by stakeholders and competent commenting authorities were reviewed and responded to, and where applicable, the EIR, specialist studies, EMPr and BCP were amended to address the issues raised.

The comments received during the review of the Draft EIR resulted primarily in refinements to specialist recommendations, mitigation measures, environmental management commitments and the BCP. The comments did not result in material changes to the proposed project location, development footprint, project scope, listed activities, alternatives assessed or the overall conclusions of the EIA. Accordingly, the amendments made between the Draft and Final EIR are not considered substantive changes to the proposed development or its assessed impacts and therefore did not necessitate the release of a revised Draft EIR for a further public review period.

This Final EIR incorporates the outcomes of the public review process and presents the final assessment of the proposed development, together with the revised specialist findings, mitigation measures, biodiversity compensation commitments and recommendations for decision-making by the DFFE. The Final EIR should therefore be read together with the CRR, which documents how stakeholder and authority input was considered during the EIA process.

1.1 BACKGROUND INFORMATION

1.1.1 HISTORY OF THE PORB

On 1 April 1976, the first phase of the PoRB was officially opened with anchor terminal operators; South African Railways and Harbours and Richards Bay Coal Terminal Pty Ltd, which is now considered one of the leading coal export terminals in the world.

The strategic decision to build a harbour at Richards Bay transformed the fishing village into a thriving industrial hub. The port is therefore a vital link to promoting trade globally. The PoRB is located approximately 160 km north-east of Durban and 465 km south of Maputo on the eastern seaboard of South Africa. Besides the massive rail infrastructure challenges, dredging the harbour was done on an unprecedented scale. The new port also gave birth to several other associated international entities such as Alusaf (now South 32) and Richards Bay Minerals.

The Richards Bay Industrial Development Zone (RBIDZ) is also strategically located within close proximity to the PoRB, it is a prime industrial business and trade hub attracting export-orientated investors as one of the Special Economic Zones (SEZs). The PoRB is also one of South Africa's leading port in terms of cargo volumes handled. It is the largest port in size, covering an area of approximately 3 773 ha, some of which is still available for further expansion and forms part of the PoRB Masterplan.

1.1.2 BERTH 605 PROJECT WITHIN THE PORB MASTERPLAN

Various development opportunities were identified by TNPA across three precincts namely South Dunes, Newark and Bayvue and are reflected in the PDFP and the PoRB

Master Plan 2021 – 2035 (**Figure 2-3**). The following projects form part of the Masterplan for the Bayvue Precinct:

- New Berth 605 CHF
- New Berths 709 and 710
- Extension of Ferro slab to cater for future growth
- Reconfiguration of Bayvue Railroad
- Powership (currently on hold)
- New Berths 802 and 803 (Mega Chrome Berths)
- Relocation of South 32
- Additional Chrome Storage Area
- Provision for DLH bulk relocation commodities
- Provision for CHF – Land

The Berth 605 project area is located within the Bayvue Precinct of the PoRB and identified in the Masterplan as Project 10 (**Figure 2-3**). The Bayvue Precinct was identified as a strategic location for the handling and consolidation of general cargo (dry bulk, liquid bulk (Phosphoric acid and liquid Pitch) and break bulk, including containers) in the PoRB. The precinct is situated on the northern side of the port, between the South 32 smelter in the west, Thulazihleka pan in the north and Tuzi-gazi in the east. Effectively the precinct accommodates dry bulk, break bulk and liquid bulk terminals which include significant road, rail, building and services infrastructure.

The proposed Berth 605 development will largely occur within an area previously disturbed through historic port development activities associated with the 600 Series Berth Basin and related infrastructure. Historical aerial imagery confirms that portions of the project footprint have been subject to dredging, earthworks, fill placement and temporary construction activities over time. This historical disturbance context formed an important consideration during the assessment of environmental impacts, alternatives and biodiversity compensation requirements. This history of change at the site is described in Section 2.2.

The intent of the design of the extended basin area for the proposed Berth 605 is to provide a safe area for manoeuvring and berthing of the design vessel at Berth 605. The following structures and infrastructure are deemed necessary to achieve the overall objective of the project and included in the overall design of the project as presented in **Figure 2-2**:

- **New berth pocket and quay wall** – A new berth pocket and quay wall is proposed. The new proposed Berth 605 quay wall will extend from the existing Berth 606 quay wall maintaining the sae cope line alignment (cope level is the top of the quay wall). On the other end of Berth 605, the quay wall will stop short of Urania Road. The quay is a mass gravity structure with a concrete foundation and walls with soil backfill internally which provides a wider footprint, but a lower density will result in a stable foundation, this is aligned to the existing Berth 606 quay wall and is considered as an economical design that has been used at the PoRB and Port of Coega. The quay wall

is expected to be 366 m in length. The new quay wall is designed for a future depth of -19 m Port Chart Datum (PCD). This will ensure that the berth can be lengthened and deepened without the need for additional quay wall deepening costs.

- **End of berth basin slopes** – The Berth 605 must fit within the space between the end of the existing Berth 606 and the South Dunes Road. With a slope of 1V:3H from -14.5 PCD to the existing ground level is 60 m long, this provides a total berth length of 338.5 m from the toe of the embankment to the start of Berth 606. This will support a vessel of 315 m Length Overall (LOA). A basin width of 305 m is applied to the bottom of the basin where a proclaimed depth of at least -14.5 m PCD is to be maintained.
- **Dredging** – The new Berth 605 quay wall will be constructed to -19m PCD to allow for further port expansion at a point in the future. For this project, the berth will be dredged such that a proclaimed depth of -14.5 m PCD is achieved, however the design dredging depth also considers sedimentation and sounding accuracy i.e. 0.6 m below -14.5 m PCD providing a design depth of -15.1 m PCD. This dredge depth is consistent with the PoRB depths and the requirements of the design vessel. This approach limits the volume of dredge material requiring disposal.
- **Dredge disposal (of the basin materials)** – An estimated 2 895 500 cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, with a bulking factor, it is estimated that a bulked volume of approximately 4 308 287 cubic metres will be disposed of at the offshore dump site. The concept design has assumed that a suitable licensed and permitted disposal site is available within 10 nautical miles of the entrance to the PoRB. This site will be used for the disposal of the dredged material and any other spoil material as described above. As beneficial use of material remains uncertain, it is likely that most or all the material, i.e., an estimated 4 308 287 cubic metres will need to be disposed of offshore. The existing offshore site will be used for the disposal of dredged material. The difference between the actual dredged volume and the bulked volume is the bulking factor of 1.3 which indicates that the dredged volume is not the same as the volume that will be disposed of at sea considered that it will be loosened during handling.
- **Disposal of excavated material (from land-based construction activities)**– The disposal of excavated material from elsewhere within the construction footprint (excluding the berth basin) includes road, rail, construction laydown area excavation and earth wall concrete and steel components (64 900m³) will be disposed of at a registered land-based disposal site. The material excavated from the compensation area (the new tidal pool area and scalloped shoreline as described in Section 9.3 of this report) is approximately 30 000 m³ and will be used as landform shaping and backfill within the compensation site. The excess material will be placed into the caisson pond (if timing allows) or disposed of at a registered land-based disposal site.
- **Scour protection** - The concept design evaluated the necessary scour protection to prevent excessive erosion, which will compromise the structural integrity of nearby infrastructure, such as Urania Road, or cause excessive sediment movement within the berth pocket. The movement of material within the berth is also of significant

concern. The depth of the berth pocket is impacted when material erodes from one area and is deposited elsewhere in the berth pocket. Consequently, maintenance dredging will be required to maintain the required berth pocket minimum navigation depth. A revetment (sloped embankment) will be constructed on the seaward side of the Urania Road. This slope must be protected against wave and propeller action to maintain the structural integrity of the Urania Road. A riprap scour protection system has been considered.

- **New rail siding** – Based on the design throughput and the current requirement of a 50-wagon container train and 2 locomotives, it is proposed that the rail siding will consist of two rail lines that are 370m each in length, each servicing 25 rakes. The existing Mhlatuze Yard will be used for shunting and staging purposes to service the new proposed rail siding.
- **New access road** – a new shared access road and vehicle access control point to the PoRB, the CHF and the adjacent vacant land surrounding the CHF is proposed. The new road will be an estimated 735 m length with a lane width of 3.7 m and a reserve width of 30 m. It will consist of two (2) lanes each direction and three (3) intersections; at Urania Road, at Ventura Road and one to the CHF. The shared access road will also have a security control facility as the road is accessible from outside of the port's security perimeter. Street lighting will be provided for as part of the new road network extension. It must be noted that the construction of the Berth 605 and associated infrastructure will not generate significant traffic. The traffic that will be generated (as discussed in Section 2.3.8 of this report) is associated with the operation of the CHF which has been designed and will be operated by Grindrod.
- **Footprint of the CHF and apron area** – The CHF will be built and operated by the operator (Grindrod) therefore this S&EIR process only considers the disturbance footprint of the CHF and not the associated permits that it will require when operational. The total area considered is 6.75 Ha for the CHF with estimated dimensions of 270 m x 250 m. The apron area is an operational area located behind the quay wall and is used for the movement of trucks. The apron area is an estimated 33 m wide and 400 m in length.
- **Provision of electrical supply to feed the facility operations and equipment** – The preferred alternative is applicable where the required electrical demand is within the available capacity of the current existing 11 kV network. A new feed will be taken from the existing 11 kV network to provide electrical power to the new CHF and quay wall. However, while there is existing capacity on the current 11 kV network, this is limited and may not be able to provide for the full electrical demands in the future. To protect against restricting future electrical supply constraints, a new 11 kV Switching Station fed from the existing Primary Substation is proposed.
- **Water** – The concept design allows for water to be sourced from the municipal supply. There are three municipal feeds into the port, supplied by two separate municipal reservoirs. This provides adequate supply contingency, and therefore, no additional storage has been included in the system. The existing 225mm diameter water main will be extended along with the new quay wall to supply ship water along the new

quay. At the end of the new quay wall extension the water main will follow Urania Road to tie into the existing 150mm diameter pipe in the vicinity of the existing gate house. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided which will consist of approximately 500 m of pipework with a diameter of 150 mm. Inside the quay wall, water will be provided to landing valves for ships and firefighting.

- **Building water** - A new 75mm diameter pipe will branch off from the 150mm diameter water pipe to supply a metered connection for the handling facility. Any connections to new buildings will be made from the metered supply point, located on the western side of the site, just south of the Seafarers club. The Container Handling Facility operator will be responsible for the water network within the facility.
 - **Ship water** - The proposed new water main line will tie into the existing 225mm diameter asbestos cement water pipe, that is in the existing quay of Berth 606, located on the eastern side of the new Berth 605. The new pipe will be 200 mm diameter, within the new quay wall, with 75 mm off takes to the landing valves. The 200mm diameter pipe reduce in size to a 160 mm diameter, where the pipe exits the new quay wall and is parallel to Urania Road and will tie into the existing 150mm diameter asbestos cement pipe north of the existing security access to complete the ring.
 - **Fire water** - The fire water in the PoRB is off the water reticulation network. Allowance for fire-hydrants will be made where there isn't a dedicated firefighting system. This allowance is for normal hydrants outside the container handling facility boundary along the lengths of pipelines that will be installed to service the new quay wall extension.
- **Sewerage** – The existing sewer network has been evaluated to identify areas that require upgrades to accommodate the extension of the sewer network for the new proposed CHF. The sewerage system will allow for wastewater from new toilets, basins, baths and showers. The proposed sewer has been designed to tie into the closest existing pipe network or an existing pump station closest to the proposed CHF. Sewerage inside the CHF has been designed to accommodate for approximately 160 people. The new sewerage pipeline will have a connection point at the northwestern boundary of the CHF. It will be approximately 100 m in length and 160 mm pipe diameter. The preferred alternative involves designing a sump to accommodate the facility's sewer through gravity flow, with pumping from the sump to the existing pumpstation PS20, located north of the facility. The final sewer pipe route will be determined during the design phase.
 - **Stormwater** – With the hydrological analysis complete and design flows computed, the stormwater pipes were sized. The minimum size of stormwater pipelines is 600mm

diameter, which considers effective maintenance of the stormwater network. With the hydrological analysis complete and design flows computed, the stormwater pipe system has been designed to accommodate a 1 in 5-year storm. The proposed CHF, as well as any future development adjacent to Berth 605 will require major floods to flow overland into the bay. The area will therefore have to be designed and shaped to accommodate overland flow during a major storm, to prevent water ponding and to control flood damage to any infrastructure. Conventional catchpits, at 50m to 80m spacing, have been shown along the proposed access road. The access road stormwater is then routed in a pipe system to the bay at a slope of 0.5%. The pipeline will be approximately 360 m along the quay line and 400 m on the other side with a 900mm pipe diameter. It will have a velocity of 0.6 m/s for self-cleaning, to prevent sand settling inside the pipe and blocking. There will also be cross drainage at the new rail siding which will be 400 m in length and 600 mm diameter. The existing network discharges into the bay through the existing quay wall.

- **Provision for temporary laydown and stockpile areas** – Areas for temporary stockpiles and laydown areas have been designated and has been further assessed in this report. An approximate area of 4.2 Ha, 220 m in length and 170 m wide to be used as a potential lay down area for the project (located alongside the CHF). In addition, two temporary stockpile areas are proposed which are split into two areas across the Harbour Arterial Road. These areas cover an area of approximately 6 Ha. The infilling of approximately 6 Ha of the basin is also being considered for stockpiling (this infilled area also forms part of the basin to be dredged).

1.2 KEY ROLE PLAYERS

1.2.1 PROJECT PROPONENT

TNPA is the project proponent (Applicant) with regards to this application for the development and operation of the proposed Berth 605 project.

Table 1-1 provides the relevant details of the project proponent.

Table 1-1 – Details of Project Proponent

Proponent:	Transnet National Ports Authority
Contact Person:	Mazwi Mdletshe
Postal Address	Queens Warehouse 237 Mahatma Gandhi Rd, Point, Durban, 4001
Telephone:	+27 31 816 9864
Email:	Mazwi.Mdletshe@transnet.net

1.2.2 COMPETENT AUTHORITY

According to Appendix 1 of Listing Notice 1 (GNR 327), the Competent Authority (CA) in respect of the activities listed in the Listing Notices is the CA in the province in which the activity is to be undertaken, unless—

(a) it is an application for an activity contemplated in section 24C(2) of the Act, in which case the competent authority is the Minister **or an organ of state** with delegated powers in terms of section 42(1) of the Act; or

(b) the listed or specified activity is or is directly related to—

- i. prospecting or exploration of a mineral or petroleum resource; or
- ii. extraction and primary processing of a mineral or petroleum resource; in which case the CA is the Minister responsible for mineral resources.

Since TNPA is a State-Owned entity, (a) above is applicable therefore the CA for the Berth 605 project is the National DFFE, the details of the CA are presented in **Table 1-2** below.

Table 1-2 – Details of the Competent Authority

CA	NATIONAL DFFE
Contact Person:	Ms Constance Musemburi
Postal Address	Private Bag X447, Pretoria, 0001
Telephone:	012 399 9000
Email:	CMusemburi@dffe.gov.za

1.2.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Environmental Assessment Practitioner (EAP) to undertake the S&EIR process for the proposed Berth 605 project. The Curriculum Vitae (CV) of the EAP is available in **Appendix A** and the EAP declaration of interest and undertaking is included in **Appendix B**.

Table 1-3 provides the relevant contact details of the EAP.

Table 1-3 – Details of the EAP

EAP	WSP Group Africa (Pty) Ltd
Contact Person:	Patricia Nathaniel
Physical Address:	WSP in Africa 1st Floor, Pharos House, 70 Buckingham Terrace, Westville

EAP	WSP Group Africa (Pty) Ltd
	3629 South Africa
Telephone:	011 361 1398
Email:	Patricia.nathaniel@wsp.com
EAP Qualifications and Registrations:	BSc (Geography) BSc (Hons) (Geography and Environmental Management)
EAPASA Registration No.:	EAPASA (2020/1120)

1.2.3.1 Statement of Independence

Neither WSP nor any of the authors of this EIR have any material present or contingent interest in the outcome of this report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

1.2.4 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-4** below. The specialist studies are attached in **Appendix G**.

Table 1-4 – Details of Specialists

Assessment	Name of Specialist	Company	Sections in Report	Specialist Report attached as in Appendix G and Declarations in Appendix C
Terrestrial Biodiversity Assessment including animal and plant species theme	Sandhya Moodley/Rudolph Greffrath	WSP	Section 6 and Section 7	G2
Avifaunal Assessment	David Allan	David Allan	Section 6 and Section 7	G3
Freshwater Assessment	Nqobile Lushozi	SASS Environmental	Section 6 and Section 7	G4
Baseline Estuarine and Marine Ecology Assessment	Brent Newman	CSIR	Section 6 and Section 7	G5
Sediment and Soil Quality	Brent Newman	CSIR	Section 6 and Section 7	G6
Heritage Impact Assessment	Gavin Anderson	Umlando Consulting	Section 6 and Section 7	G7
Marine Heritage Impact Assessment	Vanessa Maitland	Maritime Archaeology	Section 6 and Section 7	G8
Desktop Palaeontology Impact Assessment	Marion Bamford	Marion Bamford	Section 6 and Section 7	G9
Visual Compliance Statement	Sanja Erwee	SASS Environmental	Section 6 and Section 7	G10
Social Impact Assessment	Tumelo Mathulwe/Steven Horak	WSP	Section 6 and Section 7	G11
Economic Assessment	Tinotenda Makoni	Urban Econ	Section 6 and Section 7	G12

SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS FOR THE DEVELOPMENT OF NEW BERTH 605 AND ASSOCIATED INFRASTRUCTURE TO SUPPORT THE CONTAINER HANDLING FACILITY, PORT OF RICHARDS BAY, KWAZULU-NATAL | WSP

Project No.: 43102871 | Our Ref No.: DFFE REFERENCE NO: 14/12/16/3/3/2/2809

SEPTEMBER 2026

Assessment	Name of Specialist	Company	Sections in Report	Specialist Report attached as in Appendix G and Declarations in Appendix C
Climate Change Impact Assessment	Thando Mosia/ Verushka Singh	WSP	Section 6 and Section 7	G13
Noise Compliance Statement	Kirsten Collett/Jarred Lodder	WSP	Section 6 and Section 7	G14
Dredging and Dredge Disposal Assessment	Roy Van Ballegooyen	WSP	Section 6 and Section 7	G15
Wave Climate and Shoreline Change Assessment	Roy Van Ballegooyen	WSP	Section 6 and Section 7	G15
Biodiversity Compensation Plan	Rudolph Greffrath	WSP	Section 6 and Section 7	G16

1.3 EIA PHASE TERMS OF REFERENCE

The EIA Regulations identifies the proposed Berth 605 and associated infrastructure as an activity being subject to an S&EIR process due to the applicability of listed activities as contained in the Listing Notices (Listing Notice 1, 2 and 3) of the EIA Regulations. In order for the project to proceed, it will require an EA from the DFFE.

This EIR follows the Scoping Phase of the S&EIR process. The Scoping Phase involved consultation with Interested and Affected Parties (I&APs) and compilation of the POS for EIA which culminated in the submission of a FSR to the DFFE which was subsequently accepted on 28 February 2025.

As defined in Appendix 3 of the EIA Regulations, the objective of the EIA Phase is to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context.
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the Scoping Report.

- Identify the location of the development footprint within the approved site as contemplated in the Scoping Report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment.
- Determine the -
 - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and;
 - degree to which these impacts -
 - can be reversed;
 - may cause irreplaceable loss of resources, and
 - can be avoided, managed or mitigated.
- Identify the most favourable location for the activity within the development footprint of the approved site as contemplated in the scoping report based on the lowest level of environmental sensitivity identified during the assessment.
- Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the Scoping Report through the life of the activity.
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

Particular attention was given during the EIA Phase to the assessment of residual biodiversity impacts associated with habitat loss within the EFZ and mapped CBAs. The assessment included the development and refinement of a BCP to address residual ecological impacts that remain following the application of avoidance, minimisation and rehabilitation measures. In addition to the assessment of direct and indirect impacts, the EIA considered cumulative impacts associated with existing and proposed developments identified in the PoRB Master Plan, as well as long-term biodiversity conservation requirements arising from development within ecologically sensitive estuarine and terrestrial habitats.

The Public Participation Process (PPP) is a requirement of the S&EIR process; it consists of a series of inclusive interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIR decision-making process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the PPP can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project.
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities.

- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision.
- Identify shortcomings and gaps in existing information.
- Identify key concerns, raised by stakeholders that should be addressed in the subsequent specialist studies.
- Highlight the potential for environmental impacts, whether positive or negative.
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

1.4 ASSUMPTIONS AND LIMITATIONS

1.4.1 GENERAL

This section provides a brief overview of specific assumptions and limitations having an impact on this environmental application process:

- It is assumed that the information on which this report is based (existing specialist studies and project information, as well as existing information) is correct, factual and truthful.
- The proposed development is in line with the statutory planning vision for the site namely the PoRB Masterplan, and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been considered during the strategic planning for the area.
- This report is based on a 275 000 Twenty-foot Equivalent Units (TEU) vessel.
- Land disposal of the dredged material has not been considered as TNPA has confirmed that the dredged material will be disposed of at an existing authorised offshore disposal site.
- The Biodiversity Compensation Plan has been developed based on the currently assessed development footprint and associated habitat losses. The compensation measures and long-term protection commitments contained within the BCP form an integral component of the impact assessment conclusions presented in this report.
- Temporary lay down and stockpile areas have been identified and have been further investigated in this S&EIR process.
- Only the disturbance footprint of the CHF has been included in this S&EIR process however the associated permits and EA required for the operation of the facility will be applied for by the operator.
- It is assumed that stakeholders notified of the availability of this report will submit all relevant comments within the designated 30-days review and comment period, so that these can be included in the Final EIR to be timeously submitted to the competent authority, the DFFE.
- The assessment assumes that the BCP, including the establishment and long-term management of the compensation area and registration of an appropriate conservation servitude, will be implemented as proposed.

1.5 FINAL EIR STRUCTURE

As per the Appendix 3 of the EIA Regulations, the legislated requirements must be contained within an EIR for the CA to consider and come to a decision on the application.

Table 1-5 below details where the required information is located within this report.

Table 1-5 – Legislated Report Requirements as detailed in GNR 326

Appendix 3 of GNR 326	Description	Relevant Report Section
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1 and Appendix A
3(1) (b)	The location of the activity	Section 2
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	Section 2
3(1) (d)	A description of the scope of the proposed activity	Section 2
3(1) (e)	A description of the policy and legislative context within which the development is proposed	Section 4
3(1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 4
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 2 and 3
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site	Section 2
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity	Section 5
3(1) (j)	An assessment of each identified potentially significant impact and risk	Section 7
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 7
3(1) (l)	An environmental impact statement	Section 9

Appendix 3 of GNR 326	Description	Relevant Report Section
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	Section 7 and 8 Appendix H
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 9
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 9
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 9
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised	N/A
3(1) (r)	An undertaking under oath or affirmation by the EAP	Appendix B
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
3(1) (t)	Any specific information that may be required by the competent authority	N/A
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	N/A

2 PROJECT DESCRIPTION

This section provides a description of the location of the project area and the details associated with each phase of the project. The description encompasses the activities to be undertaken during the construction and operational phases as well as the consideration for access, bulk services and infrastructure in support of the overall operational efficiency of the project.

This section fulfils the requirement stipulated in Appendix 3- 2(d) (ii) of the EIA Regulations:

A description of the activities to be undertaken, including associated structures and infrastructure.

2.1 LOCATION OF THE PROPOSED PROJECT SITE

Berth 605 is located within the PoRB, King Cetshwayo District Municipality and Umhlathuze Local Municipality within the KZN Province. The project structures and infrastructure are located on the following land parcels:

- Portion 45 of Parcel 5333 of Richards Bay;
- Portion 0 of Parcel 397 of Richards Bay;
- Portion 0 of Parcel 16230 Umhlathuze; and
- Portion 21 of Parcel 5333 of Richards Bay.

The site is bounded by the rail line to the North, the current development for Berth 606 and 607 to the East, The Seafarers Club to the West (boundary shown as dashed red line) and the basin for the 600 Series berths to the South.

The approximate centre point co-ordinates for the Berth 605 project area are:

28°47'23.82"S; 32° 1'34.43"E.

The locality of the site is depicted in **Figure 2-1** and the project layout plan is depicted in **Figure 2-2**. **Figure 2-3** illustrates the Berth 605 project (number 10 on the map) within the PoRB Masterplan.



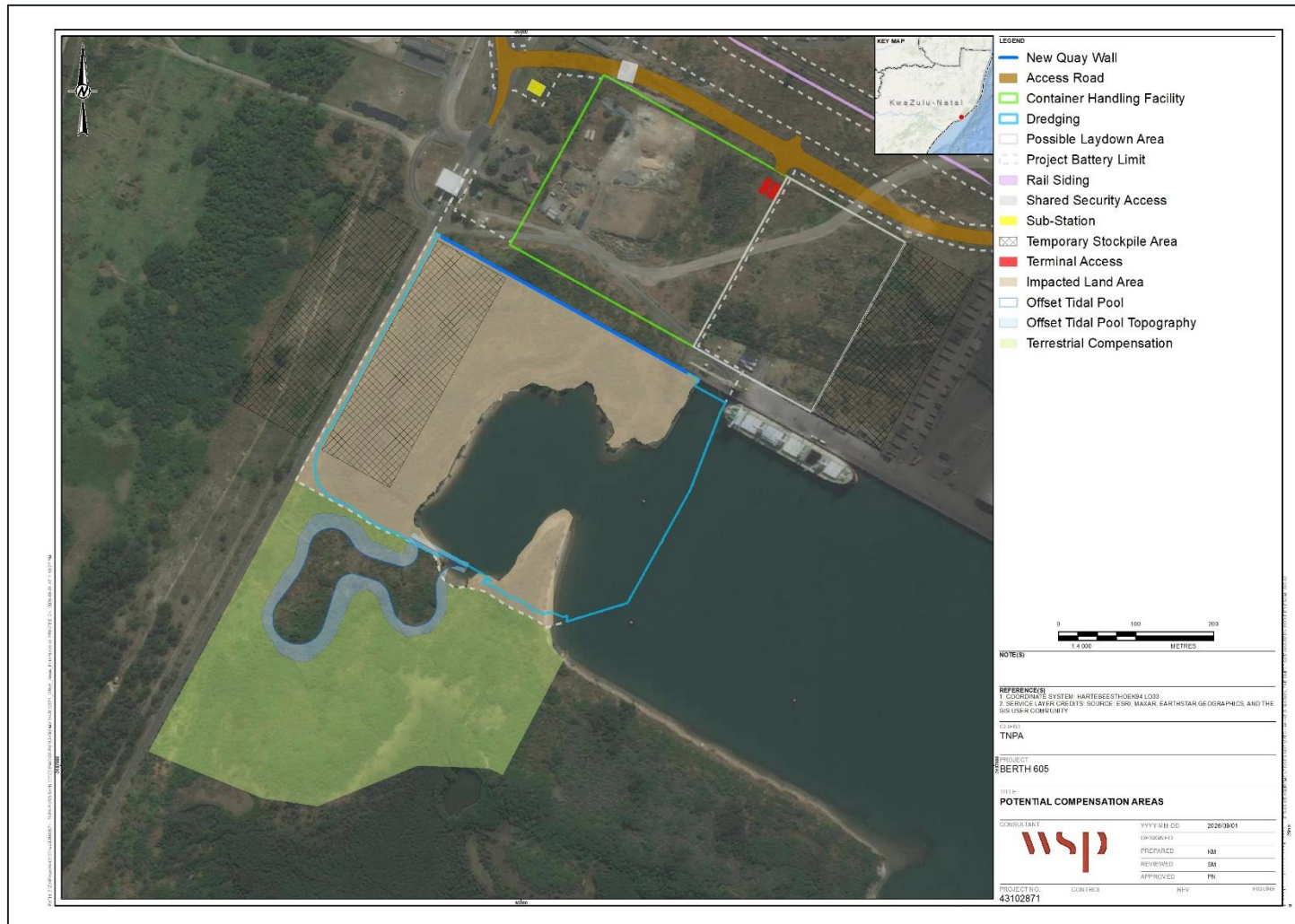


Figure 2-2 - Layout map of the proposed Berth 605 and associated infrastructure

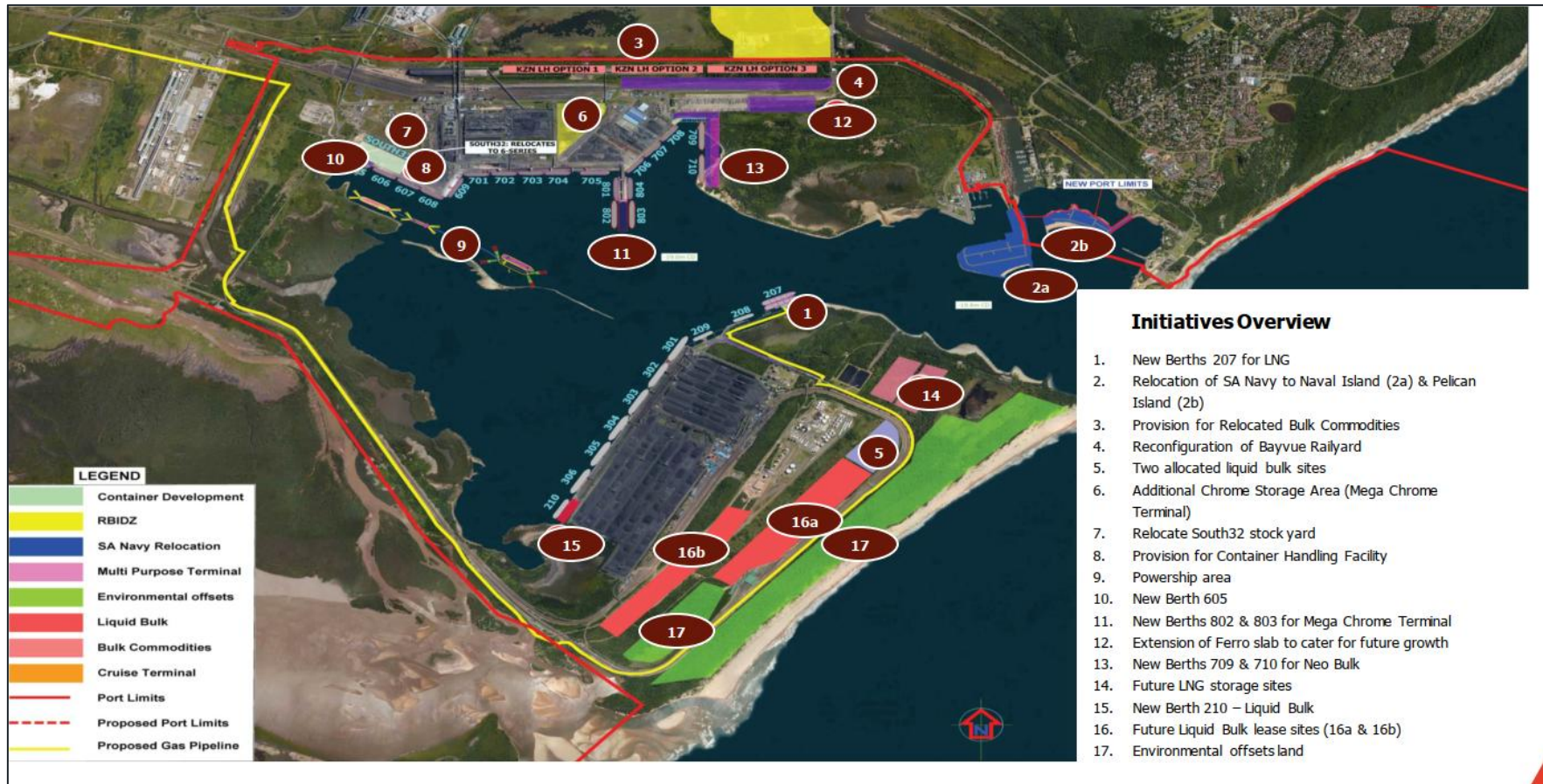


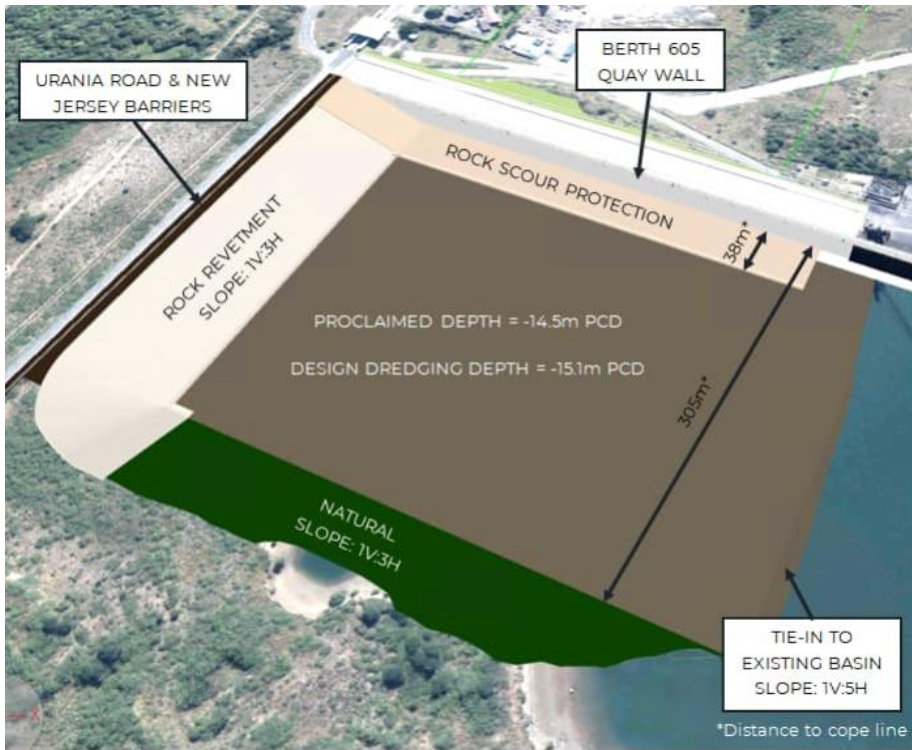
Figure 2-3 - Layout map of the Berth 605 project in relation to the PoRB Masterplan (PDFP, 2022)

Table 2-1 below indicates the cadastral information of the site and **Table 2-2** includes the co-ordinates of the project infrastructure.

Table 2-1 –Cadastral Information of the Site

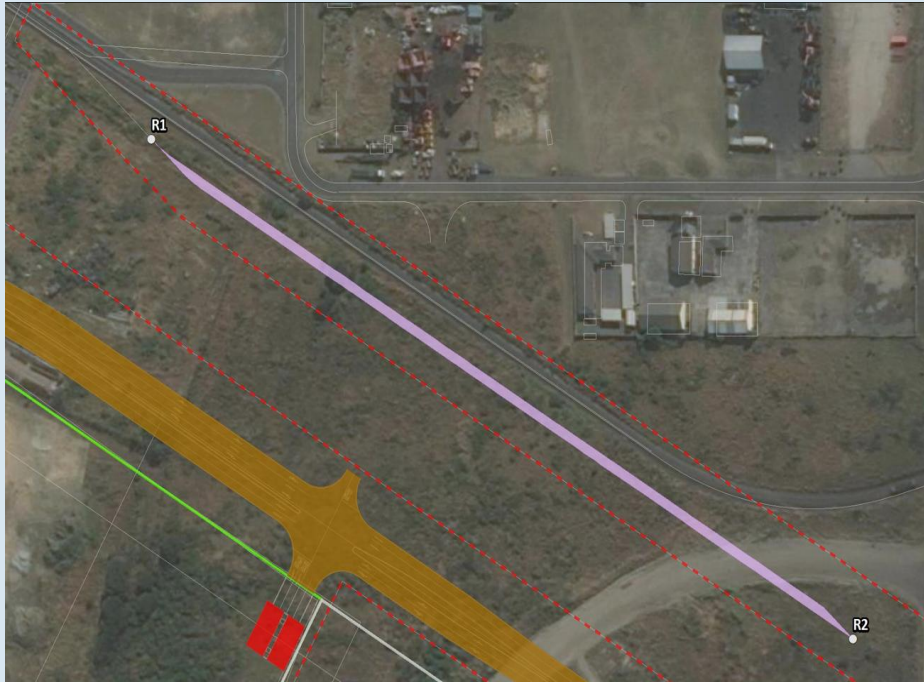
Details required as per GNR 326	Details
21 Digit Surveyor General Code of each Cadastral Land Parcel	<ul style="list-style-type: none"> ■ N0GV00000001623000000 ■ N0GV04210000533300045 ■ N0GV04210000039700000 ■ N0GV04210000533300021
Physical Address and Farm Name	<ul style="list-style-type: none"> ■ Portion 45 of Parcel 5333 of Richards Bay; ■ Portion 0 of Parcel 397 of Richards Bay; ■ Portion 0 of Parcel 16230 Umhlathuze; and ■ Portion 21 of Parcel 5333 of Richards Bay.
Land use Zoning	Port and Harbour
Municipality	King Cetshwayo District Municipality and Umhlathuze Local Municipality

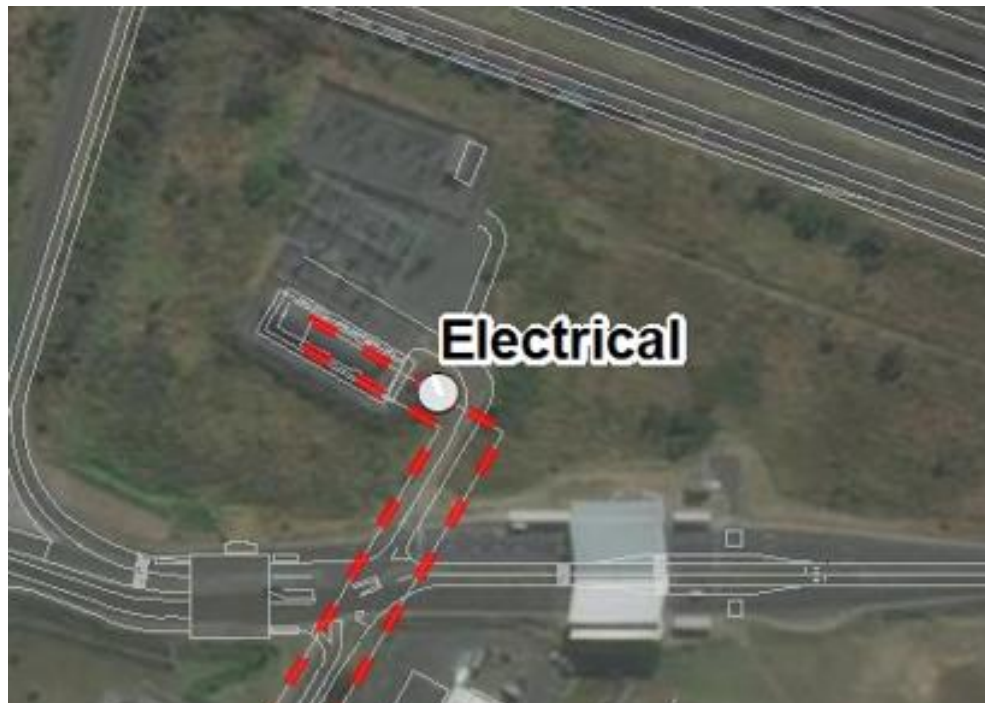
Table 2-2 – Locality of the Project Infrastructure

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
Berth 605 Pocket and Quay Wall			
Q1 (blue line)	32° 1' 33.506" E 28° 47' 21.929" S		<p>A new berth pocket and quay wall is proposed. The new proposed Berth 605 quay wall will extend from the existing Berth 606 quay wall maintaining the same cope line alignment (cope level is the top of the quay wall). On the other end of Berth 605, the quay wall will stop short of Urania Road. The quay is a mass gravity structure with a concrete foundation and walls with soil backfill internally which provides a wider footprint, but a lower density will result in a stable foundation, this is aligned to the existing Berth 606 quay wall and is considered as an economical design that has been used at the PoRB and Port of Coega.</p> <p>The quay wall is expected to be 366 m in length. The new quay wall is designed for a future depth of -19 m PCD. This will ensure that the berth can be lengthened and deepened without the need for additional quay wall deepening costs</p>
Q2 (blue line)	32° 1' 45.056" E 28° 47' 27.687" S		
Scour Protection			
SP1	Along the quay wall (as per the quay wall co-ordinates)		<p>The concept design evaluated the necessary scour protection to prevent excessive erosion, which will compromise the structural integrity of nearby infrastructure, such as Urania Road, or cause excessive sediment movement within the berth pocket. The movement of material within the berth is also of significant concern. The depth of the berth pocket is impacted when material erodes from one area and is deposited elsewhere in the berth pocket. Consequently, maintenance dredging will be required to maintain the required berth pocket minimum navigation depth. A revetment (sloped embankment) will be constructed on the seaward side of the Urania Road. This slope must be protected against wave and propeller action to maintain the structural integrity of the Urania Road. A riprap scour protection system has been considered.</p>
SP2	Along the quay wall (as per the quay wall co-ordinates)		
SP3	Along the quay wall (as per the quay wall co-ordinates)		
SP4	Along the quay wall (as per the quay wall co-ordinates)		
CHF			

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
C1	32° 1' 41.266" E28° 47' 15.217" S		<p>The CHF will be built and operated by the CHF operator, 270 m along the berth by 250 m landward. The total area considered is 6.75 Ha for the CHF.</p> <p>The apron area is approximately 33 m wide and 400 m in length and is the operational area located between the CHF and the quay wall.</p>
C2	32° 1' 36.733" E28° 47' 22.287" S		
C3	32° 1' 45.401" E28° 47' 26.606" S		
C4	32° 1' 49.930" E28° 47' 19.535" S		
Dredging and dredge disposal			
D1	32° 1' 33.252" E28° 47' 21.782" S		<p>The new Berth 605 quay wall will be constructed to -19m PCD to allow for further port expansion at a point in the future. For this project, the berth will be dredged such that a proclaimed depth of -14.5 m PCD is achieved, however the design dredging depth also considers sedimentation and sounding accuracy i.e. 0.6 m below -14.5 m PCD providing a design depth of</p>
D2	32° 1' 27.467" E28° 47' 31.902" S		
D3	32° 1' 39.282" E28° 47' 38.046" S		
D4	32° 1' 42.180" E28° 47' 37.302" S		

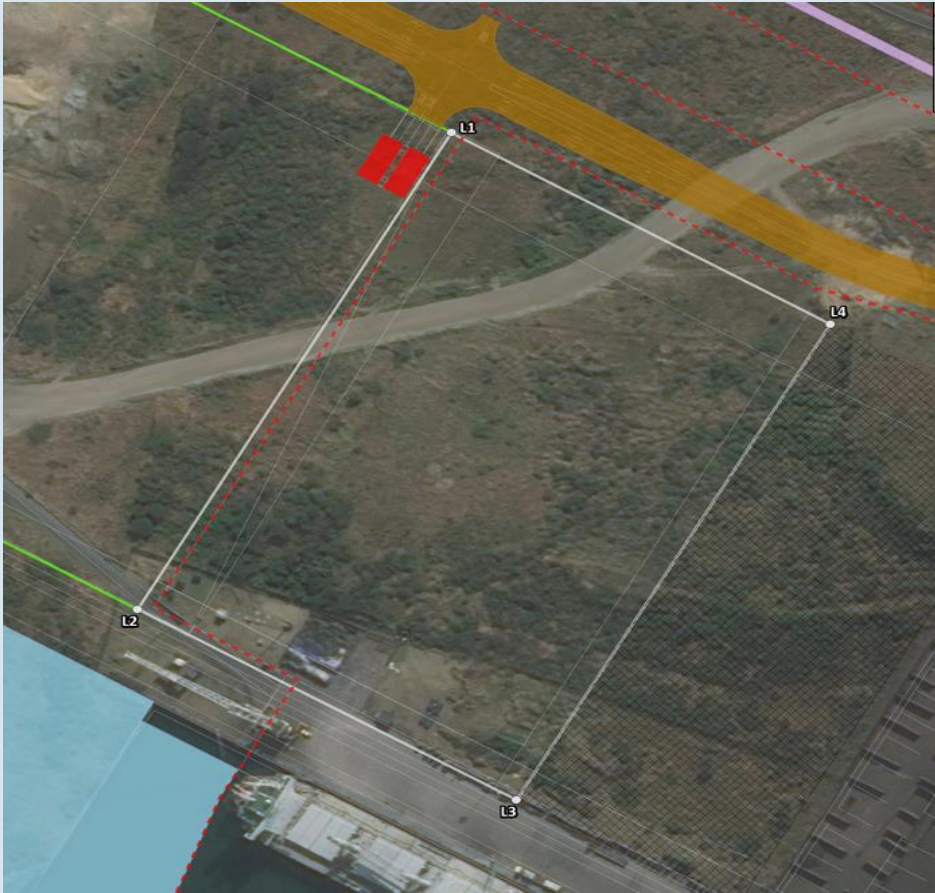
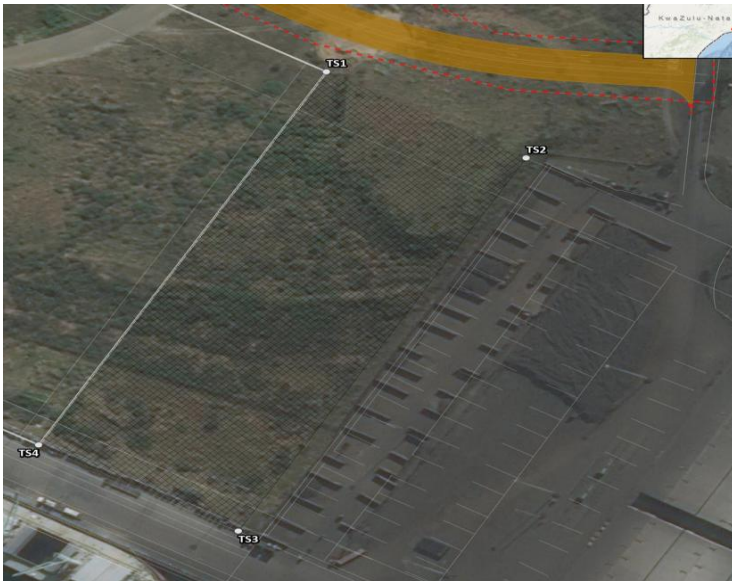
Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
D5	32° 1' 46.901" E28° 47' 28.963" S		<p>-15.1 m PCD. This dredge depth is consistent with the PoRB depths and the requirements of the design vessel. This approach limits the volume of dredge material requiring disposal.</p> <p>An estimated 2 895 500 cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, with a bulking factor, it is estimated that a bulked volume of approximately 4 308 287 cubic metres will be disposed of at the offshore dump site.</p> <p>The concept design has assumed that a suitable licensed and permitted disposal site is available within 10 nautical miles of the entrance to the PoRB. This site will be used for the disposal of the dredged material and any other spoil material as described above. As beneficial use of material remains uncertain, it is likely that most or all the material, i.e., an estimated 4 308 287 cubic metres will need to be disposed of offshore.</p> <p>The existing offshore site will be used for the disposal of dredged material.</p>
New access road			
A1	32° 1' 36.906" E28° 47' 14.559" S		<p>A new shared access road to PoRB and CHF, from Urania Road to Ventura Road. The road will replace the function of the existing unsurfaced road between Urania Road and Ventura Road which traverses the facility footprint.</p> <p>The new road will be an estimated 735 m length with a width of 30 m. It will consist of two (2) lanes each direction and three (3) intersections; at Urania Road, at Ventura Road and one to the CHF.</p>
A2	32° 1' 50.012" E28° 47' 18.553" S		
A3	32° 2' 1.390" E 28° 47' 22.342" S		

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
New railway line and siding			
R1	32° 1' 46.751" E28° 47' 13.364" S		Based on the design throughput and the current requirement of a 50-wagon container train and 2 locomotives, it is proposed that the rail siding will consist of two rail lines that are 370m each in length, each servicing 25 rakes. The existing Mhlatuze Yard will be used for shunting and staging purposes to service the new proposed rail siding.
R2	32° 1' 59.668" E28° 47' 19.994" S		
Stormwater Tie in Point			
Tie in point	32° 1' 40.124" E28° 47' 25.139" S		<p>The minimum size of stormwater pipelines is 600mm diameter, which considers effective maintenance of the stormwater network.</p> <p>With the hydrological analysis complete and design flows computed, the stormwater pipe system has been designed to accommodate a 1 in 5-year storm. The proposed CHF, as well as any future development adjacent to Berth 605 will require major floods to flow overland into the bay.</p> <p>The area therefore has been designed and shaped to accommodate overland flow during a major storm, to prevent water ponding and to control flood damage to any infrastructure.</p> <p>Conventional catchpits, at 50m to 80m spacing, have been shown along the proposed access road. The access road stormwater is then routed in a pipe system to the bay at a slope of 0.5%.</p> <p>The pipeline will be approximately 360 m along the quay line and 400 m on the other side with a 900mm pipe diameter. It will have a velocity of 0.6 m/s for self-cleaning, to prevent sand settling inside the pipe and blocking. There will also be cross drainage at the new rail siding which will be 400 m in length and 600 mm diameter. The existing network discharges into the bay through the existing quay wall.</p>

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives	
Electricity				
Tie in point	32° 1' 43.401" E28° 47' 4.662" S		The preferred alternative is applicable where the required electrical demand is within the available capacity of the current existing 11 kV network. In the instance a new feed will be taken from the existing 11 kV network to provide electrical power to the new CHF and quay wall. However, while there is existing capacity on the current 11 kV network, this is limited and may not be able to provide for the full electrical demands in the future. To protect against restricting future electrical supply constraints, a new 11 kV Switching Station fed from the existing Primary Substation is proposed.	
SS1	32° 1' 37.869" E28° 47' 15.363" S			
SS2	32° 1' 37.596" E28° 47' 15.793" S			
SS3	32° 1' 38.244" E28° 47' 16.104" S			
SS4	32° 1' 38.514" E28° 47' 15.683" S			

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
Sewerage			
Tie in point	32° 1' 41.290" E28° 47' 13.415" S		<p>The existing sewer network has been evaluated to identify areas that require upgrades to accommodate the extension of the sewer network for the new proposed CHF. The sewerage system will allow for wastewater from new toilets, basins, baths and showers. The proposed sewer has been designed to tie into the closest existing pipe network or an existing pump station closest to the proposed CHF. Sewerage inside the CHF has been designed to accommodate for approximately 160 people. The new sewerage pipeline will have a connection point at the northwestern boundary of the CHF. It will be approximately 100 m in length and 160 mm pipe diameter. The preferred alternative involves designing a sump to accommodate the facility's sewer through gravity flow, with pumping from the sump to the existing pumpstation PS20, located north of the facility.</p>
Water			
Tie in points	32° 1' 35.055" E28° 47' 19.204" S 32° 1' 45.765" E28° 47' 27.950" S		<p>The concept design allows for water to be sourced from the municipal supply. There are three municipal feeds into the port, supplied by two separate municipal reservoirs. This provides adequate supply contingency, and therefore, no additional storage has been included in the system. The existing 225mm diameter water main will be extended along with the new quay wall to supply ship water along the new quay. At the end of the new quay wall extension the water main will follow Urania Road to tie into the existing 150mm diameter pipe in the vicinity of the existing gate house. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided which will consist of approximately 500 m of pipework with a diameter of 150 mm. Inside the quay</p>

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
			<p>wall, water will be provided to landing valves for ships and firefighting.</p> <p>Building water - A new 75mm diameter pipe will branch off from the 150mm diameter water pipe to supply a metered connection for the handling facility. Any connections to new buildings will be made from the metered supply point, located on the western side of the site, just south of the Seafarers club. The Container Handling Facility operator will be responsible for the water network within the facility.</p> <p>Ship water - The proposed new water main line will tie into the existing 225mm diameter asbestos cement water pipe, that is in the existing quay of Berth 606, located on the eastern side of the new Berth 605. The new pipe will be 200 mm diameter, within the new quay wall, with 75 mm off takes to the landing valves. The 200mm diameter pipe reduce in size to a 160 mm diameter, where the pipe exits the new quay wall and is parallel to Urania Road and will tie into the existing 150mm diameter asbestos cement pipe north of the existing security access to complete the ring.</p> <p>Fire water - The fire water in the PoRB is off the water reticulation network. Allowance for fire-hydrants will be made where there isn't a dedicated firefighting system. This allowance is for normal hydrants outside the container handling facility boundary along the lengths of pipelines that will be installed to service the new quay wall extension.</p>
Communications	32° 1' 36.679" E28° 47' 15.364" S		<p>A tie in point for the fibre option cable will be included as part of the project.</p>

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
Potential laydown area			
L1	32° 1' 49.930" E28° 47' 19.535" S		An approximate area of 4.2 Ha, 220 m in length and 170 m wide to be used as a potential lay down area for the project.
L2	32° 1' 45.401" E28° 47' 26.606" S		
L3	32° 1' 50.981" E28° 47' 29.377" S		
L4	32° 1' 55.514" E28° 47' 22.318" S		
Temporary Stockpile Area			
TS1	32° 1' 55.514" E28° 47' 22.318" S		<p>Two temporary stockpile areas are proposed. The first is an area of approximately 2.4 Ha, 250 m in length and 100 m wide. The area is located SE of the CHF (adjacent image).</p> <p>The second area is split into two areas across the Harbour Arterial Road. These areas cover an area of approximately 6 Ha (image below).</p> <p>The infilling of approximately 6 Ha of the basin as indicated in purple in the last image below, is also being considered for stockpiling (this infilled area also forms part of the basin to be eventually dredged).</p>
TS2	32° 1' 58.723" E28° 47' 23.917" S		
TS3	32° 1' 54.190" E28° 47' 30.976" S		
TS4	32° 1' 50.981" E28° 47' 29.377" S		
TS5	32° 1' 29.166" E28° 47' 20.007" S		
TS6	32° 1' 23.575" E28° 47' 28.710" S		
TS7	32° 1' 26.780" E28° 47' 30.317" S		
TS8	32° 1' 32.374" E28° 47' 21.607" S		
TS9	32° 1' 33.337" E28° 47' 22.086" S		
TS10	32° 1' 27.747" E28° 47' 30.790" S		

Point	Co-ordinates	Imagery	Detailed Description of the preferred alternatives
TS11	32° 1' 30.951" E28° 47' 32.396" S	 	
TS12	32° 1' 36.546" E28° 47' 23.686" S		

2.2 SITE STATUS

This section is supplemented with information from the *Port of Richards Bay: Corporate brochure (TNPA)*, *Historic Imagery (Google Earth)* and *Vegetation and Wetland delineation: TNPA Capacity Expansion Option 3A Ecological (Cruz, 2014)*

The PoRB and the adjacent Sanctuary was originally a large, shallow, estuarine embayment estimated to be approximately 3000 ha in size. Extensive reed and papyrus swamps as well as freshwater swamp forests surrounded the original estuary played an important role in filtering water that eventually reached the estuary.

At present, there are limited habitats within the PoRB which have remained unaffected by development activities since development of the port in the 1970s. Many of the free ecosystem services and ecological functioning provided by the natural ecosystems in and around the harbour's swamps and estuary have been lost.

Historical images of the project site for the Berth 605 project components aligns with the above description as cited in Cruz (2014). Historical aerial imagery of the Berth 605 project are provided in **Table 2-3** commencing in 1975 when the site was extensively changed during early sand winning and land reclamation at the time that the port was first constructed. Areas disturbed, during time periods that aerial imagery is available, are indicated in Table 2-3 **Figure 2-4** and a consolidated view showing the combined footprint of disturbance across the site is provided (**Figure 2-5**). Current site photographs are provided in

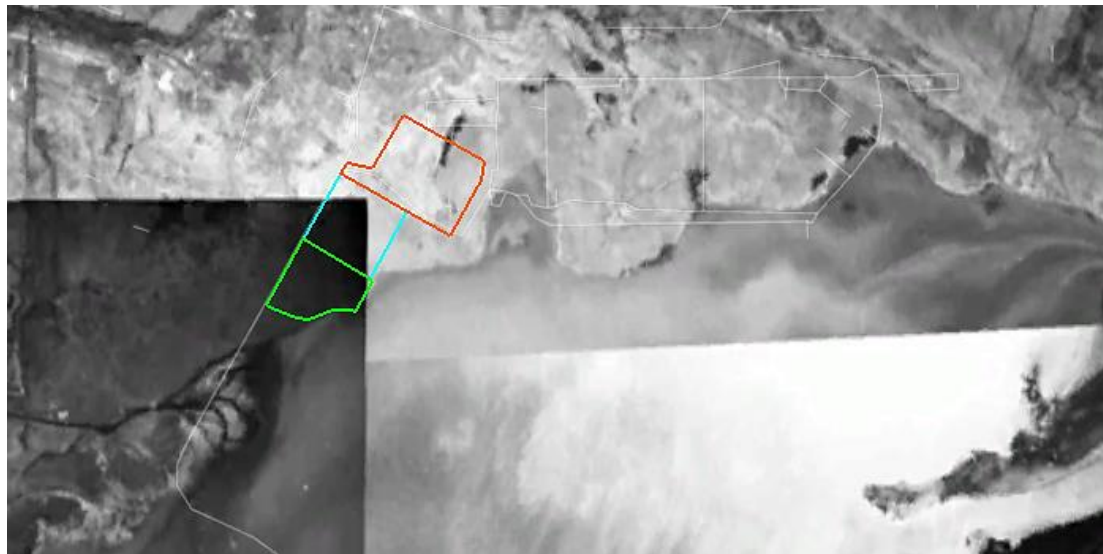
Table 2-4.

Based on the historical imagery, it can be deduced that the tidal pool in the project footprint was artificially created, linked originally to the development of the 600 Berth Basin but subsequent modifications occurred when the area was used as a site for the construction of caissons for the development of Berth 306 at the Richards Bay Coal Terminal. After the completion of the last of these projects (construction of caissons for the development of Berth 306), a small depression remained landside (NE) of the port. The depression was connected to the port waterbody by a pipe to drain the site, but which allowed tidal flow of water into the pit, and, consequently, the eventual creation of estuarine habitat and ecological function.

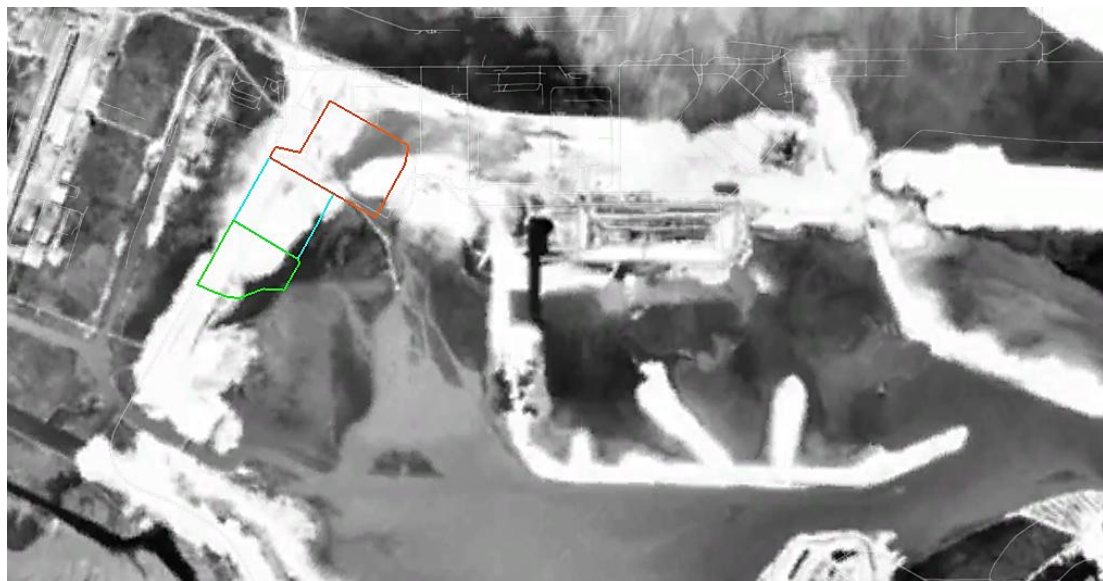
Over time marine and terrestrial fauna recolonised the pool and surrounding habitat. Crabs, burrowing prawns, swimming prawns, and fish have established populations in the pool, while larger fish appear to make use of the pool for feeding on the high tide. Birds, snakes, chameleons and frogs are abundant in the surrounding habitat. Mangroves (three species) have established around the pool. There was no active intervention here in terms of vegetation establishment, hence vegetation establishment has occurred naturally. The high density and diversity of flora and fauna suggest that it supports a rich biodiversity. Thus, given the right conditions, connectivity with the main embayment and tidal influence in this case, artificially created habitats can develop rich fauna and flora.

Notwithstanding the ecological value that has subsequently developed within portions of the project area, historical aerial imagery demonstrates that the site has been significantly transformed through previous port development activities, including dredging, excavation, fill placement, stockpiling and construction associated with the development of the 600 Series Berths and related infrastructure. The current ecological characteristics of the site therefore represent secondary ecological succession and habitat re-establishment within a historically disturbed footprint rather than an intact and undisturbed natural system.

Table 2-3 - Historical aerial imagery of the proposed site



1960 The project and compensation area footprint in relation to the original Umhlatuze Estuary prior to port development. Note the original position of the Umhlatuze River entering the estuary. No woody vegetation present in the project footprint



1975 The project and compensation areas in relation to initial sand backfill and stabilisation as part of early port development earthworks. Note the redirected river mouth south of Harbour road and the development of a sand barrier north of which the initial Port basin was deepened.



1984 Grass re-establishment evident on disturbed areas within the project footprint. Note the original estuary edge to the south of the compensation area. No woody vegetation present. The original sand barrier was the precursor to the current sand spit and still connected to land



1997 Extensive disturbance associated with the 600 series berth excavation. Note the land reclamation using excavated materials to the south of the berth basin. Similarly, note the mangrove cut line and that the sand barrier has been cut off from land by dredging of the 600 series berth basin



2004 Note the extent to which excavated materials from the 600 series berth basin have settled / sloughed into the mangroves. Note also the extent to which disturbance has pushed into the compensation area



2006 Reshaping in the Berth 605 basin to create what has become the mangrove tidal pool. Note the commencement of natural establishment of woody vegetation in the compensation area and on the adjacent eastern rock terrace. Note the limited vegetation development on material sloughed into the mangrove zone



2015 Compensation area and berth basin (green and blue) show signs of recovery while there is ongoing materials storage and handling within the container footprint. Note start of mangrove development within the tidal pool and woody vegetation developing within compensation area



2026 Nominal disturbance at the site other than road traffic passing through the container facility footprint. Berth basin and compensation areas progressing towards coastal forest. Sand spit continues to erode

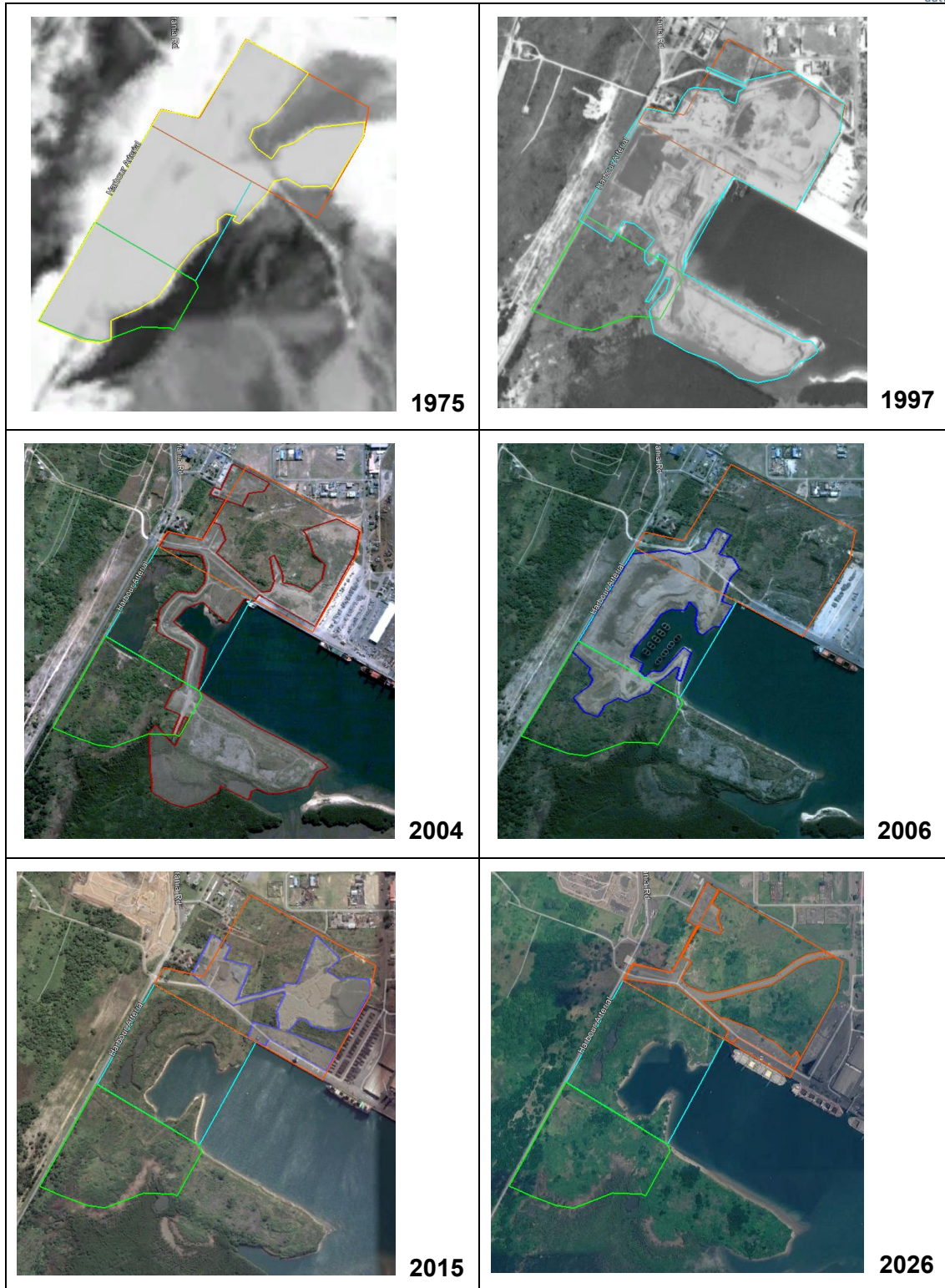


Figure 2-4 - The level of disturbance visible within the project and compensation area over time

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Figure 2-5 - The combined footprint of disturbance within the proposed project and compensation areas from 1975 (when Port construction commenced) to date

Table 2-4 – Site Photographs

Landside vegetation of the Berth 605 CHF Site



Image of the site taken from the existing 600 berth series

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Bay area adjacent to the existing 600 series quay wall

2.3 ALTERNATIVES

As described in Section 2.2 above and indicated in **Figure 2-4** and **Figure 2-5**, the proposed development site has been extensively disturbed. This is to be expected given that the site under discussion forms part of the long-term planned expansion of the 600 series berth sequence. In fact, the entire development footprint, 100% of it, has been subject to disturbance in the period from initial Port development to date. It is only a portion of the proposed compensation area footprint that has not been subject to prior disturbance.

In the section below alternatives, both technical and location-based are described. Location based alternatives do take into consideration the nature of the site, and do recognise the biodiversity value inherent in parts of the site, notwithstanding the history of disturbance at the site.

2.3.1 PREFERRED DESIGN THROUGHPUT AND LOCATION OF THE CHF

The design capacity of the terminal area for which external service supply is required is based on the 275 000 TEU capacity per year as requested by TNPA.

Figure 2-6 indicates the location of the CHF within the project area and **Table 2-5** summarises the import, export and trans-shipment split assumed for the future design capacity of 275 000 TEUs along with the assumed dwell time for each type of container.

This preferred location is based on:

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- An agreement with TNPA and the operator (Grindrod Eyamakhosi) regarding the preferred CHF of 270 m along the berth by 250 m landward. The total area considered is 6.75 Ha for the CHF but excludes the apron area.
- The area is located 33 m from the cope line to allow for an apron area considering mobile harbour cranes, as are envisaged for the 275 000 TEU operations.
- The area is located directly adjacent to the seafarer's property fence line.

Based on the above, the location as presented in **Figure 2-6** is the preferred location and therefore no alternatives for the location and footprint of the CHF have been considered. The operator will be responsible for submitting the required applications and obtaining the permits and authorisations required for the operation of the CHF. The development of the apron area forms part of the Berth 605 project.

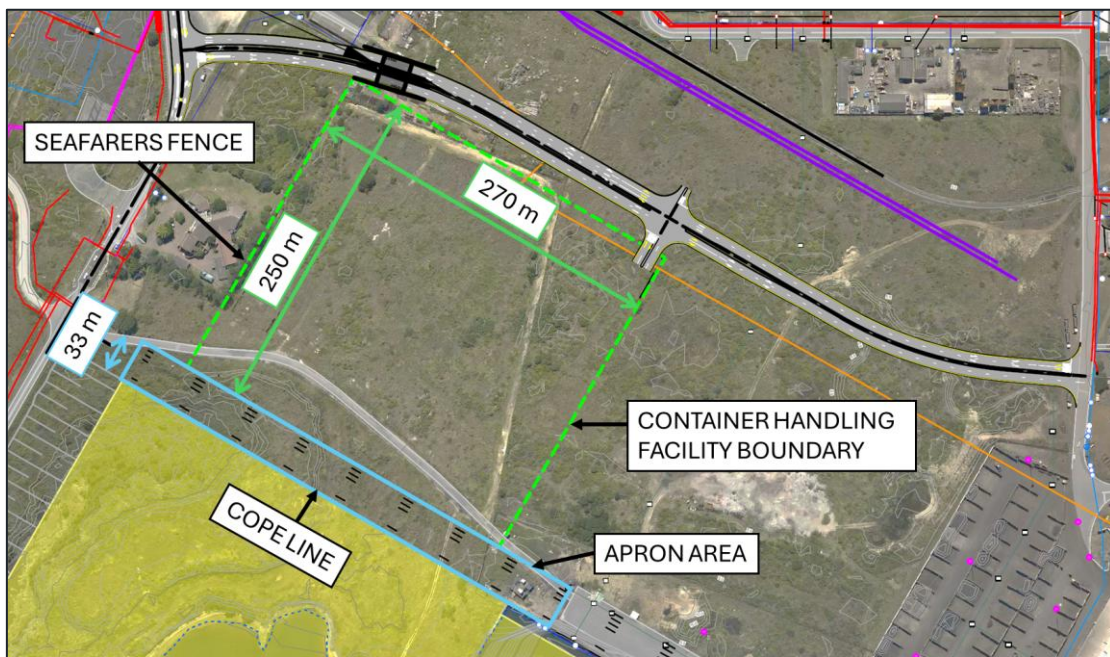


Figure 2-6 – Preferred location of the CHF within the project area

Table 2-5 – Container Terminal Throughput Assumptions

Container Type	% of Total Throughput	Dwell Time (days)
Imports – Full	17.79%	3
Imports – Empty	18.44%	3
Exports – Full	35.03%	5
Exports – Empty	11.46%	5
Transshipment – Full	8.04%	10

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Transshipment - Empty	9.24%	10
TOTAL	100%	

2.3.2 QUAY WALL DESIGN

The new proposed Berth 605 quay wall will extend from the existing Berth 606 quay wall, maintaining the same cope line alignment. At the other end of Berth 605, the new quay wall must stop short of Urania Road (**Figure 2-7**).

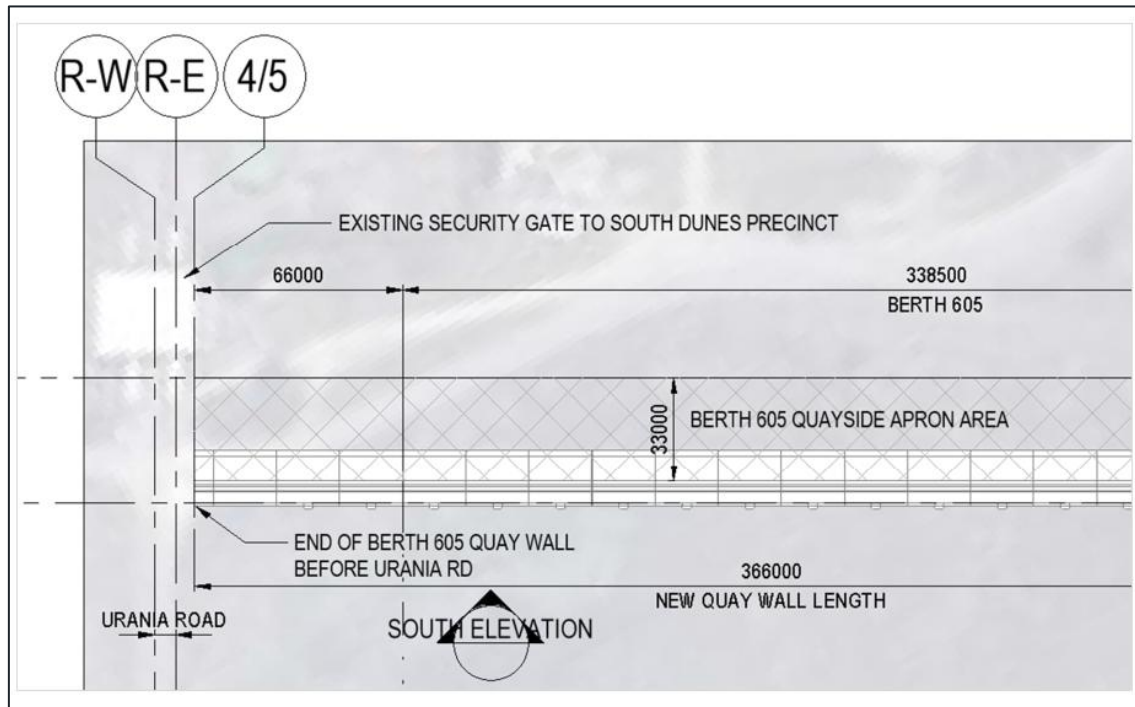


Figure 2-7 – Plan view of the end of Berth 605 at Urania Road

The existing Berth 600 series quay walls are all formed from gravity structures. The geotechnical conditions and borehole information for the expansion of the 600 series Berths 608, 607 and 606 indicate that there is cretaceous rock at the quay wall foundation level. This is deemed to have sufficient bearing capacity for the foundations of the gravity quay wall structure.

The recent Geotechnical Investigation (Mukuno, 2025) confirmed that the site is underlain by Harbour beds (Estuarine deposits) soils and siltstone bedrock. The subsoils typically comprise of silty coarse sand which are interbedded with silty clay and sandy silt. The initial investigation concluded that based on the work fieldwork results, no additional geotechnical investigation is required for the proposed development and the site is suitable for the development of the Berth 605, associated quay wall and infrastructure.

The new quay wall will be required to interface with the existing quay wall (**Figure 2-8**), however the new quay wall will be constructed with foundations which are 5 m deeper

than the existing quay walls to allow for future dredging to -19m PCD. This provision in relation to quay wall foundation depth is to allow for the possibility of future expansion in container handling volumes, which would require larger vessels and associated deeper Berth 605 water depths should it be required. Importantly, notwithstanding that this provision for expansion has been made in the proposed design brief, the current scope evaluates dredging to -15.1 m PCD.

However, for this project, the berth will be dredged such that a proclaimed depth of -14.5m PCD achieved, aligning to the current Berth 600 series basin and -15.1 m PCD including the consideration of sedimentation.

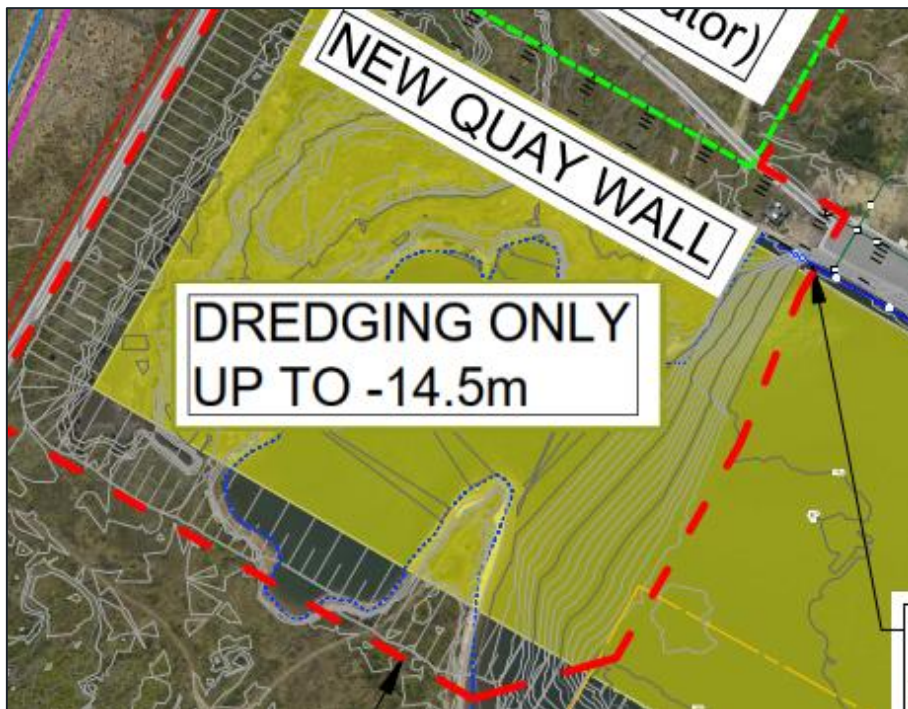


Figure 2-8 – Location of the new quay wall and dredging area

2.3.2.1 Design Alternatives for the new Quay Wall

The quay wall is the structure against which the vessel is moored for loading or unloading. The quay wall extends approximately 366 m from the end of the existing Berth 606 to within approximately 10m of the existing South Dunes Road.

Two alternative quay wall designs have been investigated and have been presented below.

Alternative 1: Gravity Quay Wall

The new quay wall is to be either a gravity type structure from mass concrete and backfilled with sand and rock or a secant (augered) pile wall. The in-situ capping beam will include two service tunnels to coordinate the required services to the quay side.

As indicated in **Figure 2-9** below, this quay wall consists of a solid in-situ mass concrete structure which is the preferred alternative. It has a smaller footprint than the other options due to it having a denser construction, but this increases the bearing pressure under the structure. It uses more concrete than all the other options.

The construction requires excavation to the foundation level and then the placement of formwork and the casting of the in-situ mass concrete in layers to form the final structural shape.

The volume of concrete required for 366 m of quay wall is approximately 81 810 m³ and the volume of excavation for the length of the quay wall is approximately 350 000 m³ including shoring or 550 000 m³ with battered slopes of 1:1.

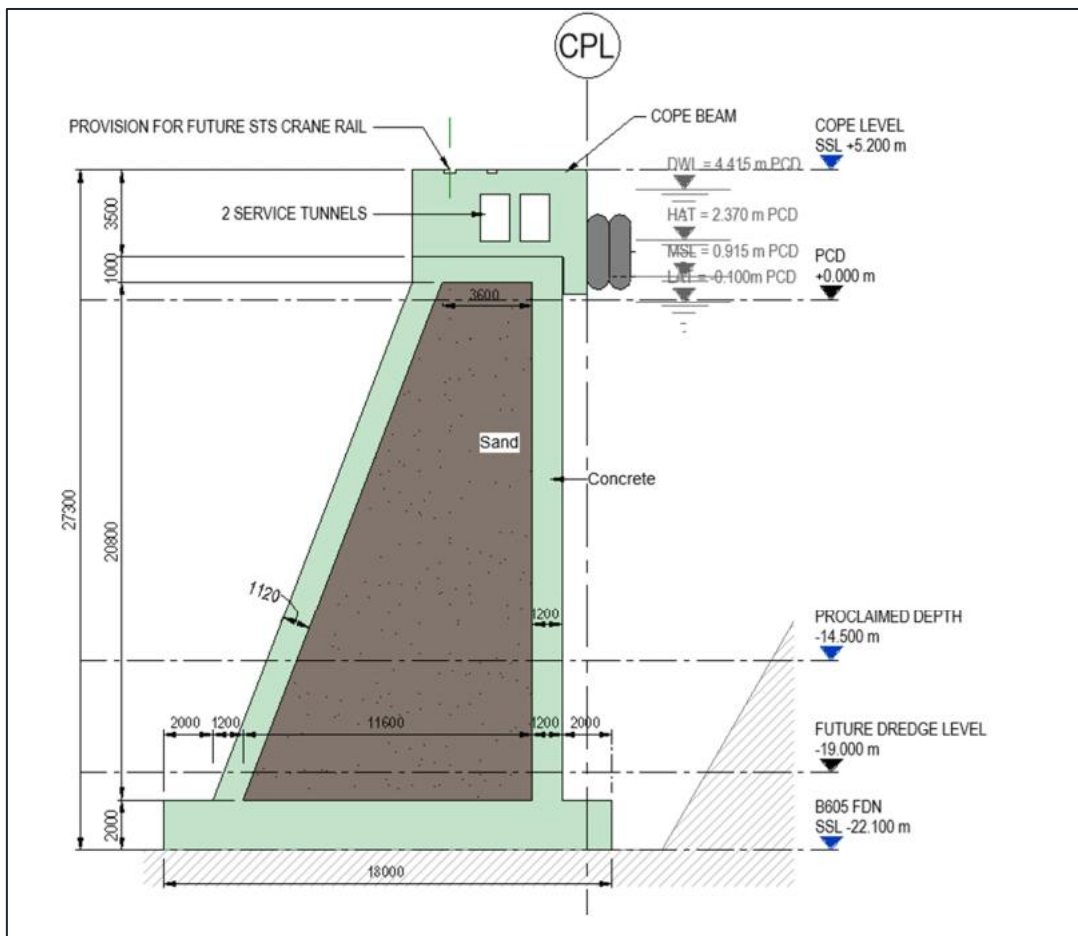


Figure 2-9 - Actual cross section through the concept gravity quay wall

Alternative 2: Secant Piles Quay Wall

Figure 2-10 below indicates the secant piles quay wall which is an alternative to the preferred alternative as indicated in **Figure 2-9**. The secant pile wall consists of a series of hard and soft piles which interlink to form a solid concrete wall. The soft piles have no reinforcement and have a weaker concrete, they are installed first, before hard piles are

drilled to join two neighbouring piles and remove a secant for each. The hard pile is larger and has reinforcement. A second line of piles supports the back of the cope beam and then a third row of piles supports a deadman anchor that can be used in the future to support a landside crane rail beam.

A deadman anchor is one type of retaining wall tieback that consists of a substantial concrete block and one or more tie rods. Typically, the concrete block sits far below the ground and at least 3 metres behind the retaining wall.

This form of construction is possible with South African contractors and locally available equipment and will limit the requirement for a large deep dewatered excavation which is required for the preferred alternative indicated in **Figure 2-9**.

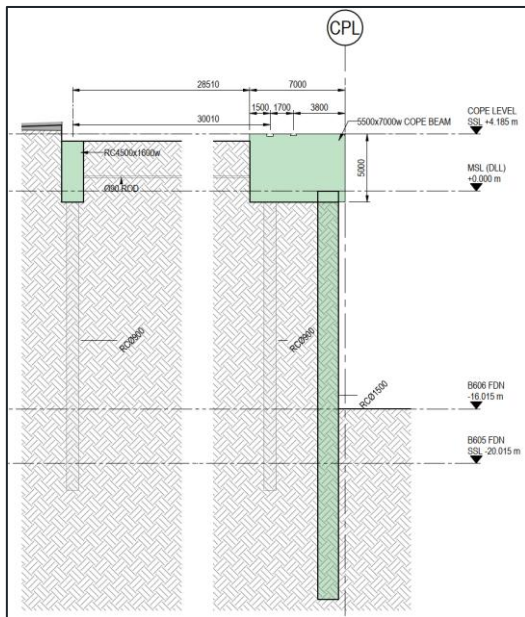


Figure 2-10 - Secant piles quay wall

Following a detailed engineering investigation between the above-mentioned alternatives for the quay wall design, the gravity quay wall of mass concrete and backfill is the preferred alternative due to the following:

- It is the least expensive option based on high level cost estimates.
- It requires manual labour therefore it can provide local employment opportunities during the construction phase.
- Less concrete will be required.

The environmental considerations for both alternatives are expected to be similar therefore only the preferred alternative has been investigated in the EIA phase.

2.3.2.2 Quay Wall Construction Methods and Sequence

The proposed construction sequence for the construction of the new Berth 605 quay wall is as below:

- The site is to be cleaned and cleared to facilitate the excavation and dewatering for the construction of the quay wall.
- Excavation to start at the end adjacent to the existing Berth 606.
- Excavate and shore the excavation sides through the loose sands, silts and clay material.
- Dewatering will be required. It is recommended that the excavation is done based on the completion of a 20 m long section of the quay wall before progressing on to the next 20 m long section. This is to reduce the dewatering effort and to maintain a manageable site. The contractor can propose longer excavation sections for review and approval of the Supervisor.
- There is a rock level that varies in depth from -7m CPD to -14m CPD generally dipping from East to West.
- The contractor will shore the work site to maintain safe access for plant and material and staff.
- The contractor must include monitoring (hourly automated total station reading of control points on Berth 606). Include digital tilt meters.
- As the excavation progresses to the foundation of Berth 606, the contractor must proceed with an underpinning of the exposed edge of Berth 606 in a hit and miss construction. That is that in a preplanned and agreed sequence of construction a block no wider than 2 m will be excavated from under the existing Berth 606 foundation and backfilled with mass concrete. The next section will be excavated (not adjacent to the previous) and the process repeated until the excavation has progressed to the final Berth 605 foundation depth with the existing Berth 606 now supported on the exposed edge by the underpinning.
- Clean and prepare the rock for the foundation. Place blinding concrete.
- Cast the reinforced concrete base for the new Berth 605 quay wall.
- Cast the first 2m high wall sections of the quay wall and back fill with suitable graded fill material to achieve the specified bulk density.
- Repeat the process of casting 2 m high walls then back fill until the top of the gravity structure is reached. Prepare shutters for the cope beam and fix reinforcement and formwork for the services tunnels and access ducts. Cast the cope beam.
- Repeat for the next 20 m long quay wall section. After the next quay wall section is complete, install filter sock (A6 BIDIM tube filled with gravel) to seal between adjacent quay walls (to prevent fine material passing through the quay wall).
- Backfill behind the quay wall (Land side) with graded core rock backfill to specification.
- Backfill in front of the quay wall (seaside) with selected rock to the underside of the future scour rock protection.
- Complete the quay wall.
- Install bollards water pipes to landing valves and other service ducts etc.
- Install fenders after dredging.

2.3.2.3 Scour Protection

The scour protection requirements are estimated for the three distinct scenarios, each defined by different drivers of scour action, such as wave and propeller action, as well as the orientation of the protection system. The distinct scenarios are defined as follows:

- Scour protection on the flat segment of the berth pocket - in this region, the main causes of scour are associated with the design vessel. These include the water jet from the main propulsion system impacting the seabed below the vessel, and the water jet interacting with the vertical quay structure.
- Scour protection for the sloped berth pocket due to propeller action - in this region, the primary driver of scour action is the main propulsion system, which directs a water jet onto the sloped seabed directly behind the vessel in the berth pocket.
- Scour protection for the basin slope due to wave action - in this region, the primary driver of scour is the interaction of waves with the basin slope. This area lies beyond the extents of the berth pocket, so it is not expected to be impacted by the propulsion system of the design vessel. Scour protection by wave action focuses on the stability of the armour stone protection required to prevent scour of the slope seaward of the Urania Road, and ultimately to prevent the road being undermined.

For the scour design, it is assumed that all sediment within the basin is erodible, representing a worst-case scenario. However, TNPA acknowledges the presence of underlying rock layers in the area at depths ranging from -5 m CD to -17 m CD. These layers might impact the final design, but this will only be considered during the detailed design phase of the scour protection system.

A revetment (sloped embankment) will be constructed on the seaward side of the Urania Road. This slope must be protected against wave and propeller action to maintain the structural integrity of the Urania Road. A riprap scour protection system is proposed.

2.3.3 DREDGING/EXCAVATION ALTERNATIVES

2.3.3.1 Preferred Dredging Depth

The new Berth 605 quay wall will be constructed to -19m CD to allow for further port expansion at a point in the future. However, the design/proclaimed depth of -14.5 m PCD requires an additional 0.6 m to a depth of -15.1 m PCD to accommodate sedimentation and bathymetry sounding accuracy. This dredge depth is consistent with the PoRB depths and the requirements of the design vessel. This approach limits the volume of dredge material requiring disposal.

Dredging to -14.5 m PCD and restricting the port basin to south of Urania Road serves to restrict the vessel size. This limits the dredging volumes considerably, favouring this alternative. The selected dredging depth therefore represents the lowest practicable depth that meets navigational and operational requirements while limiting the volume of dredged material requiring disposal and reducing the overall environmental footprint of the project.

2.3.3.2 Dredging for future expansion

The new quay wall will be required to interface with the existing quay wall. The new quay wall will however be founded 5 m deeper to allow for future dredging of the basin to -19 m PCD. This deeper key wall foundation depth will enable the quay wall to be used if the basin is deepened to -19 m PCD in future to accommodate larger vessels.

At a point in future, there would be an intent to dredge to -19 m PCD hence the berth pocket and quay wall founded to this level. Dredging to -19 m PCD (and ensuring adequate basin and berth pocket area) provides a future-ready port, as it would accommodate the Triple E (18 000 TEU) Vessel.

The deeper berth and channel would not be practical at this stage as the current berth length is too short for the longer and deeper vessels, however it is considered for the larger vessels in future.

2.3.3.3 Summary of the basin geometry to be dredged

The basin geometry to be dredged can be summarised as follows:

- The design/proclaimed depth of -14.5 m PCD requires an additional 0.6 m to a depth of -15.1 m PCD to accommodate sedimentation and bathymetry sounding accuracy.
- The basin width (at -14.5 PCD proclaimed depth) of 305 m was found to be suitable for navigation.
- The basin side slope of 1v:3h was determined, to ensure stability.
- The basin length at -14.5 m PCD depth of 338 m was found to be sufficient, accepting overlap of the design vessel into the Berth 606 quay space, as was confirmed by the mooring analysis study.

2.3.3.4 Quantity of material to be dredged

The dredge material quantities are provided in **Table 2-6**. The quantity of material excavated in the dry will comprise approximately 386 540 m³ of *in-situ* excavation material (comprising 350 000 m³ of *in-situ* material excavated for the quay wall construction and 36 500 m³ of *in situ* material from road excavations). The Dredging and Dredge Disposal Study (WSP, 2025) considered a bulking factor of 1.3, once excavated and placed in the former caisson construction pond, these volumes will increase to approximately 502 500 m³.

The material to be dredged from Berth 605 berths and basin only, will comprise approximately 2 295 000 m³ of *in-situ* material (comprising sediments and rock). If an allowance is made for a potential dredging accuracy of 0.4 m for a Cutter Suction Dredger (CSD), the volumes of material to be dredged from the Berth 605 berth and basin area only increases to 2 393 000 m³ of *in-situ* material. An assumed larger dredge volume that includes an allowance for potential over-dredging associated with a vertical dredging accuracy of 0.4 m.

The CSD dredging operations thus will need to dredge 2 393 000 m³ of *in-situ* material from the proposed new basin area and a further 502 500 m³ of bulked material from the

former caisson construction pond. The total volume to be dredge by the CSD thus will be 2 895 000 m³, comprising 2 295 000 m³ of *in-situ* material to be dredged from the berth area and basin (~83% of the material to be dredged) and the remaining 502 000 m³ of material comprising the bulked material that has been placed in the former caisson construction pond (~17% of the material to be dredged).

Given that the sediment loading rates in the dredge and dredge spoil disposal modelling study are based on the dry density of:

- the *in-situ* sediments being dredged by the CSD (lower for the sediments in the former caisson construction pond).
- the sediments in the hopper.
- the sediments once placed on the offshore dredge spoil disposal site (after a period of consolidation).

The volume of material placed on the dredge spoil disposal site has been calculated used a bulking factor of 1.55 on the total *in-situ* volume of material to be dredged. Given the nature of the material being dredged, a bulking factor of 1.55 is deemed representative of material placed on the dredge spoil disposal site.

Table 2-6 – Dredging Volumes

Source of Material	<i>In-situ</i> volumes (m ³)	Volumes to be dredged by the CSD (m ³)	Volume of placed material on the offshore site* ³ (m ³)
Road Excavation	36 540	47 500* ¹	56 637
Quay wall excavations	350 000	455 000* ¹	542 500
Total volume of material excavated in the dry	386 540	502 500* ¹	599 137
Berth and Basin Only	2 295 000	2 295 000* ²	3 557 250
Berth and Basin Only (including over-dredging)	2 393 000	2 393 000* ²	3 709 150
Total volumes being dredged by the CSD	2 779 540	2 895 500* ²	4 308 287

*¹ These are the bulked volumes (assumed initial bulking factor of 1.3) to be re-dredged from the former caisson construction pond.

*² These are the *in-situ* volumes to be dredged from berths and adjacent basin.

*³ These are the (bulk) material volumes upon placement on the dredge spoil disposal site. A bulking factor of 1.55 has been assumed for the material placed on the dredge spoil disposal site based on the expected transformation of the rock material by the CSD and an assumed approximate one-month period of consolidation. Note that in the Concept Design Report (WSP, 2024c) a bulking factor of 1.3

was assumed, subject to confirmation by the project-specific geotechnical studies. This is true for the estimated bulking factor of 1.55 used here.

2.3.3.5 Composition of Material to be Dredged

Available geotechnical information comprises boreholes along the quay line and a further three (3) boreholes west and south of the dredging area. From this limited information and drawing on prior experience of silt stone decomposition on dredging, the composition of *in-situ* material to be dredged assumed for this study is reported in **Table 2-7** below.

Table 2-7 – Composition of *in-situ* dredge material.

Material type	Basin Excavation (<i>in-situ</i> volume) (m ³)	Quay wall and road excavation (<i>in-situ</i> volume) (m ³)	Grain size (D50) of main material type	Percentage of fines in the material type	Total volumes (m ³)
Sand	541 982	111 999 ^{*1}	350 µm	4%	653 981
Silty Clay	1 024 259	57 798	< 63 µm	100%	1 082 057
Silty/clayey sand	506 759	64 220	280 µm	20%	570 979
Siltstone	320 000	152 523	6 mm ^{*2}	20% ^{*2}	472 523
Total	2 393 000	386 540	-	-	2 779 540

^{*1} This includes the road excavation material, that based on limited data, here is assumed to comprise sand only.

^{*2} The siltstone when dredged by the CSD is assumed to be transformed into 80% granular material (6mm) and 20% fines (<63µm).

2.3.3.6 Method for dredging

A proclaimed depth of -14.5m PCD needs to be maintained to accommodate the design vessel. Added to this depth is an allowance for sedimentation (between maintenance dredging campaigns) and for bathymetry sounding accuracy, resulting in a required depth of -15.1 m PCD. To achieve this depth, the basin area will be excavated by means of dredging, except for the topsoil (an assumed 300 mm of surface material and associated vegetation) that is to be removed and carted away separately. This comprises an approximate 47 000 m³ of material assumed to comprise mostly sands.

The excavation of road material and a quay wall excavation will occur in the dry prior to the commencement of the main basin dredging activities. Ultimately, this former construction caisson pond area will become part of the future basin opposite Berth 605.

The dredging activity for the project will comprise the excavation of the basin will be placed in the former construction caisson pond temporarily. The dredging will take place using a Cutter Suction Dredger (CSD) with material loaded into barges and transported

to the existing registered offshore disposal site that is presently is used for the disposal of spoil from ongoing maintenance dredging activities.

2.3.4 ALTERNATIVES FOR DREDGED AND EXCAVATED MATERIAL DISPOSAL

2.3.4.1 Preferred alternative for disposal of dredged material

An estimated 2 895 500² cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, with a bulking factor, it is estimated that a bulked volume of approximately 4 308 287 cubic metres will be disposed of at the offshore dump site.

A suitable licensed and permitted disposal site is available within 10 nautical miles of the entrance to the PoRB. This site will be used for the disposal of the dredged material and any other spoil material as described above. As beneficial use of material remains uncertain, it is likely that most or all the material, i.e., an estimated 4 308 287 cubic metres will need to be disposed of offshore.

The existing offshore site will be used for the disposal of dredged material. The offshore disposal site proposed for the disposal of dredged material is an existing authorised disposal area that is currently utilised for maintenance dredging activities associated with the Port of Richards Bay. The suitability of the disposal site and the associated disposal methodology were assessed through specialist investigations undertaken for the proposed Berth 605 development.

2.3.4.2 Alternatives for the disposal/beneficial use of dredged material

An assessment of beneficial uses was undertaken, specifically for the Berth 605 considered the potentially viable following options as an alternative to offshore disposal:

- **Use as infill or construction material:** The use of siltstone rock was considered for beneficial use. However, when dredged using a CSD, the material transforms to a condition which is not useful, i.e. a gravel (~6 mm grain size) with 20% fine material. This material is therefore not of use, for example, as for revetment rock in the port. Furthermore, should it be possible to effectively isolate the sands from the fines material, the opportunity for use as construction fill is modest compared to the volume of material to be dredged for the Berth 605 project.
- **Beach nourishment:** The sand component of the material to be dredged can be considered for nourishment discharge onto the beach. Approximately 654 000 m³ of sand (< 23% of the material to be dredged) exists with a low percentage of fines and

² this is most accurate volumes and some variation in volumes referenced from studies reflects the evolution of the planning and design process

a grain size that would be suitable for beach nourishment (silty/clayey sand is unsuitable for beach nourishment). However, most of this material is situated above existing water-level in the port and the proposed method of dredging is such that this suitable sand gets mixed with unsuitable material. Specifically, the cutter suction dredger will be working below water-level (where layers of material largely are not suitable) and will undercut the slope (sometimes with the aid of water jets) causing the suitable sand to collapse/avalanche into the basin where it will mix with the unsuitable material. The resulting material discharged into the hopper barges will then be sub-optimal for beach placement as it will contain a relatively high percentage of fines. This would result in significant plumes of fine sediment at the beach discharge, which is visually and ecologically undesirable. Similarly, coarse material (6 mm) generated from dredging of rock by the CSD, if it could be isolated, also is not ideal for placement on the beaches to the north of the port.

A further consideration is the means of transportation of material to the beach. The hopper barges discharge material by means of a split hull and are not geared for hooking up to the beach reclamation pipe and pumping material to the northern beach.

If this sand were to be used for beach nourishment, carting by truck and/or significant adaptations to equipment could be considered. However, noting that the quantity available is close to the annual sand requirement to the northern beach, it would be more economical to source the material from the sand trap and or the nearshore region of the southern beach.

Although the material to be dredge contains more sands (38%) than the Port of Richards Bay Expansion project (4%), it contains a similar quantity of fines as well as coarse material both of which are problematic for placement on the northern beaches.

Consequently, offshore disposal of the dredge material from the capital dredging for the Berth 605 project is considered the most viable dredge material disposal option for the capital dredging undertaken for the Berth 605 development project and therefore the option assessed in the modelling study.

While beneficial use opportunities were investigated, the available material characteristics, operational constraints and logistical considerations indicate that offshore disposal remains the most practical and environmentally defensible alternative for the proposed capital dredging campaign.

2.3.4.3 Preferred alternative for the disposal of excavated materials

The disposal of excavated material from elsewhere within the construction footprint (excluding the berth basin) includes road, rail, construction laydown area excavation and earth wall concrete and steel components (64 900m³) will be disposed of at a registered land-based disposal site.

The material excavated from the compensation area (the new tidal pool area and scalloped shoreline as described in Section 9.3 of this report) is approximately 30 000 m³ and will be used as landform shaping and backfill within the compensation site. The

excess material will be placed into the caisson pond (if timing allows) or disposed of at a registered land-based disposal site.

2.3.5 ALTERNATIVES FOR TEMPORARY STOCKPILE STORAGE AREAS

Figure 2-11 indicates the temporary storage areas for materials removed from land-based excavations, these areas have been further investigated in the EIA process (areas indicated in orange and grey in the figure below).

Other areas for temporary stockpiling were considered but were eliminated due to the following:

- Availability of space at the port to store large volumes of material.
- Proximity of the stockpile areas to the Berth 605 site.
- Avoidance of double handling of the material that will be required for sites further away.

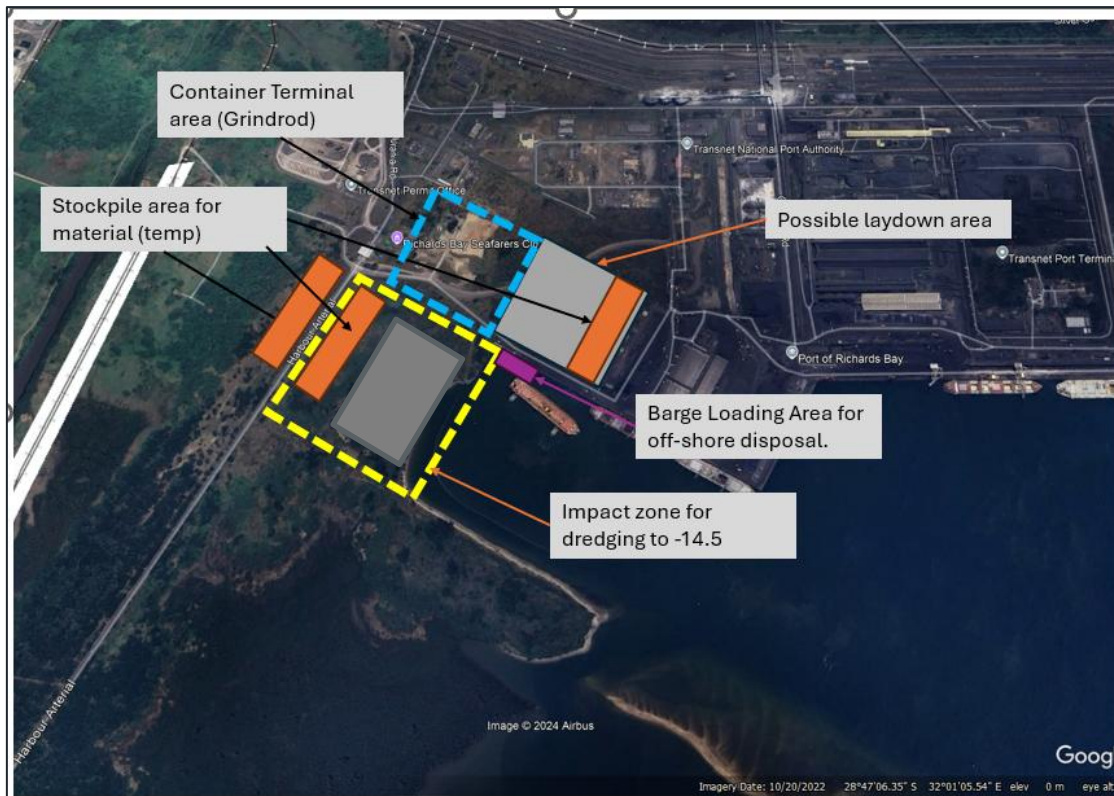


Figure 2-11 – Temporary stockpile storage areas

2.3.6 UTILITIES

2.3.6.1 Electricity

Berth 605 will derive its electricity supply from the Neptune Primary Substation which is also known as the Harbour West Substation (**Figure 2-12**). The preferred alternative is applicable where the required electrical demand is within the available capacity of the current existing 11 kV network. In this instance a new feed will be taken from the existing

SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS FOR THE DEVELOPMENT OF NEW BERTH 605 AND ASSOCIATED INFRASTRUCTURE TO SUPPORT THE CONTAINER HANDLING FACILITY, PORT OF RICHARDS BAY, KWAZULU-NATAL | WSP

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11 kV network to provide electrical power to the new CHF and quay wall. However, while there is existing capacity on the current 11 kV network, this is limited and may not be able to provide for the full electrical demands in the future. To protect against restricting future electrical supply constraints, a new 11 kV switching station fed from the existing primary substation is proposed as part of the preferred alternative.

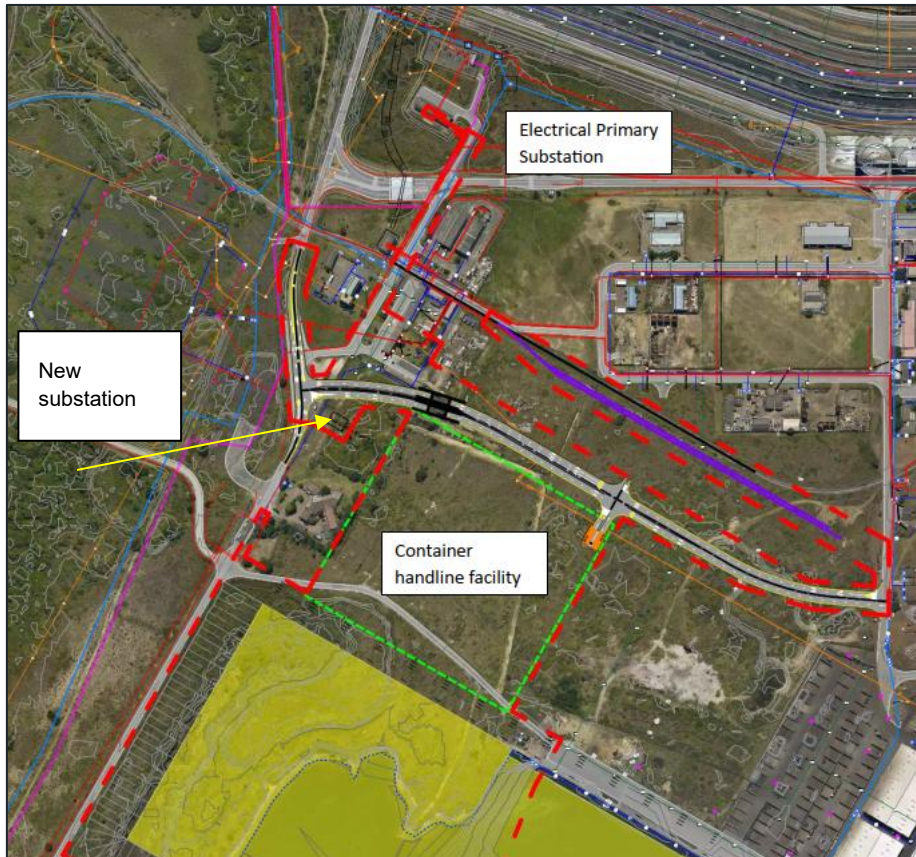


Figure 2-12: Existing and proposed substation

The preferred alternative is the only alternative considered as it ties into the existing network infrastructure. This alternative is also based on the assumption that no shore supply or ship to shore cranes are required.

2.3.6.2 Stormwater

Preferred alternative

With the hydrological analysis complete and design flows computed, the stormwater pipes were sized. The minimum size of stormwater pipelines is 600mm diameter, which considers effective maintenance of the stormwater network. The stormwater pipe system has been designed to accommodate a 1 in 5-year storm. The proposed CHF, as well as any future development adjacent to Berth 605 will require major floods to flow overland into the bay.

The area has been designed and shaped to accommodate overland flow during a major storm, to prevent water ponding and to control flood damage to any infrastructure. The minimum size of stormwater pipelines is 600mm diameter, which considers effective maintenance of the stormwater network.

The back of quay wall drainage will be collected in a concrete channel and will be routed into a pipe system that discharges through the new quay wall directly into the bay. The stormwater pipes were sized to accommodate the stormwater from the future CHF. Two field inlet structures were provided at the back of the quay wall to allow the existing terrain, pre-CHF, to drain and for the future CHF internal stormwater to tie into. These field inlet structures will need to be changed to suit the stormwater design of the CHF.

The following was noted on the existing stormwater network (refer to **Figure 2-13**):

- The existing network discharges into the bay through the existing quay wall.
- The existing stormwater pipe dissects the identified area for the CHF.

Based on the above, the most feasible and preferred alternative for the project is to tie into the existing stormwater network.

The tie in pipeline will be approximately 360 m along the quay line and 400 m on the other side with a 600 mm pipe diameter. It will have a velocity of 0.6 m/s for self-cleaning, to prevent sand settling inside the pipe and blocking. There will also be cross drainage at the new rail siding which will be 400 m in length and 600 mm diameter.

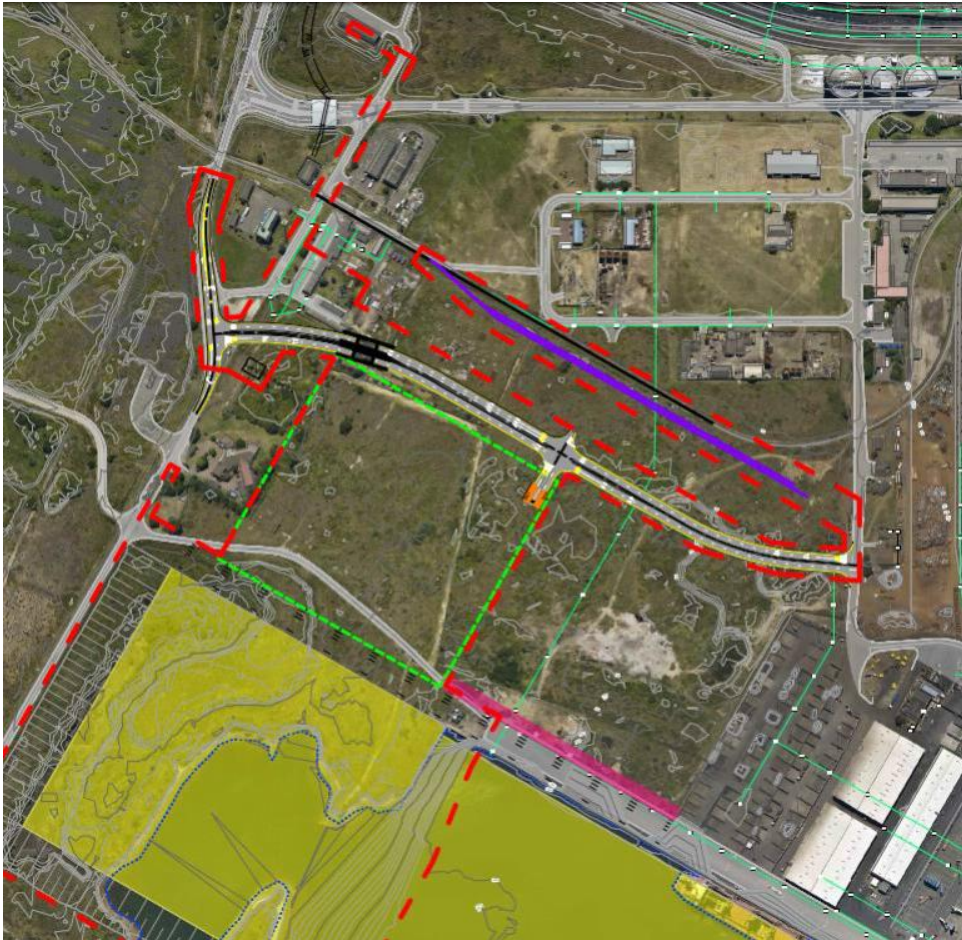


Figure 2-13: Existing Stormwater Layout (green lines)

Alternative retention pond

The preferred alternative is to discharge the stormwater pipe into the basin via the quay wall as this is the current method of stormwater discharge that exists in the vicinity of the project area. However, a retention pond was also considered to manage stormwater.

The preferred alternative is favoured over the retention pond due to the following:

- Lower in cost for design and construction in comparison to the retention pond.
- There is no design associated with the retention pond at this stage therefore it could result in a time delay to the project.
- The preferred alternative is a simple solution as it ties into the existing stormwater network and adopts the same approach as the existing stormwater system around the site.

Based on the above, only the preferred alternative has been investigated in the EIA process.

2.3.6.3 Sewerage

Preferred alternative

The preferred alternative involves designing a sump to accommodate the facility's sewerage through gravity flow, with pumping from the sump to the existing pumpstation PS20, located north of the facility (**Figure 2-14**). The final sewer pipe route will be determined during the final design phase.

The sewage system will allow for wastewater from new toilets, basins, baths, showers and water that cannot be discharged to the stormwater system.

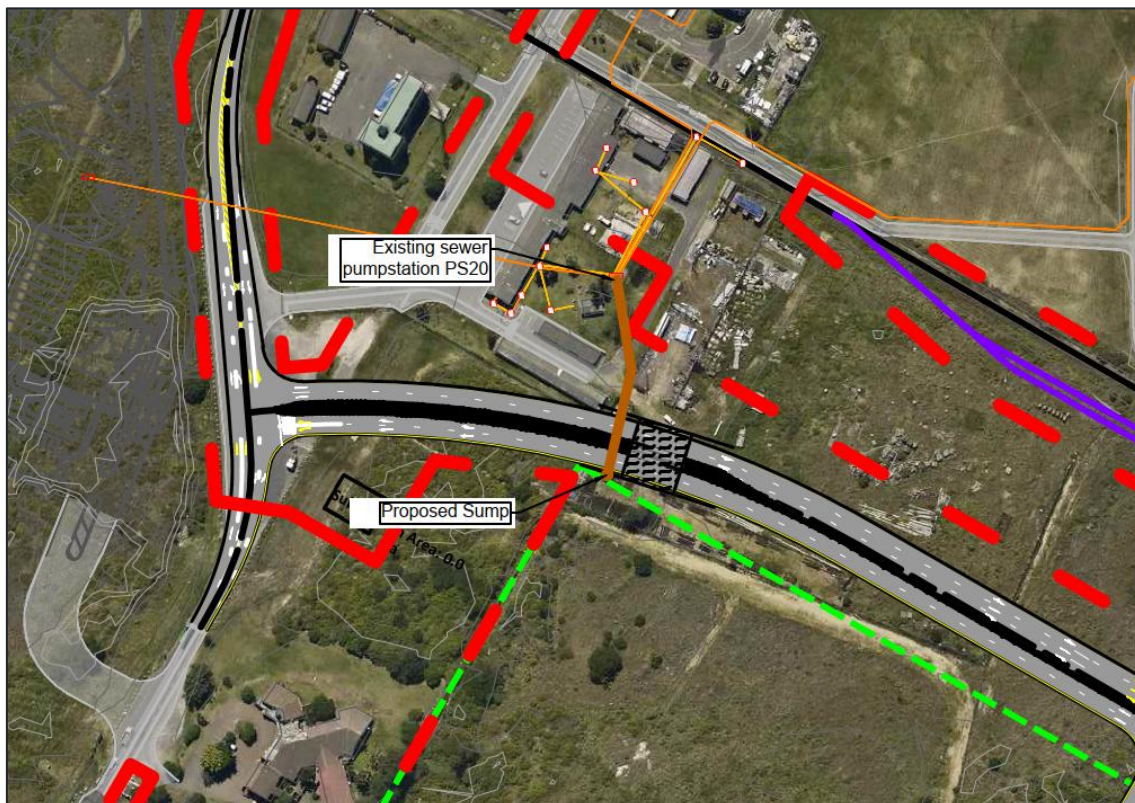


Figure 2-14: Existing sewer layout and location of the proposed sump (red lines)

Alternative

The alternative for the sewerage system is to accommodate the facility's sewerage through gravity flow to the existing pumpstation PS20, located north of the facility. However, the invert levels will determine if the gravity flow system works.

Both alternatives will tie into the existing sewer system and have been further investigated in the EIA phase.

2.3.6.4 Water

Preferred alternative

The concept design allows for water to be sourced from the municipal supply. There are three municipal feeds into the port, supplied by two separate municipal reservoirs. This provides adequate supply contingency, and therefore, no additional storage has been included in the system. The existing water network consists of 225 mm diameter water main pipes (in the vicinity of the quay wall) and 150mm diameter pipes (in the vicinity of the gatehouse).

The existing 225mm diameter water main will be extended along with the new quay wall to supply ship water along the new quay. At the end of the new quay wall extension the water main will follow Urania Road to tie into the existing 150mm diameter pipe in the vicinity of the existing gate house. Connections to new buildings will be off takes from either the existing network directly, or via extensions to the existing network brought to the boundary of the proposed CHF. A tie in point will be provided which will consist of approximately 500 m of pipework with a diameter of 150 mm. Inside the quay wall, water will be provided to landing valves for ships and firefighting. Water will be provided as follows:

- Building water - A new 75mm diameter pipe will branch off from the 150mm diameter water pipe to supply a metered connection for the handling facility. Any connections to new buildings will be made from the metered supply point, located on the western side of the site, just south of the Seafarers club. The Container Handling Facility operator will be responsible for the water network within the facility.
- Ship water - The proposed new water main line will tie into the existing 225mm diameter asbestos cement water pipe, that is in the existing quay of Berth 606, located on the eastern side of the new Berth 605. The new pipe will be 200 mm diameter, within the new quay wall, with 75 mm off takes to the landing valves. The 200mm diameter pipe reduce in size to a 150 mm diameter, where the pipe exits the new quay wall and is parallel to Urania Road and will tie into the existing 150mm diameter asbestos cement pipe north of the existing security access to complete the ring.
- Fire water - The fire water in the PoRB is off the water reticulation network. Allowance for fire-hydrants will be made where there isn't a dedicated firefighting system. This allowance is for normal hydrants outside the CHF boundary along the lengths of pipelines that will be installed to service the new quay wall extension.

Alternative

The first proposed supply point for the CHF is from the water ring main adjacent to Urania Road on the western side of the CHF and south of the Seafarers Club.



Figure 2-15: Proposed new water main layout (preferred on the left in blue) and proposed supply A (Alternative on the right in blue)

Based on the outcome of the engineering investigations, both alternatives are equal in scoring and have been further assessed in the EIA phase.

2.3.7 RAIL

2.3.7.1 Preferred alternative

The approach to the design of the rail siding is based on the requirement that this is a freight railway line, and the Transnet design standards must be used. A simple layout was considered for the seamless interface from the mainline to the container storage area at Berth 605 and for the ease of loading and offloading of containers.

The scope of the proposed rail infrastructure involves the design and construction of the rail siding to accommodate the 275 000 TEUs and up to the maximum capacity. The rail siding has been designed to connect to the existing rail infrastructure at the location shown in **Figure 2-16** below.

Based on the design throughput and the current requirement of a 50-wagon container train, it is proposed that the rail siding will consist of two rail lines that are 370 m each in length, each servicing 25 rakes. The width of the rail reserve will be approximately 15 m, and 30 m at maximum including the hard standing for loading.



Figure 2-16: Location of rail siding connection to the existing rail.

It is understood that currently the Mhlaluzi yard is being utilized to stage not-to-go wagons, however it consists of four rail lines that can each accommodate one 50-wagon train. Therefore, it is assumed that the Mhlaluzi Yard will be used for shunting and staging purposes to service the new proposed rail siding. It must be noted that the existing infrastructure which the new proposed rail siding is designed to branch off from, has not been operational and therefore will need to be rehabilitated.

The preferred alternative will be the only alternative considered for the following reasons:

- It can accommodate the current planned throughput and aims to accommodate the future capacity of the terminal.
- It is considered a simple option in terms of constructability as it links to the existing rail infrastructure.
- The area of disturbance is limited due to the existing disturbed areas surrounding the proposed new railway siding.

2.3.8 ROAD TRANSPORT AND ACCESS

2.3.8.1 Preferred new access road

The scope of the proposed road infrastructure is:

- A shared access road and security access control that will link Urania Road and Ventura Road, with a 4-way intersection to serve the terminal and adjacent land north of the terminal.
- The link and access will accommodate the maximum capacity of Berth 605, calculated to be 275 000 TEUs.

- The road will connect at a T-junction on Urania Road approximately 155 m north of the security access control located further south on Urania Road.

As indicated in the figure below, the new road will be an estimated 735 m length with a reserve width of 30 m and a lane width of 3.7 m.

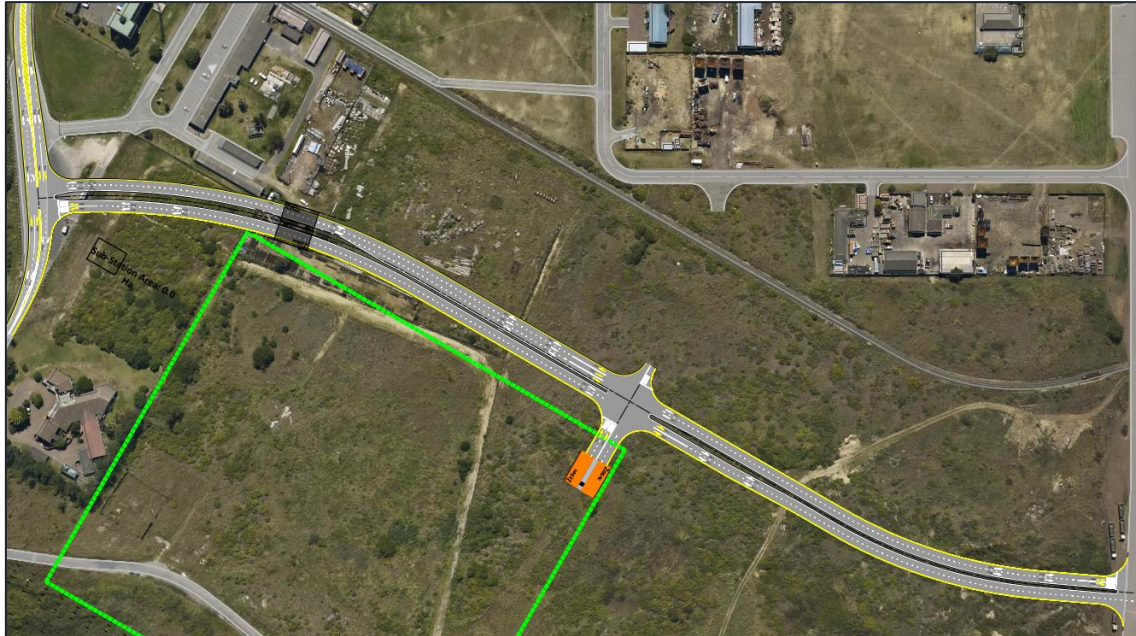


Figure 2-17: Location of the new access road (yellow)

2.3.8.2 Alternatives considered for an access road

Option 2 as indicated in **Figure 2-18** below, provides a shared access road and vehicle access control point to the port, the CHF and the adjacent vacant land surrounding the facility.

- It consists of a dual carriageway road with 2 lanes per direction.
- It takes access off Urania Road at a new T-junction that could be stop controlled or signalised, pending traffic demand.
- Provides access to the vacant properties west and north of the CHF.
- Provides access to Ventura Road and the potential rail sidings.
- Replaces the function of the existing gravel road between Urania Road and Ventura Road that have to be removed.

This alignment was based on a previous footprint of the CHF which has been revised, therefore this option for a road has been eliminated and will not be further considered in the EIA process.

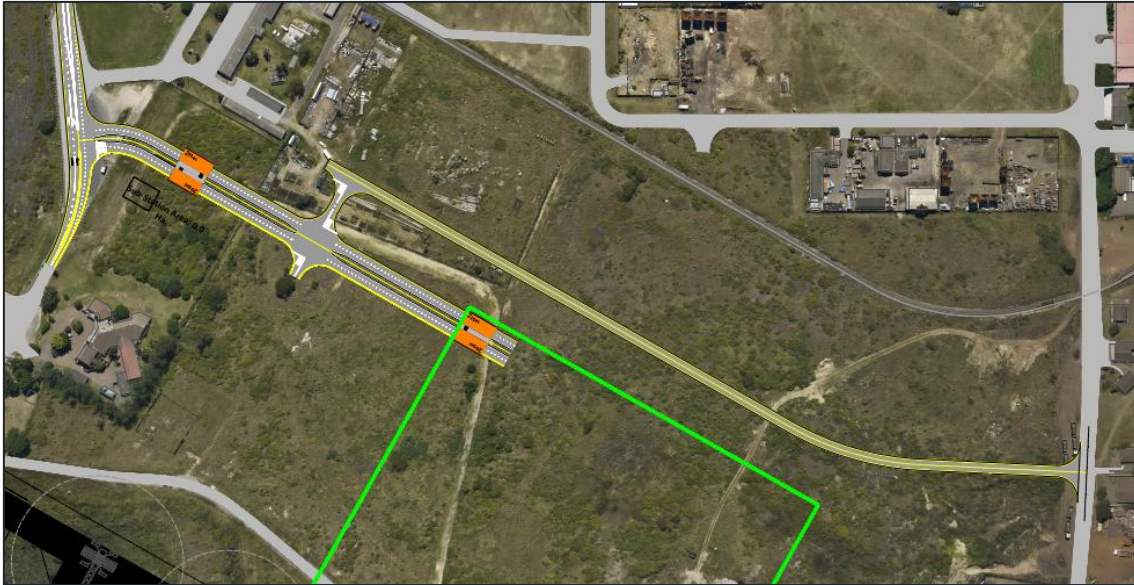


Figure 2-18 – Location of the previously considered access road options

2.3.9 BIODIVERSITY CONSIDERATIONS IN THE ALTERNATIVES ASSESSMENT

The assessment of alternatives considered engineering feasibility, operational requirements, environmental constraints and biodiversity considerations. From a biodiversity perspective, the preferred alternative is located within an area that has previously been disturbed and modified through historical port development activities (Figure 2-5). Notwithstanding the ecological recovery that has occurred within components of the proposed project footprint, the site does represent a brownfield development opportunity within an operational port environment.

Alternative development opportunities outside of the identified footprint would require disturbance of additional areas within the Port of Richards Bay and could result in impacts to habitats that have not previously been transformed. The preferred alternative consequently reduces the need for expansion into undisturbed areas and aligns with the principle of limiting environmental impacts through the utilisation of previously modified land where feasible.

The proposed location further allows for the implementation of biodiversity compensation measures immediately adjacent to the impact footprint, thereby improving the ecological feasibility of habitat replacement and long-term management when compared to alternative locations elsewhere within the Port.

2.4 SUMMARY OF ALTERNATIVES

The table below provides a summary of the alternatives that have been investigated in the EIA phase. The preferred alternatives were selected following consideration of technical feasibility, operational requirements, environmental impacts and biodiversity constraints. Collectively, the preferred alternatives represent the most practicable

approach to achieving the project objectives whilst limiting the extent of environmental disturbance and enabling the implementation of biodiversity compensation measures associated with residual impacts.

Table 2-8 – Summary of the Alternatives

Project Component	Preferred Alternative	Alternative 1
Berth Pocket and Quay Wall		
Design of the quay wall	<p>The new quay wall will be required to interface with the existing quay wall. The gravity quay wall of mass concrete and backfill is the preferred alternative due to the following:</p> <p>Least expensive option.</p> <p>Requires manual labour and can provide local employment.</p> <p>Less concrete will be required.</p> <p>The quay wall is expected to be 366 m in length. The new quay wall is designed for a future depth of -19 m PCD. This will ensure that the berth can be lengthened and deepened without the need for additional quay wall deepening costs.</p>	<p>The secant quay wall design has been considered however has been eliminated due to the following:</p> <p>Higher costs.</p> <p>More concrete required.</p> <p>The environmental considerations for both alternatives are expected to be similar therefore only the preferred alternative has been investigated in the EIA phase.</p>
Scour Protection	<p>A revetment (sloped embankment) will be constructed on the seaward side of the Urania Road. This slope must be protected against wave and propeller action to maintain the structural integrity of the Urania Road. A riprap scour protection system has been considered.</p>	<p>No alternatives have been considered for scour protection as the proposed scour protection system was designed based on distinct scenarios addressing both wave and propeller action.</p> <p>The design will be further refined during the detailed design stage.</p>
Dredging		
Dredge depth to accommodate the design vessel	<p>The basin geometry to be dredged can be summarised as follows:</p>	<p>Dredging to – 19 m CD for the Berth 605 project was considered as an alternative</p>

SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS FOR THE DEVELOPMENT OF NEW BERTH 605 AND ASSOCIATED INFRASTRUCTURE TO SUPPORT THE CONTAINER HANDLING FACILITY, PORT OF RICHARDS BAY, KWAZULU-NATAL | WSP

Project No.: 43102871 | Our Ref No.: DFFE REFERENCE NO: 14/12/16/3/3/2/2809

SEPTEMBER 2026

Project Component	Preferred Alternative	Alternative 1
	<p>The design/proclaimed depth of -14.5 m PCD requires an additional 0.6 m to a depth of -15.1 m PCD to accommodate sedimentation and bathymetry sounding accuracy.</p> <p>The basin width (at -14.5 PCD proclaimed depth) of 305 m was found to be suitable for navigation.</p> <p>The basin side slope of 1v:3h was determined, to ensure stability.</p> <p>The basin length (quay length) at -14.5 m PCD depth of 338 m was found to be sufficient, accepting overlap of the design vessel into the Berth 606 quay space, as was confirmed by the mooring analysis study.</p>	<p>and eliminated due to the following:</p> <p>It will be an expensive exercise to dredge to -19 m CD as part of the Berth 605 project. It is more feasible to dredge to -19 m CD when the port is able to accommodate for the larger vessels.</p> <p>The volume of dredged material associated with a dredged depth of – 19 m CD will be approximately 6 million cubic metres, and the existing disposal site is not able to accommodate this volume of dredged material at present.</p> <p>Dredging to - 19 m PCD for purposes of the Berth 605 project is eliminated and has not been investigated in the EIA phase.</p>
Disposal of dredged material		
Disposal of dredged material	An estimated 2 895 500 cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, it is estimated that a bulked volume of approximately 4 308 287 cubic metres will be disposed of at the offshore dump site.	<p>Beneficial uses have been assessed as part of the Dredge and Dredge Disposal Assessment; however, these were eliminated for the reasons identified in Section 2.3.4.1.</p> <p>Only the preferred alternative has been investigated in the EIA phase.</p>
Disposal of excavated material	Excavated material (excluding the berth basin) from elsewhere within the construction footprint includes road, rail, construction laydown area excavation and earth wall concrete and steel components (estimated total volume of 64 900m ³). This material will be reused on site where possible as fill during site / platform preparation.	<p>The preferred alternative is to make use of the excavated material as backfill and the disposal of the excess at a registered landfill site.</p> <p>The alternative to the preferred, is the offshore disposal of excavated material together with the dredged material from the basin.</p>

Project Component	Preferred Alternative	Alternative 1
	Excess material, or material not suitable as fill will be disposed of at a registered land-based disposal site. The material excavated from the compensation area (the new tidal pool area and scalloped shoreline as described in Section 9.3 of this report) is approximately 30 000 m ³ and will be used as landform shaping and backfill within the compensation site. The excess material will be placed into the caisson pond (if timing allows) or disposed of at a registered land-based disposal site.	This option is not advisable due to the mixing of the land based and marine based materials and therefore has not been further assessed in this EIA process.
Sites for the temporary stockpile and laydown areas		
Temporary stockpile and laydown areas	Due to the constraints on the availability of land for the temporary stockpile and laydown areas, the preferred alternative as depicted in Figure 2-9 were the only sites considered.	<p>Other areas for temporary stockpiling were considered but were eliminated due to the following:</p> <ul style="list-style-type: none"> ■ Availability of space at the port to store large volumes of material. ■ Proximity of the stockpile areas to the Berth 605 site. ■ Avoidance of double handling of the material that will be required for sites further away. <p>Only the preferred alternative has been assessed.</p>
Utilities		
Electricity	The electrical demand is within the available capacity of the current existing 11 kV network. New feed for the project will be taken from the existing network.	<p>Whilst there is available capacity from the existing capacity network, it may not be able to provide for the full electrical demands in the future therefore a new 11 kV substation is proposed.</p> <p>The substation has been further investigated in the EIA</p>

Project Component	Preferred Alternative	Alternative 1
		phase as part of the preferred alternative.
Stormwater		
Extension of the existing stormwater network	<p>With the hydrological analysis complete and design flows computed, the stormwater pipe system has been designed to accommodate a 1 in 5-year storm. The propose handling facility, as well as any future development adjacent to Berth 605 will require major floods to flow overland into the bay.</p> <p>The extension of the existing stormwater network to service the proposed project is the preferred alternative as the existing system discharges into the bay through the existing quay wall. The most feasible and reasonable alternative is for the project to tie into the existing stormwater network.</p>	<p>The alternative considered is to direct stormwater into a retention pond. This is considered unfavourable as the retention pond would result in additional costs, there is no available site for the retention pond and the design of the retention pond is not available and therefore could cause significant delays in the process.</p> <p>This alternative has not been further investigated in the EIA phase.</p>
Sewerage		
Design and technology alternatives	<p>The preferred alternative involves designing a sump to accommodate the facility's sewerage through gravity flow, with pumping from the sump to the existing pumpstation PS20, located north of the facility</p>	<p>The alternative for the sewer supply is to accommodate the facility's sewerage through gravity flow to the existing pumpstation PS20, located north of the facility. However, the invert levels will determine if the gravity flow system works.</p> <p>Both alternatives will tie into the existing sewerage system and have been further investigated in the EIA phase.</p>
Water		
	<p>The concept design allows for water to be sourced from the municipal supply. There are three municipal feeds into the</p>	<p>The first proposed supply point for the CHF is from the water ring main adjacent to Urania Road on the western</p>

Project Component	Preferred Alternative	Alternative 1
	port, supplied by two separate municipal reservoirs. The existing 225 mm diameter water main will be extended along the new quay wall to supply ship water along the new quay. At the end of the new quay wall extension the water main will follow Urania Road to tie into the existing 150mm diameter pipe in the vicinity of the existing gate house.	side of the CHF and south of the Seafarers Club. Based on the outcome of the engineering investigations, both alternatives are equal in scoring and have been further assessed in the EIA phase.
Rail		
Design alternative	Based on the design throughput and the current requirement of a 50-wagon container train, it is proposed that the rail siding will consist of two rail lines that are 370 m each in length, each servicing 25 rakes. The width of the rail reserve will be approximately 15 m, and 30 m at maximum including the hard standing for loading.	The preferred alternative is the only alternative considered in the EIA for the following reasons: It can accommodate the current planned throughput and aims to accommodate the future capacity of the terminal. It is considered a simple option in terms of constructability as it links to the existing rail infrastructure. The area of disturbance is limited due to the existing disturbed areas surrounding the proposed new railway siding.
Access Road		
	The new road will be an estimated 735 m length with a reserve width of 30 m and lane width of 3.7 m	An alternative for the road was considered however, this alignment was based on a previous footprint of the CHF which has been revised, therefore this option for a road has been eliminated and has not been further considered in the EIA process.
CHF		

Project Component	Preferred Alternative	Alternative 1
Design capacity of the CHF	Design capacity is based on the import, export and transshipment split assumed for the future design capacity of 275 000 TEU.	<p>Port planning considers the berth capacity, land side capacity and gate capacity that determines the throughput of containers for the new Berth 605 and the CHF.</p> <p>Initially, the design was to be done to facilitate the future capacity of 1 000 000 TEU per annum through the container handling facility.</p> <p>Based on the constraint associated with the extent of the footprint of the CHF, the throughput capacity determined for the 6.75 Ha site is 275 000 TEU per year therefore the design capacity of 1 000 000 TEU was eliminated and has not been further investigated in the EIA process.</p>
Location of the CHF	<p>As depicted in Figure 2-4, the location of the CHF is based on the extent that is required to accommodate for a 270 m long and 250 wide facility. The preferred site alternative is adequate for a facility of this size.</p> <p>In addition, the CHF is to be located within close proximity to the new berth.</p>	Due to the location of the proposed Berth 605, there were no other feasible and reasonable alternative sites available for consideration of the CHF therefore no site alternatives have been investigated in the EIA phase.

2.5 SELECTION OF THE PREFERRED ALTERNATIVES

The identification and assessment of alternatives formed a key component of the EIA process and was undertaken in accordance with the requirements of the EIA Regulations. The alternatives assessment considered technical feasibility, operational requirements, environmental sensitivities, constructability, economic viability and the potential environmental impacts associated with each alternative.

The preferred alternative was identified through an iterative design and assessment process during which environmental constraints and specialist recommendations were integrated into project planning and engineering design. The assessment sought, as far as reasonably practicable, to avoid environmentally sensitive areas, minimise the overall

development footprint and reduce residual impacts through the application of the mitigation hierarchy.

Particular consideration was given to biodiversity-related constraints associated with the location of the project within the EFZ, Key Biodiversity Area and mapped CBAs. Notwithstanding these sensitivities, the preferred development footprint is located within an area that has been historically disturbed and modified by previous port development activities and therefore represents the most suitable location to accommodate the required port infrastructure within the existing PoRB environment.

Alternatives that would require expansion into previously undisturbed areas were not considered preferable as these alternatives could result in the disturbance of additional sensitive habitats and greater environmental impacts. The preferred alternative therefore represents the most practical and environmentally acceptable option for meeting the identified project objectives while limiting environmental disturbance and providing an opportunity for the implementation of biodiversity compensation measures to address residual impacts.

Based on the findings of the specialist studies and impact assessment process, the preferred alternative is regarded as the Best Practicable Environmental Option (BPEO), as it provides the greatest operational and socio-economic benefit while avoiding or minimising environmental impacts to the extent reasonably possible.

2.5.1 MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVES

The assessment of alternatives for the proposed Berth 605 development was undertaken in accordance with the requirements of the EIA Regulations which require consideration of reasonable and feasible alternatives and a motivation for the preferred site, activity and technology alternatives. The alternatives assessment considered environmental, technical, operational, planning and socio-economic factors in identifying the preferred development option.

2.5.1.1 Preferred Site Alternative

The preferred site is located within the existing operational PoRB and forms part of the Bayvue Precinct identified within the PDFP and Master Plan. The site was selected primarily because it is directly adjacent to the existing 600 Series Berths and enables the efficient development of a dedicated berth for the proposed CHF.

From an environmental perspective, the preferred site is located within an area that has been historically disturbed through previous port development activities, including dredging, filling, stockpiling and construction associated with the development of the 600 Series Berths and related infrastructure. Historical aerial imagery demonstrates that the footprint does not represent an intact greenfield environment but rather an area that has undergone significant anthropogenic modification followed by ecological recovery over time (Figure 2-4 and Figure 2-5).

Alternative locations within the port were considered less favourable as they would either:

- compromise existing port operations;
- require the development of additional infrastructure;
- create operational inefficiencies for container handling activities; or
- result in disturbance of areas that have not been previously transformed.

The preferred site therefore represents the most practical location within the Port of Richards Bay to accommodate the proposed berth while limiting the need for expansion into previously undisturbed areas.

2.5.1.2 Preferred Activity Alternative

The proposed activity comprises the development of Berth 605 and associated infrastructure to support the future operation of a dedicated CHF. The activity is required to support projected container handling requirements within the Port of Richards Bay and to improve operational efficiencies by providing dedicated container-handling infrastructure while allowing existing berths to continue functioning as multipurpose terminals.

The preferred activity was selected as it aligns with:

- the Port Development Framework Plan;
- the Port of Richards Bay Master Plan;
- provincial and national economic development objectives; and
- Transnet National Ports Authority's strategic mandate to provide and maintain port infrastructure.

The no-go alternative would result in the loss of the identified economic and operational benefits associated with the proposed development and would not enable the required expansion of port infrastructure to accommodate future freight demand.

2.5.1.3 Preferred Technology Alternative

The preferred engineering and infrastructure alternatives were selected following a comparative assessment of feasibility, constructability, environmental impacts and operational requirements.

The preferred alternatives include:

- a gravity quay wall design;
- dredging to the minimum operational depth required for the design vessel;
- utilisation of an existing authorised offshore dredged material disposal site;
- extension of existing service infrastructure; and
- development of supporting road, rail and utility infrastructure within the existing port environment.

These alternatives were considered the most practicable because they:

- minimise construction complexity;

- reduce environmental disturbance;
- make use of existing infrastructure and authorised facilities where possible;
- reduce the volume of material requiring disposal; and
- provide long-term operational flexibility within the Port of Richards Bay.

2.5.1.4 Environmental Considerations in the Selection of the Preferred Alternative

Environmental considerations formed an integral component of the alternatives assessment process. Particular consideration was given to the location of the project within the Estuarine Functional Zone, Critical Biodiversity Areas, Key Biodiversity Areas and areas supporting estuarine, mangrove and terrestrial habitats.

The assessment recognised that residual biodiversity impacts would occur; however, the preferred alternative was selected because it:

- utilises a previously disturbed footprint within an existing port environment;
- minimises the need for development in additional natural areas;
- enables the implementation of habitat compensation measures immediately adjacent to the impact area;
- allows for the establishment of a Biodiversity Compensation Area that can be secured through a conservation servitude; and
- provides the most balanced outcome when environmental, technical, operational and socio-economic considerations are assessed collectively.

The Environmental Impact Assessment therefore concluded that the preferred site, activity and technology alternatives collectively represent the Best Practicable Environmental Option, as they provide the greatest overall benefit while avoiding and minimising environmental impacts to the extent reasonably possible and providing appropriate compensation measures for residual impacts.

3 NEED AND DESIRABILITY OF THE PROJECT

The DEA&DP Guideline (2013) states that the essential aim of need and desirability is to determine the suitability (i.e., is the activity proposed in the right location for the suggested land-use/activity) and timing (i.e., is it the right time to develop a given activity) of the development. Therefore, need and desirability address whether the development is being proposed at the right time and in the right place. Similarly, the 'Best Practicable Environmental Option' (BPEO) as defined in NEMA is *"the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term."*

3.1 NEED AND DESIRABILITY OF THE PORB MASTERPLAN

An overview of the PoRB Masterplan must be provided to understand the need and desirability of the Berth 605 project.

The PoRB is one of the two main dry bulk ports in South Africa. While serving the hinterlands of Northern KwaZulu-Natal, Gauteng and Mpumalanga, the port is the largest exporter of coal in South Africa. By tonnage, the port has the largest Dry Bulk Terminal in South Africa and handles approximately 54% of South Africa's total dry bulk cargo demand. The port is located adjacent to the Richards Bay Industrial Development Zone (TNPA PDFP, 2022).

The port has three precincts, namely the South Dunes, Bayvue and Newark. The South Dunes precinct accommodates the coal terminal and the liquid bulk terminals. Other dry bulk, liquid bulk and multipurpose operations are in the Bayvue precinct, while the small craft harbour and repair quay are in the Newark precinct. In general, the port currently focuses on three major activities namely, exporting dry, break and liquid bulk. Other services include bunkering, minor ship repairs and providing facilities for services and recreational craft. In addition to providing bulk facilities for the hinterland, the port plays an important role in the local economy of the City of Umhlathuze's growing industrial base (TNPA PDFP, 2022).

According to the Port Development Framework Plan, *the PoRB aspires to be a premier dry bulk and liquid bulk port with diversification in other segments. The port desires to be a growing, effective, efficient, and integrated port by investing in infrastructure and improving terminal and supply chain efficiencies* (TNPA PDFP, 2022).

To achieve the goal of becoming a premier dry bulk and liquid bulk port, the PoRB must be able to accommodate for the capacity demand for the main commodities.

3.1.1 BERTH CAPACITY VERSUS VOLUME

The capacity demand volumes for each of the main commodities of the port are indicated in this section. These main cargo types are dry bulk (with a dedicated Coal terminal), break bulk (MPT), containers (MPT) and liquid bulk (TNPA PDFP, 2022).

3.1.1.1 Coal (Richards Bay Coal Terminal)

The terminal currently has a total of six berths, but makes use of four berths for cargo loading. The current installed capacity is 91 million tons per annum and is lower than the theoretical capacity due to storage capacity and handling equipment constraints. The demand forecast indicates that the installed capacity will be exceeded by 2038. To improve the installed capacity to reach the theoretical capacity, additional ship loaders and stockpile areas are required (TNPA PDFP, 2022).

3.1.1.2 Dry Bulk

The PoRB currently has 7 dry bulk berths. The current theoretical throughput is 21 million tons per annum and installed capacity 18 million tons per annum. In the short-term scenario, there is insufficient capacity according to the TNPA forecast volume capacity. It is envisaged that the berth capacity will be increased from 21 million tons to 40 million tons due to the provision of two additional berths (Berth 802 and 803 which are currently in the design phase) and the conversion of Berth 702 from an import berth to an export berth (TNPA PDFP, 2022).

3.1.1.3 Break Bulk/Multi-purpose Terminal (MPT)

At present there are 6 berths available for Break Bulk/MPT operations at the Bayview Precinct, which include provision for handling phosphoric acid and pitch pencil. Container operations are also handled at the MPT berths. The current installed capacity is 8 million tons per annum. According to the volume projection, no new berths are required up until 2052. However, beyond 2052, due to the prediction of the demand forecast, planning for an additional berth to provide additional break bulk (MPT) capacity is necessary (TNPA PDFP, 2022).

3.1.1.4 Containers

The berths available for container usage at the MPT have a theoretical and installed capacity of 50 000 TEUs per annum. TNPA 10-year forecast container volumes are relatively below the theoretical and installed berth capacity. According to the volume projection, no new berths are required by 2052 (TNPA PDFP, 2022).

3.1.1.5 Liquid Bulk

The current two liquid bulk berths at the PoRB have a combined capacity of 3 million kilolitres per annum. Based on the TNPA forecast for the next 10 years, there will be a shortfall between the installed capacity and the demand (TNPA PDFP, 2022).

3.2 BERTH 605 WITHIN THE PORB

Based on the above, the Berth 605 project falls within the short-term plan (2032) for the PoRB. According to TNPA, the overarching objective of the project is to have a dedicated berth for the CHF at the PoRB. The new Berth 605 will ensure that the 606 to 609 berths are utilised for the MPT and not for handling of containers. This will result in an

improvement in the operational efficiency of the MPT. The CHF with the berth will ensure that this facility will have high operational efficiencies (TNPA PDFP, 2022).

In addition to the strategic and operational need for the proposed development, the location of Berth 605 within the existing Bayvue Precinct provides an opportunity to expand port infrastructure within a footprint that has historically been modified through previous port-related development activities. The preferred location is adjacent to existing berth infrastructure and utilises land that has already been affected by historic dredging, earthworks and construction activities associated with the development of the Port of Richards Bay. This reduces the need to develop previously undisturbed land elsewhere within or adjacent to the port environment.

The assessment of need and desirability considered both operational requirements and environmental constraints. Although the project area falls within the Estuarine Functional Zone and mapped Critical Biodiversity Areas, the site forms part of an existing operational port environment and is located within a historically disturbed footprint. The preferred location was therefore considered more appropriate than alternative locations that could require expansion into areas that have not previously been transformed and that may support a greater extent of intact ecological habitat.

3.2.1 ENVIRONMENTAL NEED AND DESIRABILITY

In terms of the NEMA and EIA Regulations, consideration must be given to whether a development is proposed in the appropriate location and whether the anticipated benefits outweigh the identified environmental costs. The proposed Berth 605 development responds to an identified strategic infrastructure requirement within the Port of Richards Bay and is consistent with the long-term planning framework established in the Port Development Framework Plan and Port Master Plan.

The development is proposed within an existing port environment where substantial transformation has already occurred over an extended period. The project therefore supports the principle of concentrating infrastructure development within existing industrial and port-related areas rather than promoting expansion into previously undeveloped areas.

Specialist investigations have identified residual environmental impacts associated with the development, particularly relating to biodiversity and estuarine habitats. These impacts are recognised and have informed the development of avoidance, mitigation, rehabilitation and biodiversity compensation measures. The implementation of these measures, together with the long-term protection of the compensation area, contributes towards balancing infrastructure development requirements with environmental conservation objectives.

3.3 CONCLUDING STATEMENT

Based on the assessment undertaken, the proposed Berth 605 development is considered both needed and desirable within the context of national port infrastructure planning, regional economic development objectives and the operational requirements

of the Port of Richards Bay. The preferred location is regarded as the most appropriate and practical location available within the port environment, taking into account engineering requirements, environmental sensitivities, historical land disturbance and the ability to implement biodiversity compensation measures to address residual ecological impacts.

4 GOVERNANCE FRAMEWORK

4.1 APPLICABLE LEGISLATION

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable national legislation is explained in **Table 4-1** below.

Table 4-1 – Applicable National Legislation³

Legislation	Description of Legislation and Applicability
The Constitution of South Africa (No. 108 of 1996)	<p>The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.</p> <p>Applicability:</p> <p>This EIA process was undertaken to identify and determine the potential impacts associated with the proposed Berth 605 project. The recommended mitigation measures will aim to adequately address the potential impacts and are managed to acceptable levels to support the rights as enshrined in the Constitution.</p>
National Environmental Management Act (No. 107 of 1998) (NEMA)	<p>In terms of Section 24(2) of the NEMA, the Minister may identify activities which may not commence without prior authorisation. The Minister thus published GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3), as amended, listing activities that may not commence prior to authorisation.</p> <p>The regulations outlining the procedures required for authorisation are published in the EIA Regulations. Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in</p>

³ It should be noted that all dimensions outlined in relation to Listing Notice 1, 2 and 3 are provisional and are subject to final design.

Legislation	Description of Legislation and Applicability
	<p>terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity.</p> <p>Applicability:</p> <p>WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed in this section are considered applicable to the development: A S&EIR process must be followed. The listed activities were confirmed during the Scoping Phase.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</p>	<p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) was promulgated in June 2004 within the framework of the NEMA to provide for the management and conservation of national biodiversity. The NEM:BA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEM:BA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI).</p> <p>SANBI was established by the NEM:BA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems.</p> <p>CBAs are areas of high biodiversity value which are usually at risk of being lost and usually identified as important in meeting biodiversity targets, except for Critically Endangered Ecosystems or Critical Linkages. CBAs in the Province can be divided into two sub-categories:</p> <ul style="list-style-type: none"> ■ Irreplaceable (parts of the site are within this sub-category), and ■ Optimal (northern parts of the site are within this sub-category). <p>The Threatened or Protected Species Regulations and lists (2007 & 2017 (marine)), Alien and Invasive Species Regulations and lists (2020) published under the NEM:BA will be applicable if there are any protected species to be removed as part of the project.</p> <p>Applicability:</p> <p>According to the DFFE Screening Report and confirmed in the Terrestrial Biodiversity Assessment, the development falls within an irreplaceable CBA. This is defined as areas that are considered critical for meeting biodiversity targets and thresholds, and which requires to ensue persistence of viable populations of species and functional ecosystems.</p> <p>In terms of flora, the NEM: BA as of 2022, no longer includes mangrove forests on the Revised National List of Ecosystems that are threatened and in need of protection however individual species are still protected under the National Forest Act.</p>

Legislation	Description of Legislation and Applicability
	<p>In terms of fauna, there were two Species of Conservation Concern (SCC) identified by the specialist that could be likely to occur. Regarding fauna, the African clawless otter was observed on site and the associated conservation status is near threatened. The vulnerable Samango monkey was also present on site.</p> <p>Permits for removal or destruction of nationally protected plant species will be applied for prior to the construction phase.</p> <p><u>In addition to the permitting requirements associated with protected species, the principles of the mitigation hierarchy, biodiversity conservation and ecological sustainability as contemplated in NEM:BA were applied throughout the Environmental Impact Assessment process. Residual biodiversity impacts identified through the specialist studies informed the development of a Biodiversity Compensation Plan which forms part of the environmental assessment process and provides measures to address residual impacts that cannot reasonably be avoided, minimised or rehabilitated.</u></p>
<p>The National Forests Act (No. 84 of 1998)</p>	<p>1The purposes of this Act are to</p> <ul style="list-style-type: none"> - (a) promote the sustainable management and development of forests for the 10 benefit of all; (b) create the conditions necessary to restructure forestry in State forests; (c) provide special measures for the protection of certain forests and trees: (d) promote the sustainable use of forests for environmental, economic. educational. recreational, cultural, health and spiritual purposes: and (e) promote community forestry; promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. <p>In the Berth 605 Project footprint, a narrow band of white and black mangroves fringe the small tidally influenced pool inland of the Assembly Basin, while there are scattered mangrove trees in the Assembly Basin. Mostert (2014) considered the ecosystem functionality of mangroves fringing the small tidally influenced pool to be very high.</p> <p>The National Forests Act, 1998 (Act 84 of 1998), Section 3 states that “...natural forests may not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits”. Section 7 of the Act prohibits the cutting, damaging, disturbance, destruction and removal of any indigenous living or dead protected tree in a forest without a licence. Mangroves are protected according to the Act. The removal of mangroves that fringe the tidally influenced pool inland of the Assembly Basin will thus need to be motivated to the Minister, and licence obtained. A case of “exceptional circumstances” for their removal would be the construction of Berth</p>

Legislation	Description of Legislation and Applicability
	<p>605 in the 600 Berth Basin to enhance the economy in northern KwaZulu-Natal and South Africa.</p> <p>The NEM: BA no longer considers mangrove forests as ecosystems that need to be protected, however individual black and red mangrove tree species are still included on the National Forest Act's Annual List of Tree Species which are protected under 12 of the Act.</p> <p>Removal of these trees will require permits to be granted by the DFFE prior to construction.</p> <p>The Biodiversity Compensation Plan includes the creation and long-term management of replacement estuarine habitat intended to support the natural re-establishment of mangrove communities in suitable areas adjacent to the project footprint. The proposed approach therefore seeks to address the residual loss of mangrove habitat through habitat compensation and long-term ecological management.</p>
The National Heritage Resources Act (No. 25 of 1999) (NHRA)	<p>The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA) and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.</p> <p>Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally:</p> <p>Section– 35 (4) - No person may, without a permit issued by the responsible heritage resources authority-</p> <ul style="list-style-type: none"> ■ destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite. ■ destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite. ■ Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as- ■ any development or other activity which will change the character of a site— (i) exceeding 5 000 m² in extent, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. <p>In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources</p>

Legislation	Description of Legislation and Applicability
	<p>authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed project, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).</p> <p>Applicability:</p> <p>The proposed area for the Berth 605 and associated structures and infrastructure exceeds 5000 m² therefore triggers the requirement for a HIA to be undertaken. In addition, considering the sensitivity of the site from a marine archaeological perspective, the project has been subjected to a Terrestrial and Marine Archaeological Impact Assessment.</p>
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA)	<p>A list of 'Category A', and 'Category B' and subsequently 'Category C' waste management activities were first published, in GN 718 of 3 July 2009. These were amended, with the latest amendment being GN 1094 at the time of submission of this application.</p> <p>Category A and B activities require a Waste Management Licence in terms of section 20(b) of NEMWA, whereas Category C activities require that the person conducting these activities complies with the relevant requirements or standards as stated in GN. R.921, as amended.</p> <p>A number of regulations and standards regulating waste management have been published under NEMWA and updated to Government Gazette 46602 dated 24 June 2022 including:</p> <ul style="list-style-type: none"> ■ List of waste management activities that have, or are likely to have, a detrimental effect on the environment, 2013 (as amended) ■ National Waste Management Strategy, 2020 ■ Waste Classification & Management Regulations, 2013 ■ National Norms & Standards for the Assessment of Waste for Landfill Disposal, 2013 ■ National Norms & Standards for Disposal of Waste to Landfill, 2013 ■ National Norms and Standards for the Remediation of Contaminated Land and Soil Quality, 2014 <p>Applicability:</p> <p>Based on the details of the project provided by TNPA to date, there are no applicable waste related activities as the dredged material will be disposed of at an existing registered offshore disposal site. The temporary storage of excavated materials may require a registration under the Norms and Standards and will be applied for separately.</p>
National Environmental Management: Air	<p>NEM:AQA provides for the protection of the environment by regulating air quality in order to prevent air pollution.</p>

Legislation	Description of Legislation and Applicability
Quality Act 39 of 2004 (NEM:AQA)	<ul style="list-style-type: none"> Sections 21, 22, 22A - Listing of activities in Atmospheric Emission Licensing. Sections 23-25 – Controlled emitters Section 32 – Control of Dust Section 34 – Control of Noise Section 35 – Control of offensive odours <p>Several regulations and standards regulating air quality have been published under NEMAQA. including:</p> <ul style="list-style-type: none"> National Ambient Air Quality Standards, 2009 National Ambient Air Quality Standard for Particulate Matter of Aerodynamic Diameter less than 2.5-micron metre (PM2.5), 2012 Declaration of a Small Boiler as a Controlled Emitter and Establishment of Emission Standards, 2013 National Dust Control Regulations, 2013 Listed Activities and Associated Minimum Emission Standards 2013 (amended) Regulations regarding Air Dispersion Modelling, 2014 National Atmospheric Emission Reporting Regulations, 2015 National Greenhouse Gas Emissions Reporting Regulations, 2016 (amended) Declaration of greenhouse gases as priority air pollutants, 2017 National Pollution Prevention Plans Regulations, 2017 (amended) (including the Regulations prescribing the format of the Atmospheric Impact Report (2013). <p>Applicability:</p> <p>The Berth 605 project does not trigger the requirement for an Air Emissions License (AEL) however the above-mentioned sections of the NEM:AQA and the associated regulations has been considered during the EIA process. Short term impacts to the air quality during construction and the Greenhouse Gas Emissions for the project has been assessed as part of the EIA process.</p>
National Protected Area Expansion Strategy, 2010	<p>The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010).</p> <p>According to the NPAES (2016) dataset, the project area falls within a Priority Focus Area, which is of high importance for biodiversity because it is considered a high priority for protected area expansion.</p>

Legislation	Description of Legislation and Applicability
The National Water Act (No. 36 of 1998) (NWA)	<p>The purpose of the National Water Act (No. 36 of 1998) (NWA) is to provide a framework for the equitable allocation and sustainable management of water resources. Both surface and groundwater sources are national resources, which cannot be owned by any individual, and rights to which are not automatically coupled to land rights, but for which prospective users must apply for authorisation and register as users. The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources.</p> <p>The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21), which may impact on water resources through the categorisation of 'listed water uses.' Defined water-use activities require the approval of DWS in the form of a General Authorisation (GA) or Water Use Licence (WUL) authorisation.</p> <p>Applicability:</p> <p>Based on the location of the site in relation to the wetlands that have been identified, a General Authorisation (GA) is applicable. <u>Based on the findings of the freshwater assessment, no freshwater wetlands occur within the direct development footprint and no direct impacts on freshwater wetlands are anticipated. Freshwater wetlands occur within the broader study area and regulatory requirements associated with these systems will be addressed through the applicable water use authorisation process. The freshwater assessment concluded that freshwater ecosystem losses do not form part of the biodiversity compensation requirements for the project.</u></p>
National Ports Act (Act No. 12 of 2005)	<p>According to Regulation 11 of the National Ports Act, the main function of the Authority is to own, manage, control and administer ports to ensure their efficient and economic functioning, and in doing so the Authority must plan, provide, maintain and improve port infrastructure amongst other functions.</p> <p>Applicability:</p> <p>The TNPA provides port infrastructure and marine services at the eight commercial seaports in South Africa. It operates within a legislative and regulatory environment created by the National Ports Act 2005 (Act No. 12 of 2005). There are no permits under the National Ports Act that will be applied for as part of the environmental permitting process.</p>
The National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008)	<p>The National Environmental Management: Integrated Coastal Management Act 24 of 2008 aims:</p> <ul style="list-style-type: none"> to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable; to define rights and duties in relation to coastal areas;

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	<ul style="list-style-type: none"> to determine the responsibilities of organs of state in relation to coastal areas; to prohibit incineration at sea; to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment; to give effect to South Africa's international obligations in relation to coastal matters; and to provide for matters connected therewith. <p>Applicability:</p> <p>This Act has been considered in the Estuarine and Marine Ecology Assessment. In addition, the dredged material associated with the Berth 605 project will be disposed of at an existing approved offshore disposal site.</p>
<p>The National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008): Dumping at Sea Regulations</p>	<p>The Dumping at Sea Regulations were published in terms of sections 83(1)(g), (h), (k) and (r) of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) and details the application process for dumping at sea.</p> <p>Applicability:</p> <p>The project will use an existing approved offshore site for the disposal of dredged materials.</p>
<p>Marine Living Resources Act 18 of 1998</p>	<p>Regulates the utilization, conservation and management of marine living resources and the need to protect whole ecosystems preserve marine biodiversity and minimize marine pollution.</p> <p>Applicability:</p> <p>The Berth 605 project is located within the PoRB, the entire site is located within the EFZ therefore the impact on the estuarine and marine ecology has been investigated in the EIA process.</p>
<p>Civil Aviation Act (No. 13 of 2009)</p>	<p>Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations. All proposed developments or activities in South Africa that potentially could affect civil aviation must thus be assessed by SACAA in terms of the Civil Aviation Regulations and South African Civil Aviation Technical Standards (SA CATS) to ensure aviation safety. Potential impacts from the piggling station must be reviewed by these authorities.</p>

Legislation	Description of Legislation and Applicability
	<p>The Obstacle Evaluation Committee (OEC) which consists of members from both the SACAA and South African Air Force (SAAF) fulfils the role of streamlining and coordinating the assessment and approvals of proposed developments or activities that have the potential to affect civil aviation, military aviation, or military areas of interest. With both being national and international priorities, the OEC is responsible for facilitating the coexistence of aviation and renewable energy development, without compromising aviation safety.</p> <p>Applicability:</p> <p>The details of the proposed project will be provided to the SACAA who is registered on the stakeholder list.</p>
National Road Traffic Act 93 of 1996	<p>Provides for controlling transport of dangerous goods, hazardous substances and general road safety.</p> <p>Applicability:</p> <p>The project constitutes the development of a new road. The design of the roads will be in accordance with this Act.</p>

4.2 PROVINCIAL AND LOCAL LEGISLATION AND PLANNING

The table below summarises the key policies and plans as an outline of the governance framework for the project.

Table 4-2 – National, Provincial and Local Legislation and Plans

Applicable Plan	Description of Plan
National Estuarine Management Protocol, 2015	<p>This document presents guidelines for the development and implementation of individual Estuarine Management Plans as required by the National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008), as amended by the National Environmental Management: Integrated Coastal Management Amendment Act (Act No. 36 of 2014) (hereafter referred to as the ICMA) and in accordance with the National Estuarine Management Protocol.</p> <p>The Umhlathuze & Richards Bay Estuarine Management Plan (EstMP) (2018) was compiled in accordance with the National Estuarine Management Protocol and has been considered by the relevant specialists in the various studies that have been undertaken to inform the EIA process.</p> <p><u>Recommendations contained within the Estuarine and Marine Ecology Assessment and Biodiversity Compensation Plan were developed with consideration of the estuarine management objectives applicable to the Richards Bay Estuary and the broader Estuarine Functional Zone.</u></p>

Applicable Plan	Description of Plan
KwaZulu-Natal Planning and Development Act 6 of 2008	Strategic spatial development intentions for the municipality based on the IDP and SDF, influenced by and in alignment with adjacent municipalities.
KwaZulu-Natal Provincial Spatial Economic Development Strategy (2022)	The prioritisation of spatial economic development initiatives in the province, including strategy to ensure that investment occurs in the sectors that provide the greatest socio-economic return to investment.
Port Development Framework Plan, 2022	The National Ports Act (2005) prescribes that the National Ports Authority is to prepare and periodically update a Port Development Framework Plan for each port. This process ensures that the development plans remain current, aligned with national policies and inclusive of changes in the ports' environment.
KZN Biodiversity Sector Plan 2016	<p>CBAs are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan – and may be terrestrial or aquatic. The primary purpose of a map of CBAs is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes.</p> <p>The site, although developed and disturbed to a certain extent, is located in a CBA: Irreplaceable as defined by the KZN Biodiversity Sector Plan (2016). The impact to the CBAs has been considered by the terrestrial ecologist and EAP as part of the EIA process. It must be noted that the CBAs have not been adopted by the regional CA.</p> <p><u>Although the project footprint overlaps areas mapped as CBA 1: Irreplaceable, specialist investigations confirmed that the footprint occurs within an area that has been historically disturbed through previous port development activities. The assessment therefore considered both the biodiversity importance of the site and the existing level of disturbance when evaluating impacts, alternatives and environmental acceptability. Residual impacts associated with development within these biodiversity priority areas have informed the Biodiversity Compensation Plan developed for the project.</u></p>
Ezemvelo KZN Wildlife Strategic Plan, 2015	To ensure effective conservation, sustainable use of biodiversity, and promote ecotourism within KwaZulu-Natal in collaboration with stakeholders for the benefit of present and future generations.

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Applicable Plan	Description of Plan
KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs - Provincial Norms and Standards for Climate Change and Energy Efficiency in Land Use Management (January 2020)	Providing set of norms and standards that focus on climate change and energy efficiency, which are interrelated, which must be used in the assessment of land development applications in order to proactively respond to climate change. A climate change impact assessment has been undertaken by a specialist to inform the EIA process.
KwaZulu-Natal Coastal Management Programme (2019)	Developed to bring provincial coastal management in KwaZulu-Natal in line with the Integrated Coastal Management Act. The Provincial Coastal Management Programme (PCMP) sets out the objectives and requirements to fully realise integrated coastal management in KwaZulu-Natal.
KwaZulu-Natal Amafa and Research Institute Act, 2018	<p>The KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 05 of 2018) was established to recognise the KwaZulu-Natal Amafa and Research Institute as the provincial heritage resources authority for the KwaZulu-Natal in terms of Section 23 of the National Heritage Resources Act, 1999, and to amalgamate <i>Amafa aKwzaZulu-Natali</i> in terms of the KwaZulu-Natal Heritage Act, 2008. The aim of the of the Institute and Act is to identify, conserve, protect, manage and administer heritage resources, whilst researching and generating relevant knowledge to provide solutions within the field of heritage in the province.</p> <p>Applicability:</p> <p>The proposed area for the Berth 605 and associated structures and infrastructure exceeds 5000 m² therefore triggers the requirement for a HIA to be undertaken. In addition, considering the sensitivity of the site from a marine archaeological perspective, the project has also been subjected to a Marine Archaeological Impact Assessment. AMAFA will provide a response once the HIA is uploaded for comment.</p>
King Cetshwayo District Municipality Integrated Development Plan (IDP) 2024-2025	The objective is to promote economic growth in the District and improve the socio-economic conditions of residents, including infrastructure development and service delivery.
Umhlathuze Spatial Development Framework 2017-2022	The SDF provides strategic guidance on locations of development and land use, which feeds into strategic decisions of the local municipality. The SDF also includes the Environmental Management Framework for the municipality with specific reference to the PoRB expansion.

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Applicable Plan	Description of Plan
Umhlathuze Environmental Services Management Plan, 2024	<p>The Municipality compiled an Environmental Services Management Plan (ESMP) as broader planning tool to guide spatial development. The ESMP outlines a number of goals for Environmental Services Management. Two critical goals are:</p> <p>To define cohesive and functional spatial management units within the municipal area that needs to be managed in order to optimize the delivery of environment services.</p> <p>To develop management plans for each management unit that identify the management activities required to secure environmental services supply.</p> <p>The areas that provide environmental services to the City are spatially defined, and the following “Levels” of protection were determined:</p> <p>Nature Reserves (Level 1) Conservation Zones (Level 2) Open Space Linkage Zone (Level 3) Development Zone (Level 4)</p> <p>The Berth 605 project area falls within Level 4 as it is an already transformed area earmarked for development.</p>
Umhlathuze Municipality Spatial Planning and Land Use Management By-Law, 2017	<p>The Umhlathuze Municipality Spatial Planning and Land Use Management By-Law, 2017 provides for:</p> <ul style="list-style-type: none"> ■ the establishment of the Municipal Planning Approval Authority and the Municipal Planning Appeal Authority; ■ the adoption, repeal, review, extension and amendment of the Municipality’s land use scheme, ■ the regulation and management of spatial and land use planning and development, ■ the categorisation of land development applications, processes and procedures for land development applications, appeals against decisions of the Municipal Planning Approval Authority; and ■ offences, penalties and enforcement matters; and matters incidental thereto.
The City of Umhlathuze Roads and Traffic Safety By-laws, 2019	<p>The City of Umhlathuze Roads and Traffic Safety By-laws, 2019 provide for measure for preventing minimising or managing public nuisances. In addition, it prohibits certain activities public places.</p>

4.3 ADDITIONAL PERMITS AND AUTHORISATIONS

Table 4-3 – Additional Permits and Authorisations required for the Proposed Project

Permits / Authorisation	Legislation	Relevant Authority	Status
Section 38 (8) for the review of environmental documents	Section 38 (1) & (8) of the NHRA	SAHRA	The EIR is pending upload to the SAHRIS website for comment
General Authorisation	NWA	DWS	A GA process will be undertaken for the project in due course
Permits for removal or destruction of nationally protected plant species	NEM:BA	DFFE	Permits will be obtained prior to the commencement of construction.
Removal of mangroves at the tidally influenced pool	National Forest Act (Act 84 of 1998)	DFFE	Permits will be obtained prior to the commencement of construction.
Dumping at sea permit	The National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008): Dumping at Sea Regulations	DFFE	TNPA must ensure availability of licensed disposal site prior to construction.
<u>Registration of conservation servitude and implementation of biodiversity compensation commitments</u>	<u>Environmental Authorisation Conditions and Biodiversity Compensation Plan</u>	<u>TNPA / DFFE</u>	<u>To be incorporated as part of Environmental Authorisation implementation requirements</u>

4.4 INTERNATIONAL STANDARDS AND GUIDELINES

4.4.1 IFC PERFORMANCE STANDARDS

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group

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(WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's Sustainability Framework articulates the Corporation's strategic commitment to sustainable development and is an integral part of IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability. IFC's Access to Information Policy reflects IFC's commitment to transparency and good governance on its operations and outlines the Corporation's institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Proposed Development is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

A brief overview of the PS is outlined below.

Table 4-4 – Objectives and Applicability of the IFC Performance Standards

Reference	Requirements	Project Specific Applicability
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts		
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the affected communities) and, where appropriate, other stakeholders.	

Reference	Requirements	Project Specific Applicability
	The IFC Standards state under PS 1 (Guidance Note 23) that “the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project’s potential impacts as identified during the course of the assessment process.” This document is the DSR undertaken for the proposed project. The impact assessment phase will comprehensively assess the key environmental and social impacts and complies with the requirements of the South African EIA Regulations.	
Performance Standard 2: Labour and Working Conditions;		
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. PS2 is considered applicable as a contractor will be appointed to undertake the required scope of work. Formal human resource and labour policies will be compiled in the event that the project is developed in the future as part of the project specific ESMS/corporate ESMS.	
Performance Standard 3: Resource Efficiency and Pollution Prevention		
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world. PS3-related impacts, such as the management of construction waste, hazardous substances, stormwater, use of water, etc will be further assessed during the EIA phase. The project is not GHG emissions intensive and will seeks to facilitate resource efficiency and pollution prevention. Pollution in the construction phase be further assessed during the EIA phase. In addition, a Climate Change Impact Assessment will be undertaken to determine the GHG emissions and the related impact of the project.	
Performance Standard 4: Community Health, Safety, and Security		
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. The requirements included in PS 4 will be addressed in the EIA process. The following generic plans will be included in the EMPr: ■ Emergency Response Plan; ■ Transport Management Plan;	

Reference	Requirements	Project Specific Applicability
	<ul style="list-style-type: none">■ HIV/AIDS Management Plan; and■ Security Policy. <p>All plans will be made site specific where necessary.</p>	
Performance Standard 5: Land Acquisition and Involuntary Resettlement		
Overview	<p>Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.</p> <p>PS5 is not applicable to the proposed project as the project is located within an existing port which is controlled by TNPA.</p>	
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources		
Overview	<p>Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.</p> <p>The proposed development is located within a CBA and EFZ therefore a terrestrial biodiversity assessment and a marine ecology assessment will be undertaken.</p> <p>The methodologies for the specialist assessments will include a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.</p> <p>The prevalence of invasive alien species will be determined, and mitigation and management measures are included in the EMPr.</p> <p><u>In accordance with the principles of Performance Standard 6, residual biodiversity impacts that remain following mitigation have informed the development of a Biodiversity Compensation Plan and long-term biodiversity management commitments associated with the proposed development.</u></p>	
Performance Standard 7: Indigenous People		
Overview	<p>Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.</p>	

Reference	Requirements	Project Specific Applicability
	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area.	
Performance Standard 8: Cultural Heritage		
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. A Heritage Assessment will be conducted as part of the EIA process by a suitably qualified specialist.	

4.4.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

In support of the Performance Standards, the World Bank Group (WBG) has published a number of Environmental Health and Safety (EHS) Guidelines. The EHS Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility. The EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to PS3: Pollution Prevention and Abatement, as well as certain aspects of occupational and community health and safety.

Where host country regulations differ from the levels and measures presented in the EHS Guidelines, projects seeking international funding may be expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is required.

The following IFC / WBG EHS Guidelines have been generally consulted during the preparation of the BA in order to aid the identification of EHS aspects applicable to the project:

- General EHS Guidelines – this includes a section on a range of environmental, occupational health and safety, community health and safety, and construction activities that would apply to the project. The guideline also contains recommended guidelines adopted from the World Health Organisation (WHO) for ambient air and water quality, which are referred to in the relevant impact assessment sections in the ESIA report.

4.4.3 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in

projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 125 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 4-5**.

It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to this process and have not been included in this discussion.

Table 4-5 - Requirements and Applicability of the Equator Principles

Requirement		Project Specific Applicability
Principle 1: Review and Categorisation		
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC.	The proposed project can be regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.

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Requirement		Project Specific Applicability
	<p>Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts.</p> <p>The categories are:</p> <ul style="list-style-type: none"> Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and Category C: Projects with minimal or no adverse environmental and social risks and/or impacts. 	
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed project.	The impact assessment supported by specialist input will comprehensively assess the key environmental and social impacts in accordance with the requirements of the South African EIA Regulations (2014, as amended). In addition, a site-specific EMPr will be compiled.
Principle 3: Applicable Environmental and Social Standards		
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC PS. In addition, this S&EIR process will be undertaken in accordance with NEMA (the host country's relevant legislation).
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		
Overview	For all Category A and Category B Projects, the EPFI will require the client	The EMPr will serve to management and monitor activities associated

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Requirement	Project Specific Applicability
<p>to develop or maintain an Environmental and Social Management System (ESMS).</p> <p>Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards.</p>	<p>with all phases of the proposed project.</p>
Principle 5: Stakeholder Engagement	
Overview	<p>EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process.</p> <p>The S&EIR process will include a stakeholder engagement process which complies with the South African EIA Regulations. The process includes consultations with local communities, nearby businesses, and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments).</p> <p>The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication.</p>
Principle 6: Grievance Mechanism	
Overview	<p>For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.</p> <p>The EMP will include a Grievance Mechanism Process for Public Complaints and Issues. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner.</p>
Principle 7: Independent Review	
Overview	<p>For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the</p> <p>This principle is not applicable</p>

Requirement	Project Specific Applicability
	Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.
Principle 9: Independent Monitoring and Reporting	
Overview	<p>To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.</p> <p>This principle is not applicable</p>

4.5 LISTED ACTIVITIES UNDER THE NEMA EIA REGULATIONS

The listed activities that have been identified in terms of the NEMA EIA Regulations are presented in **Table 4-6** below.

Table 4-6: Listed Activities under the NEMA EIA Regulations

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
19a	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—</p> <ul style="list-style-type: none"> (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea; — but excluding where such infilling, depositing , dredging, excavation, removal or moving— (f)will occur behind a development setback; (g)is for maintenance purposes undertaken in accordance with a maintenance management plan; (h)falls within the ambit of activity 21 in this Notice, in which case that activity applies; (i)occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or <p>where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>The basin located within the estuary will be dredged to around -14.5 CD proclaimed depth and -15.1 CD including the consideration for sedimentation.</p> <p>An estimated 2.8 million cubic metres of dredged material will be disposed of at an existing authorised offshore disposal site. However, it is estimated that a bulked volume of approximately 3. 6 million cubic metres will be disposed of at the offshore dump site. This activity is therefore applicable.</p>
27	<p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</p>	<p>Indigenous vegetation to be cleared is approximately 18.6 ha which exceeds the minimum threshold of this activity therefore this activity is applicable.</p>

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<ul style="list-style-type: none"> (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. 	
Activity No(s):	Provide the relevant Scoping and EIA Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
12	<p>The development of railway lines, stations or shunting yards excluding —</p> <ul style="list-style-type: none"> (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in a mining area; or (iii) additional railway lines within the railway line reserve. 	<p>Development of the new railway siding will consist of two rail lines that are 370 m each in length, each servicing 25 rakes. The width of the rail reserve will be approximately 15 m, and 30 m at maximum including the hard standing for loading therefore this activity is applicable.</p>
26	<p>Development—</p> <ul style="list-style-type: none"> (i) in the sea; (ii) in an estuary; (iii) within the littoral active zone; (iv) in front of a development setback; or (v) if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater; <p>in respect of —</p> <p>(a) facilities associated with the arrival and departure of vessels and the handling of cargo;</p>	<p>The entire project area is located within an estuary and the EFZ therefore this activity is applicable.</p>

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(b) piers; (c) inter- and sub-tidal structures for entrapment of sand; (d) breakwater structures; (e) coastal marinas; (f) coastal harbours or ports; (g) tunnels; or (h) underwater channels;	
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres in (d) KZN in: i.in an estuarine functional zone;	Development of the new access road will be approximately 735 m in length with a width of 30 m where no reserve exists within the EFZ therefore this activity is applicable .
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan in (d) KZN. xiii. in an estuarine functional zone	Indigenous vegetation to be cleared will exceed 300 square metres (approximately 18.6Ha) within the EFZ therefore this activity is applicable .
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs— (a) within a watercourse;	Development of the Berth 605 and associated infrastructure within the EFZ therefore this activity is applicable

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>In (d) KZN.</p> <p>i. in an estuarine functional zone;</p>	

5 EIA METHODOLOGY

5.1 S&EIR PROCESS AND PHASING

The S&EIR process consists of various phases with associated timelines as defined in the EIA Regulations. The process can generally be divided into four main phases, namely, (i) an unregulated pre-application phase, (ii) an Application and Scoping Phase, (iii) an Impact Assessment Phase (current phase) and (iv) EA and Appeal Phase.

The main objectives of the phases can be described as follows:

■ **Pre-Application Phase (completed):**

- Undertake consultation meetings with the relevant authorities to confirm the required process and general approach to be undertaken.
- Identify stakeholders, including neighbouring landowners/residents and relevant authorities.
- Compile a DSR describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that may require further investigation in the EIA Phase.
- Develop draft terms of reference for the specialist studies to be undertaken in the Impact Assessment Phase.
- Inform stakeholders of the proposed project, feasible alternatives and the S&EIR process and afford them the opportunity to register and participate in the process and identify any issues and concerns associated with the proposed project.

■ **Application and Scoping Phase (completed):**

- Compile and submit application forms to the CA and pay the relevant application fees (TNPA is a state-owned entity therefore is exempted from the payment of fees).
- Incorporate comments received from stakeholders during the pre-application phase into the DSR.
- Release of the DSR for a 30-day comment period.
- Submit the finalised FSR including a comments and responses report, following the consultation period, to the relevant authority, in this case the DFFE, for acceptance/rejection.

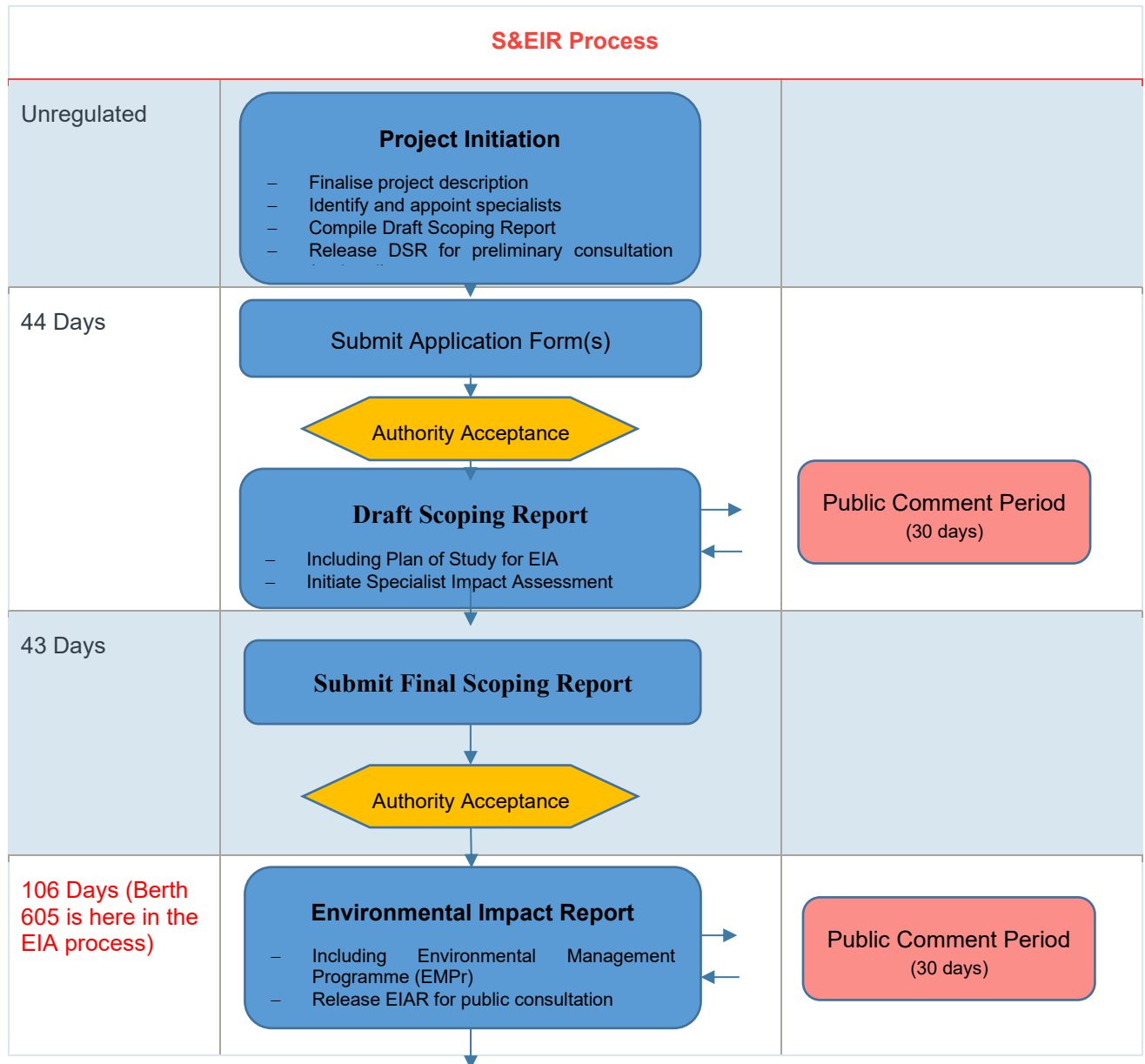
■ **EIA Phase (current phase):**

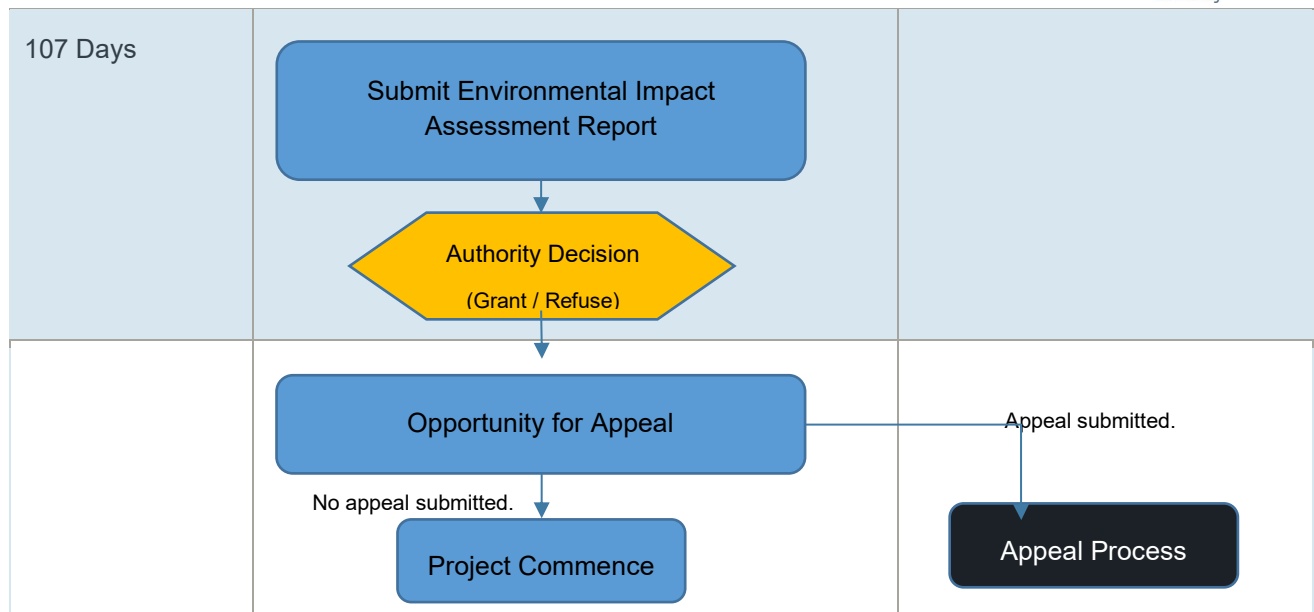
- Continue to inform and obtain contributions from stakeholders, including relevant authorities, stakeholders, and the public and address their relevant issues and concerns.
- Assess in detail the potential environmental and socio-economic impacts of the project as defined in the DSR.
- Identify environmental and social mitigation measures to avoid and/or address the identified impacts.
- Conduct the required specialist studies.
- Develop and/or amend the EMPr based on the mitigation measures developed in the EIR.
- Submit the EIR and the associated EMPr to the competent authority to undertake the decision-making process.

■ Authorisation and Appeal Phase

- The DFFE to provide written notification of the decision to either grant or refuse EA for the proposed project; and
- Notify all registered I&APs of the decision and right to appeal.

Table 5-1 – S&EIR Process





5.2 SUMMARY OF THE SCOPING PHASE

5.2.1 PRE-APPLICATION CONSULTATION

Pre-application consultation with the CA, in this case the DFFE EIA Directorate was undertaken on 19 September 2024. The EAP presented the project and POS to the DFFE, and this was accepted by means of acknowledgement of the meeting minutes dated 11 November 2024.

In addition, a pre-application consultation was also held with the DFFE: Oceans and Coast Directorate on 13 November 2024. The meeting confirmed the EAPs understanding of the permitting requirements for the project specifically related to the Dump at Sea Permit and associated requirements.

The pre-application meetings also confirmed the required specialist studies and level of assessment required for each study.

Refer to **Appendix D** of this report for Stakeholder Engagement Report (SER) which includes the meeting minutes.

5.2.2 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

An application for EA was submitted simultaneously with the DSR on 18 November 2024. The DFFE acknowledged receipt of the application form and the DSR on 19 November 2024 and a reference number was allocated to the application (14/12/16/3/3/2/2656).

Refer to **Appendix D** of this report for SER which includes the proof of submission of the application and DSR and the acceptance of the FSR

5.2.3 PUBLIC PARTICIPATION PROCESS

5.2.3.1 Purpose of the Public Participation Process

A Public Participation Process (PPP) is a requirement of the S&EIR process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIR decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project

information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the PPP can be summarised as follows:

The objectives of the PPP can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the project.
- Clearly outline the scope of the project, including the scale and nature of the existing and proposed activities.
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision.
- Identify shortcomings and gaps in existing information.
- Identify key concerns, raised by stakeholders that should be addressed in the subsequent specialist studies.
- Highlight the potential for environmental impacts, whether positive or negative.
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

The EIA Regulations, in Chapter 6 provide clear guidelines regarding the minimum requirements for public participation as part of the EIA process. Although these regulations do not prescribe in detail the methods of public participation, the 2017 Public Participation Guidelines in terms of the NEMA EIA Regulations, as amended provided direction and emphasise the importance of meaningful consultation and was implemented for the Berth 605 PPP.

5.2.3.2 Identification of I&APs

Chapter 6 (40) (2) (a -d) and (41)(2)(b) of the EIA Regulations require consultation with-

- The CA in this instance is the DFFE.
- Every State department that administers a law relating to a matter affecting the environment relevant to an application for an EA.
- All organs of state which have jurisdiction in respect of the activity to which the application refers.
- All potential or, where relevant, registered I&APs.

In addition to the above, the following I&APs must receive notification of the proposed application:

- The occupiers of the site and, if the applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken.
- Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken.
- The municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area.
- The municipalities which have jurisdiction in the related areas.
- Any other party required by the CA.

I&APs were identified through several mechanisms. These include:

- Utilising existing databases from other projects in the area.
- Networking with local business owners, non-governmental agencies, community-based organisations, and local council representatives.

- Field work in and around the project area.
- Advertising in the press.
- Placement of community notices.
- Completed comment sheets.
- Attendance registers at meetings.

All I&APs identified to date have been registered on the project database. The EAP endeavoured to ensure that individuals/organisations from referrals and networking were notified of the proposed project. Stakeholders were identified at the horizontal (geographical) and vertical extent (organisations level). A list of I&APs captured in the project database is included in the PPP Report included in **Appendix D**. Relevant commenting authorities have been automatically registered as I&APs. In accordance with the EIA Regulations, all other persons must request in writing to be placed on the register, submit written comments or attend meetings in order to be registered as stakeholders and included in future communication regarding the project.

Section 41 of the EIA Regulations states that written notices must be given to identified I&APs as outlined in **Table 5-2**.

Table 5-2 – Interested and Affected Parties

NEMA REQUIREMENT	DISCUSSION
<i>(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land</i>	The applicant is the landowner.
<i>(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken</i>	The applicant is the landowner and occupant.
<i>(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken</i>	The applicant is the landowner and occupant.
<i>(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area</i>	The Ward Councillors from Wards 2 of the City of uMhlathuze Local Municipality has been included in the stakeholder database.
<i>(v) the municipality which has jurisdiction in the area</i>	The King Cetshwayo District as well as the City of uMhlathuze Local Municipalities have been included on the stakeholder database.
<i>(vi) any organ of state having jurisdiction in respect of any aspect of the activity</i>	The DFFE has been consulted as the CA regarding the application.
<i>(vii) any other party as required by the competent authority.</i>	All tiers of government, namely, national, provincial, local government and parastatals have been included on the stakeholder database. Inclusive of but not limited to: <ul style="list-style-type: none"> ■ DFFE EIA Directorate ■ DFFE Oceans and Coast Directorate

NEMA REQUIREMENT	DISCUSSION
	<ul style="list-style-type: none"> ■ DFFE: Biodiversity Conservation Unit Directorate ■ DWS ■ SAHRA ■ KZN Department of Agriculture and Rural Development ■ Department of Economic Development, Tourism and Environmental Affairs ■ Ezemvelo KZN Wildlife ■ Umhlathuze Local Municipality ■ King Cetshwayo District Municipality

5.2.3.3 I&AP Notification

Direct Notification

The objectives of the notification process are as follows:

- Notify potential I&APs of TNPAs intent to apply for an EA for the Berth 605 project.
- Share information about the proposed Project, EA application, EIA and proposed PPP, and opportunities for comment.
- Invite stakeholders to register as I&APs and to participate in the EIA process by contributing comments as milestones are achieved.
- Invite I&APs to attend public meetings.
- In terms of the POPIA, to obtain I&APs' consent to use their contact details for the sole purpose of providing them with information about the proposed Project and inviting them to contribute comments, as well as reflecting their names in the CRR.

Notification of the project was issued to potential I&APs, via direct correspondence (i.e., SMSs and e-mail) on 18 November 2024. Proof of the distribution of the email and sms notifications is included in the PPP Report as found in Appendix D of this report.

Newspaper Advertisements

According to Regulation 41 (1) (c) of the EIA Regulations, an advertisement must be placed in one local newspaper or any official Gazette and in at least one provincial or national newspaper if the activity extends beyond the metropolitan or district municipality boundaries.

Given the location of the project, which is confined to one local municipality, newspaper advertisements were placed in one local newspaper. However, considering the nature of the project and the applicant being TNPA, a newspaper advert was also placed in a regional newspaper as best practice.

Notification of the proposed project was issued to the general public via an advertisement published in the Zululand Observer (English) and Isolezwe newspaper (isiZulu) on 15 November 2024.

A copy of the advertisements has been included in the PPP Report included in **Appendix D** of this report.

Site notices

The EIA Regulations require that site notices be fixed at places conspicuous to the public at the boundary or on the fence of the site where the activity (to which the application relates) is to be

undertaken, as well as at any alternative sites. Posters (in English and isiZulu), conforming to the size specifications as per the EIA Regulations were placed on Monday, 18 November 2024, at the following points:

- Aquadene Public Library
- Richards Bay Library
- Umhlathuze Municipality
- Zululand Yacht Club
- Richards Bay Ski-Boat Club
- Richards Bay Seafarers Club
- IDZ Entrance
- Blackwood's Richards Bay
- TNPA Entrance
- Corner of Anglers Road and Krewelkrin Street
- Department Home Affairs King Cetshwayo District (Richards Bay)

Although the project is located within the PoRB, WSP placed site notices at locations that are visible to the larger public including road intersections in the vicinity of the port, public libraries and ski boat clubs. The site notices were placed at the public places, with permission, in English and Isizulu.

Proof of the erected site notices is included in the PPP Report as found in **Appendix D** of this report.

5.2.4 DRAFT SCOPING REPORT

Printed copies and electronic copies of the DSR, Registration and Comment Forms were also made available during the public comment period at the following locations:

- Aquadene Public Library
- Richards Bay Library

The DSR was made available for public review for a 30-day comment period from 19 November 2024 to 13 January 2025. The comment period was extended by an additional 3 days to accommodate for the year end break. The DSR was also made available on the WSP website (<https://www.wsp.com/en-za/services/public-documents>) and a datafree website.

5.2.4.1 Comments and Responses on the DSR

All the issues, questions, comments, and recommendations contributed by registered I&APs during the S&EIR process have been incorporated into a Comment and Response Register (CRR) which forms part of the PPP Report included in this report. Contributions received by I&APs have been categorised according to relevant topics. An important consideration during the scoping phase is that the DSR is released into the public domain within the same timeframe as the PPP and I&APs are provided with the notification of the project and of the DSR comment period simultaneously, therefore the DSR did not contain all the details of the PPP that was undertaken, this was included in the PPP Report included in the FSR and the Draft EIR.

The CRR include the following:

- List of all issues raised;
- Record of who raised the issues;
- Record of where the issues were raised;

- Record of the date on which the issue was raised; and
- Response to the issues.

The following key issues were raised by I&APs during the PPP for the DSR:

- Assessment of the correct listed activities during the EIA process.
- The consideration of alternatives for the various project components.
- The identification and assessment of all areas of sensitivity.
- The assessment of cumulative impacts.
- The undertaking of the required specialist studies.
- The fulfilment of the minimum requirements for the PPP.
- The inclusion of an EMPr into the Draft EIR.
- Request for building plans ahead of construction.
- Consideration of air quality impacts.
- The request for a Traffic Impact Assessment to inform the EIA process.
- Alternatives for dredge disposal.
- Required submissions to the SAHRA for heritage related permits.
- Environmental pollution associated with berthing structures.
- Climate change impacts.
- Economic contribution of the project.

5.2.5 FINAL SCOPING REPORT

The FSR was made available for public information on 20 January 2025 on the WSP website (<https://www.wsp.com/en-za/services/public-documents>). The FSR was submitted to the DFFE on 21 January 2025 and accepted on 28 February 2025.

Refer to **Appendix D** for the decision on the FSR.

5.3 DEFINING THE BASELINE ENVIRONMENT

The site has been the subject of a number of specialist assessments in support of a parallel planning and statutory approvals process being undertaken for the proposed development. The specialist studies from this process and further research have been utilised to support the environmental application process. Therefore, the description of the baseline environment has been compiled through a combination of site investigations, desktop reviews and information obtained from the specialist assessments. Desktop reviews made use of available information including existing reports, aerial imagery and mapping.

5.3.1 DFFE WEB BASED SCREENING TOOL

The DFFE has developed the National Web-based Environmental Screening Tool to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of regulation 16 (1)(v) of the EIA Regulations. The Notice of the requirement to submit a report generated by the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA and regulation 16(1)(b)(v) of the EIA regulations states that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, is compulsory when submitting an application for EA in terms of Regulation 19 and Regulation 21 of the EIA Regulations.

The Screening Report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed project was generated and is attached as Appendix E. The screening report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of the S&EIR process based on the development type and the environmental sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making.

Table 5-3 below provides a summary of the sensitivities identified for the development footprint.

Table 5-3 - Sensitivities Identified in the DFFE Screening Report and Site Verification

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity	Site Verification and Protocol for Specialist Study
Agriculture Theme	X				<p>The DFFE Screening Tool does not prescribe a protocol of the agricultural theme therefore a specialist assessment will not be undertaken.</p> <p>The site is considered very high sensitivity due to the very high land capability rating. However, based on the site verification by the EAP and various specialists on the location of the site within the port and current land use, the very high sensitivity is refuted, the site is considered low in sensitivity for the agricultural theme.</p>
Animal Species Theme		X			<p>The DFFE Screening Tool prescribed an animal species assessment be conducted based on the likely presence of sensitive avifaunal species.</p> <p>The site verification by the specialist confirmed that the site is high in sensitivity due to the presence of sensitive species and sensitive habitats such as the sandspit.</p> <p>Therefore, a terrestrial animal species assessment has been incorporated into the Terrestrial Biodiversity Assessment. In addition, an avifaunal assessment has been conducted.</p>

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity	Site Verification and Protocol for Specialist Study
Aquatic Biodiversity Theme	X				<p>The DFFE Screening Tool prescribed that an Aquatic Biodiversity Assessment be undertaken based on the presence of the estuary.</p> <p>The site verification by the specialist confirmed that the site is within an estuary and the associated EFZ.</p> <p>An Aquatic and Freshwater Assessment has been conducted.</p> <p>In addition, a Baseline Estuarine and Marine Ecology Assessment has been undertaken.</p>
Archaeological and Cultural Heritage Theme				X	<p>The DFFE Screening Tool prescribed that a site verification be undertaken for the archaeological and cultural heritage theme. However, the NHRA requires that a HIA be undertaken therefore a terrestrial and marine heritage assessment has been undertaken.</p> <p>The site verification by the specialist confirmed that the site is very low in sensitivity for the heritage theme. The terrestrial and underwater HIA has been conducted in support of the EIA process.</p>
Civil Aviation Theme		X			<p>The DFFE Protocol requires that a site verification be undertaken by the EAP or a specialist as the site is located between 8 and 15km from a civil aviation aerodrome. Based on the site verification the High Sensitivity is refuted as the project will not impact on the aerodromes; therefore, a formal Civil Aviation Assessment will not be undertaken as part of this application. Nevertheless, the Air Traffic Navigation Services and the South African Civil Aviation Authority (SACAA) have been included on the list of I&APs.</p>
Defence Theme				X	<p>The DFFE protocol requires that a site verification be undertaken by an EAP for the defence theme. The site verification confirmed that the</p>

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity	Site Verification and Protocol for Specialist Study
					<p>project will have no impact on any defence sites.</p> <p>However, it is noted that the SA Navy at the Port of Durban will be relocating to Pelican Island at the PoRB, however the relocation has no association to the Berth 605 project. Nonetheless, the Ministry of Defence has been added to the stakeholder database and will be kept informed on the Berth 605 S&EIR process.</p>
Palaeontology Theme			X		The DFFE Screening Tool prescribed that a site verification be undertaken for the palaeontology theme, however a Desktop Palaeontology Impact Assessment has been undertaken.
Plant Species Theme			X		<p>The DFFE Protocol requires that a compliance statement be completed for the site.</p> <p>Site verification by the specialist confirmed that the site is high in sensitivity as there is high plant species abundance at the site including SCC. A plant species assessment has been incorporated into the Terrestrial Biodiversity Assessment.</p>
Terrestrial Biodiversity Theme	X				<p>The DFFE Screen Tool prescribed that a Terrestrial Biodiversity Assessment be undertaken based on the CBA that the project area falls within.</p> <p>The site verification by the specialist confirmed that the site has very high sensitivity due to the presence of the forests and estuary within the project footprint.</p> <p>A Terrestrial Biodiversity Assessment has been undertaken.</p>
Additional Specialist Studies					
Visual Impact Assessment					The DFFE Protocol requires that a site verification be undertaken for the visual and landscape theme.

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity	Site Verification and Protocol for Specialist Study
					Based on specialist opinion following the site assessment, a full Visual Impact Assessment will not be required. A baseline and compliance statement has been compiled.
Socio-economic impact assessment					The DFFE protocol requires that site verification be undertaken. However, based on the strategic nature and location of the project, a Socio-economic assessment has been undertaken.
Climate Change Impact Assessment					The DFFE Screening Report did not stipulate the Climate Change Assessment to be undertaken, however given the nature of the project, an assessment will be undertaken.
Noise					<p>Considering the site, which is located within a port, there is existing disturbance caused by port related activities. A noise impact assessment will not be undertaken however baseline surveys have been conducted.</p> <p>The site verification by the noise specialist indicates that there are no sensitive receptors of noise within proximity of the project area, a Compliance Statement has been included in the Draft EIR.</p>

5.4 IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT IMPACTS DURING THE SCOPING PHASE

5.4.1 SCOPING PHASE METHODOLOGY

The potential impacts associated with the proposed development were determined at both a desktop level based on existing information, as well as the field assessment. The following methodology was used during the scoping phase:

- Identify potential sensitive environments and receptors that may be impacted on by the proposed development.
- Identify the type of impacts that are most likely to occur (including cumulative impacts).
- Determine the nature and extent of the potential impacts during the various developmental phases, including, construction and operation.
- Identify potential No-Go areas (if applicable).

- Summarise the potential impacts that will be considered further in the EIA phase through detailed specialist studies.

Appendix 2 of the EIA Regulations requires the identification of the significance of potential impacts during scoping phase. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and, consequence, where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and severity are detailed in **Table 5-4** and **Table 5-5** respectively.

Table 5-4 - Significance Screening Tool

	Consequence Scale				
Probability Scale		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

Table 5-5 - Probability Scores and Descriptors

Score	Descriptor
4	Definite: The impact will occur regardless of any prevention measures
3	Highly Probable: It is most likely that the impact will occur
2	Probable: There is a good possibility that the impact will occur
1	Improbable: The possibility of the impact occurring is very low

5.4.2 FINDINGS OF THE SCOPING PHASE

The Scoping Phase identified impacts associated with the proposed Berth 605 and associated structures and infrastructure. The findings of the preliminary significance ratings undertaken during the scoping phase for the construction phase and operational phase are included in the table below. The impacts that were low to negligible in significance were not further assessed in the EIA Phase.

Table 5-6 – Findings of the Scoping Phase

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
Climate	GHG emissions	Negative	2	2	Low	Yes (Climate Change Impact Assessment)
	Climate change trends on the project	Negative	3	2	Medium	
Topography and Geology	Constructability	Negative	3	2	Medium	Yes (Geotechnical Assessment)
Aquatic and Freshwater Environment	Changes in water flow regime	Negative	2	2	Low	Yes (Aquatic and Freshwater Impact Assessment)
	Changes in sediment volume	Negative	2	2	Low	
	Introduction and spread of alien vegetation	Negative	2	2	Low	
	Loss and disturbance of watercourse habitat and fringe vegetation	Negative	2	2	Low	
	Changes in water quality	Negative	2	2	Low	
	Loss of aquatic biota	Negative	2	2	Low	

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
	Loss and direct disturbance of wetland habitat	Negative	3	2	Medium	
Estuarine and Marine Ecology	Impact on marine ecology as a result of water-based construction activities	Negative	4	2	Medium	Yes (Baseline Estuarine and Marine Ecology Assessment)
	Loss of estuarine and marine fauna	Negative	4	2	Medium	
	Changes in water quality	Negative	4	2	Medium	
	Noise impacts on marine ecology	Negative	4	2	Medium	
	Marine habitat loss and fragmentation	Negative	4	2	Medium	
Terrestrial Biodiversity	Habitat loss and fragmentation (CBA)	Negative	2	2	Low	Yes (Terrestrial Biodiversity Assessment and Biodiversity Compensation Plan)
	Direct loss and disturbance of habitat and associated flora Species of	Negative	2	2	Low	

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
	Conservation Concern					
	Establishment and Spread of Alien Invasive Species	Negative	2	2	Low	
	Loss and Fragmentation of Faunal Habitats	Negative	2	2	Low	
	Injury and mortality of faunal Species of Conservation Concern	Negative	2	2	Low	
Avifauna	Disturbance of avifauna due to construction activities	Negative	3	2	Medium	Yes (Avifaunal Assessment)
	Loss of avifaunal habitat	Negative	3	2	Medium	
	Loss of avifaunal Species of Conservation Concern	Negative	3	2	Medium	
Heritage and Cultural Resources	Disturbance to known land and	Negative	2	2	Low	Yes (Land and Marine)

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
	marine cultural resources					Archaeological and Heritage Impact Assessment)
	Chance Find of Cultural Resources	Negative	2	2	Low	
Palaeontology	Chance Find of Palaeontological resources	Negative	2	2	Low	Yes (Desktop Palaeontology Impact Assessment)
Socio-Economic	Creation of local employment, training, and business opportunities	Positive	3	1	Low	Yes (Socio-economic Impact Assessment)
	Increased opportunity for local businesses and suppliers	Positive	3	2	Medium	
	Impact of construction workers on local communities	Negative	2	1	Very low	
	Nuisance impacts associated with construction related activities	Negative	3	1	Low	

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
Visual	Visual impacts on the landscape and aesthetics	Negative	3	1	Low	Visual baseline and compliance statement
Noise	Noise impacts on sensitive receptors	Negative	3	2	Medium	A terrestrial noise baseline survey has not been conducted however a noise compliance statement is included in this EIR. A marine noise assessment has not been as agreed upon with the DFFE during the pre-application stage. The project will not contribute to or increase the marine noise disturbance at the port.
	Noise impacts on marine ecology	Negative	3	2	Medium	
	Noise impacts on avifauna	Negative	3	2	Medium	
Traffic	Increased traffic generation around the study area by construction vehicles	Negative	3	1	Low	No (however a high-level traffic assessment is being conducted as part of the engineering requirements for the project).
	Deterioration of the surrounding road	Negative	3	1	Low	

Aspect	Impact	Nature	Probability	Consequence	Significance (Before Mitigation)	Further Assessment Required
	network due to an increase of traffic around the site					A TIA was however requested by the Umhlathuze Local Municipality. It must be noted that the CHF is traffic generating and not the Berth 605 nor the new access road.
	Transportation of abnormal loads during the construction phase	Negative	3	1	Low	
	Increased traffic due to new roads to and from the project area	Negative	3	1	Low	

5.5 IMPACT ASSESSMENT PHASE METHODOLOGY

The following activities were undertaken or are currently being undertaken as part of the EIA Phase:

- Continue to inform and obtain contributions from stakeholders, including relevant authorities, stakeholders, and the public and address their relevant issues and concerns.
- Assess in detail the potential environmental and socio-economic impacts of the project as defined in the Scoping Report.
- Identify environmental and social mitigation measures to avoid and/or address the identified impacts.
- Develop and/or amend an EMPr based on the mitigation measures developed in the EIR.
- Submit the EIR and the associated EMPr to the competent authority to undertake the decision-making process.
- The DFFE to provide written notification of the decision to either grant or refuse EA for the proposed project.
- Notify all registered I&APs of the decision and right to appeal.
- Authorisation and Appeal Phase.

5.5.1 SPECIALIST STUDIES

Specialist assessments were conducted in accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. “the Protocols”), or Appendix 6 of the EIA Regulations, depending on which legislation apply to the assessment under consideration.

Specialist studies were undertaken during the EIA phase to consider and assess environmental impacts associated with the proposed project. The outcomes of these studies are included in the relevant reports contained in Appendix G . The table below provides a list of the Specialist Studies that have been undertaken.

Table 5-7 – Details of Specialists

Assessment	Name of Specialist	Company
Terrestrial Biodiversity Assessment including animal and plant species theme	Sandhya Moodley/Rudolph Greffrath	WSP
Biodiversity Compensation Plan	Rudolph Greffrath	WSP
Avifaunal Assessment	David Allan	David Allan
Freshwater Assessment	Nqobile Lushozi	SASS Environmental
Baseline Estuarine and Marine Ecology Assessment	Brent Newman	CSIR
Sediment and Soil Quality	Brent Newman	CSIR
Heritage Impact Assessment	Gavin Anderson	Umlando Consulting

Assessment	Name of Specialist	Company
Marine Heritage Impact Assessment	Vanessa Maitland	Maritime Archaeology
Desktop Palaeontology Impact Assessment	Marion Bamford	Marion Bamford
Visual Compliance Statement	Sanja Erwee	SASS Environmental
Social Impact Assessment	Tumelo Mathulwe	WSP
Economic Assessment	Tinotenda Makoni	Urban Econ
Climate Change Impact Assessment	Thando Mosia/Verushka Singh	WSP
Noise Compliance Statement	Kirsten Collett/Jared Lodder	WSP
Wave and Shoreline Change Assessment	Roy Van Ballegooyen	WSP
Dredging and Dredge Disposal Assessment	Roy Van Ballegooyen	WSP

5.5.2 PPP FOR THE EIA PHASE

5.5.2.1 I&APs and Authority Consultation

There will continue to be ongoing communication between WSP and I&APs throughout the S&EIR process. These interactions include the following:

- A letter will be sent out to all registered stakeholders providing them with an update of the proposed project and the release of the Draft EIR for public comment.
- Interactions with stakeholders will be recorded in the CRR.
- Feedback to I&APs will take place both individually and collectively.
- Written responses (email, faxes or letters) will be provided to stakeholders acknowledging issues.
- As per the EIA Regulations, particular attention will be paid to landowners, and neighbouring communities.

5.5.2.2 Public Review

The Draft EIR was placed on public review for a period of 30 days from 8 April 2026 to 11 May 2026 at the following public places:

- Richards Bay Public Library
- Aquadene Public Library
- WSP website (<https://www.wsp.com/en-za/services/public-documents>).

All registered I&APs and authorising/commenting state departments will be notified of the public review period as well as the locations of the Draft EIR via email and SMS.

5.5.2.3 Comment and Response Report

The DEIR, EMPr and supporting specialist studies were made available for public review and comment for a period of thirty (30) days in accordance with the EIA Regulations. The purpose of the review period was to provide I&APs, commenting authorities and organs of state with an opportunity to evaluate the findings of the EIA process and provide comments on the proposed development, specialist findings, impact assessments, mitigation measures and environmental management commitments.

Comments were received from a range of stakeholders including government departments, environmental authorities, non-governmental organisations and interested stakeholders. The key issues raised during the review process related primarily to biodiversity impacts, impacts on estuarine habitats and mangrove systems, biodiversity compensation requirements, alternatives considered, cumulative impacts, dredging and dredged material disposal, climate change considerations, long-term protection of compensation areas and environmental management commitments.

The comments received were reviewed by the EAP together with the relevant specialists and project team. Where necessary, specialist studies, the EMPr and the BCP were revised to address matters raised during the consultation process. Particular focus was placed on comments submitted by the Department of Forestry, Fisheries and the Environment (DFFE), Ezemvelo KZN Wildlife (EKZNW), the City of uMhlathuze and other commenting authorities.

As a result of the public review process, a number of refinements and improvements were incorporated into the Final EIR. These included, inter alia:

- Revision of the Biodiversity Compensation Plan and associated compensation calculations;
- Expansion of the proposed compensation area to achieve the agreed biodiversity compensation objectives;
- Refinement of habitat-based compensation calculations and biodiversity compensation ratios;
- Introduction of long-term conservation commitments through a conservation servitude;
- Additional monitoring, management and adaptive management measures for the compensation area;
- Further clarification of impacts on freshwater wetlands and estuarine ecosystems;
- Additional information regarding dredged material disposal and cumulative impacts;
- Refinement of specialist findings and impact assessment conclusions; and
- Strengthening of mitigation and environmental management commitments.

The comments received during the review process did not result in material changes to the proposed project footprint, project scope, listed activities, preferred alternative or the overall conclusions of the EIA. The amendments incorporated into the Final EIR primarily represent refinements to specialist recommendations, mitigation measures, biodiversity compensation proposals and environmental management commitments.

Accordingly, the Final EIR reflects the outcomes of the public participation process and demonstrates how comments received from stakeholders and authorities were considered and incorporated into the environmental assessment process. Full details of the comments received, and responses provided are contained within the CRR included in the PPP Report (Appendix D).

5.5.2.4 Submission and Decision Making

The EAP must submit the Final EIR to the competent authority within 106 days of the acceptance of the FSR. Once submitted, the DFFE will be allocated 107 days to review the Final EIR in order to either grant or refuse the application. The DFFE must issue their decision within this specified timeframe.

5.5.2.5 Notification of EA

All stakeholders will receive a letter at the end of the process notifying them of the authority's decision, thanking them for their contributions, and explaining the appeals procedure as outlined in the National Appeal Regulations, 2014 (GNR 993 of 2014).

5.5.3 IMPACT ASSESSMENT METHODOLOGY

The EIR uses a methodological framework developed by WSP to meet the combined requirements of International Best Practice and the EIA Regulations.

As required by the EIA Regulations, the determination and assessment of impacts will be based on the following criteria:

- Nature of the Impact
- Significance of the Impact
- Consequence of the Impact
- Extent of the impact
- Duration of the Impact
- Probability if the impact
- Degree to which the impact:
 - can be reversed;
 - may cause irreplaceable loss of resources; and
 - can be avoided, managed or mitigated.

Following international best practice, additional criteria have been included to determine the significant effects. These include the consideration of the following:

- Magnitude: to what extent environmental resources are going to be affected.
- Sensitivity of the resource or receptor (rated as high, medium and low) by considering the importance of the receiving environment (international, national, regional, district and local), rarity of the receiving environment, benefits or services provided by the environmental resources and perception of the resource or receptor).
- Severity of the impact, measured by the importance of the consequences of change (high, medium, low, negligible) by considering inter alia magnitude, duration, intensity, likelihood, frequency and reversibility of the change.

It should be noted that the definitions given are for guidance only, and not all the definitions will apply to all of the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

5.5.4 METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct, indirect, secondary as well as cumulative impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in **Table 5-8**.

Table 5-8 – Impact Assessment Criteria and Scoring System

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental	Improbable	Low Probability	Probable	Highly Probability	Definite

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
management measures or mitigation					
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
Impact Significance Rating					
Total Score	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
Environmental Significance Rating (Negative (-))	Very low	Low	Moderate	High	Very High
Environmental Significance Rating (Positive (+))	Very low	Low	Moderate	High	Very High

5.5.5 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed projects' actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 5-1** below.

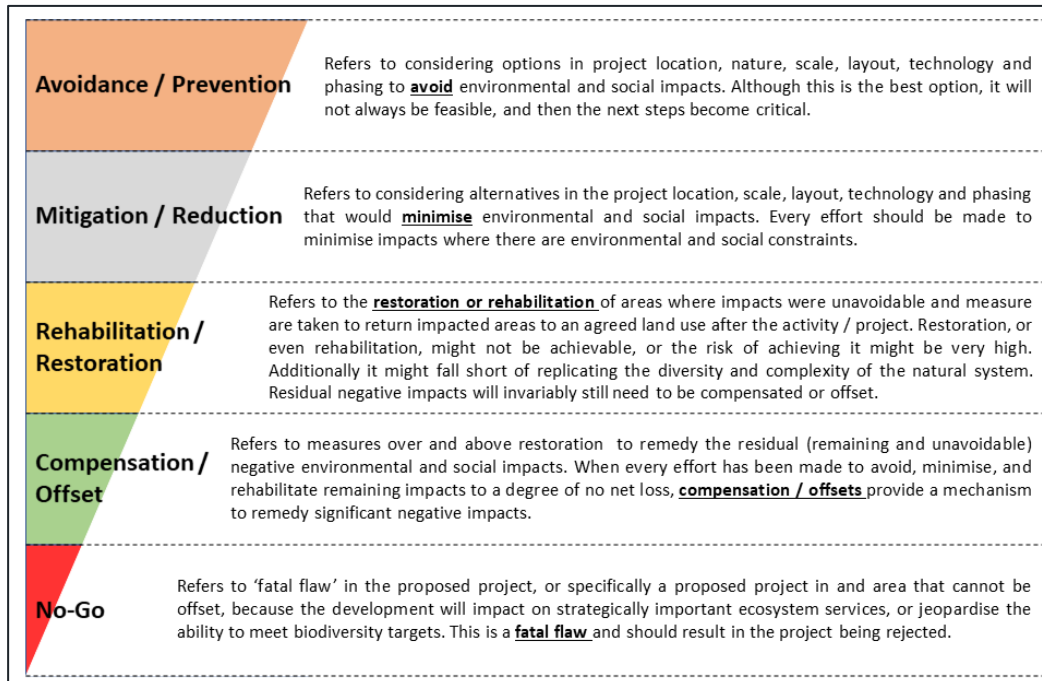


Figure 5-1 - Mitigation Sequence/Hierarchy

6 BASELINE ENVIRONMENT

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed project is located. It is important to gain an understanding of the project area and its surroundings, as it will provide for a better understanding of the receiving environment in which the project is being considered.

The description of the baseline environment is essential in that it represents the conditions of the environment before the construction of the project (i.e., the current, or status quo, environment) against which environmental impacts of the proposed project can be assessed and future changes monitored.

The area has previously been studied to some extent and is recorded in various sources of information. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed project.

The following characteristics of the receiving environment for the project area are described in the table below.

Table 6-1 – Characteristics of the receiving environment

Receiving Environment	Characteristics
Physical	<ul style="list-style-type: none"> Climate Geology and Soils Surface Water
Biological	<ul style="list-style-type: none"> Vegetation Habitats Biodiversity Conservation Plans Plant Species Animal Species Avifauna
Social and Economic	<ul style="list-style-type: none"> Heritage Palaeontology Socio-Economic Visual Noise Traffic Land Use Existing Services and Infrastructure

6.1.1 CLIMATE

6.1.1.1 General

This section focuses on key climate variables, including temperature, precipitation, wind patterns, sea surface temperatures, and sea level rise, to provide an understanding of the region's historical climate

from 1991 to 2020. By analysing these variables, the baseline offers insights into long-term trends and variability, forming the foundation for assessing current climate risks and preparing for future impacts. The analysis captures observed patterns and trends for each variable, highlighting notable changes and seasonal characteristics.

Table 6-2 presents the KwaZulu Natal baseline climate data for the 1991–2020 period. The mean annual temperature for the province is 18.6°C, with average monthly temperatures ranging between 22.4°C (in January and February) and 13.7°C in July. A clear seasonal trend is observed, with the highest temperatures occurring during the summer months (December, January, and February) and lower temperatures during the winter months (June, July, and August). Mean annual precipitation is estimated to be 866.8mm, with most rainfall occurring between November to February, and generally conditions persisting during the months of May to August (i.e. lowest rainfall) (Climate Change Impact Assessment for Berth 605, WSP 2025a).

Table 6-2 – Baseline climate data for the KwaZulu Natal Province. Source: World Bank CCKP

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Min Temp (°C)	17.0	17.1	15.7	12.9	9.4	6.4	6.3	8.3	11.1	13.0	14.4	16.0
Avg Mean Temp (°C)	22.4	22.4	21.4	19.0	16.4	13.9	13.7	15.5	17.8	19.1	20.1	21.6
Avg Max Temp (°C)	27.8	27.8	27.1	25.2	23.4	21.4	21.3	22.9	24.6	25.1	25.9	27.2
Precip (mm)	135.7	124.2	95.4	50.6	25.5	16.4	16.7	22.8	51.3	88.1	110.0	130.0

6.1.1.2 Temperature

Figure 6-1 provides the observed annual average surface air temperature in KwaZulu Natal from 1991 to 2022, alongside a 5-year smoothed curve to illustrate long-term trends. Key observations are summarised below:

- The baseline temperature data for KwaZulu Natal, South Africa, from 1991 to 2022, presents the region's temperature trends over the past 30 years. There is a noticeable increase in the annual mean temperature from 1991 (18.4°C) to 2022 (18.9°C), with the highest annual mean temperature recorded in 2019 (19.6°C).
- The 5-year smoothed curve provides a clearer trend which appears to be a gradual increase over the years indicating a clear warming pattern. The 5-year smooth temperature also peaks around 2016-2018, indicating a period of higher average temperatures.

Summary:

- Overall Increase: Both the annual mean and the 5-year smooth temperatures indicate an overall warming trend from 1991 to 2022.
- Fluctuations and Variability: There are periods of higher temperatures (e.g., 2015-2019) and lower temperatures (e.g., 1994-1997), but the general trend shows an upward trajectory which is indicative of a warming trend.

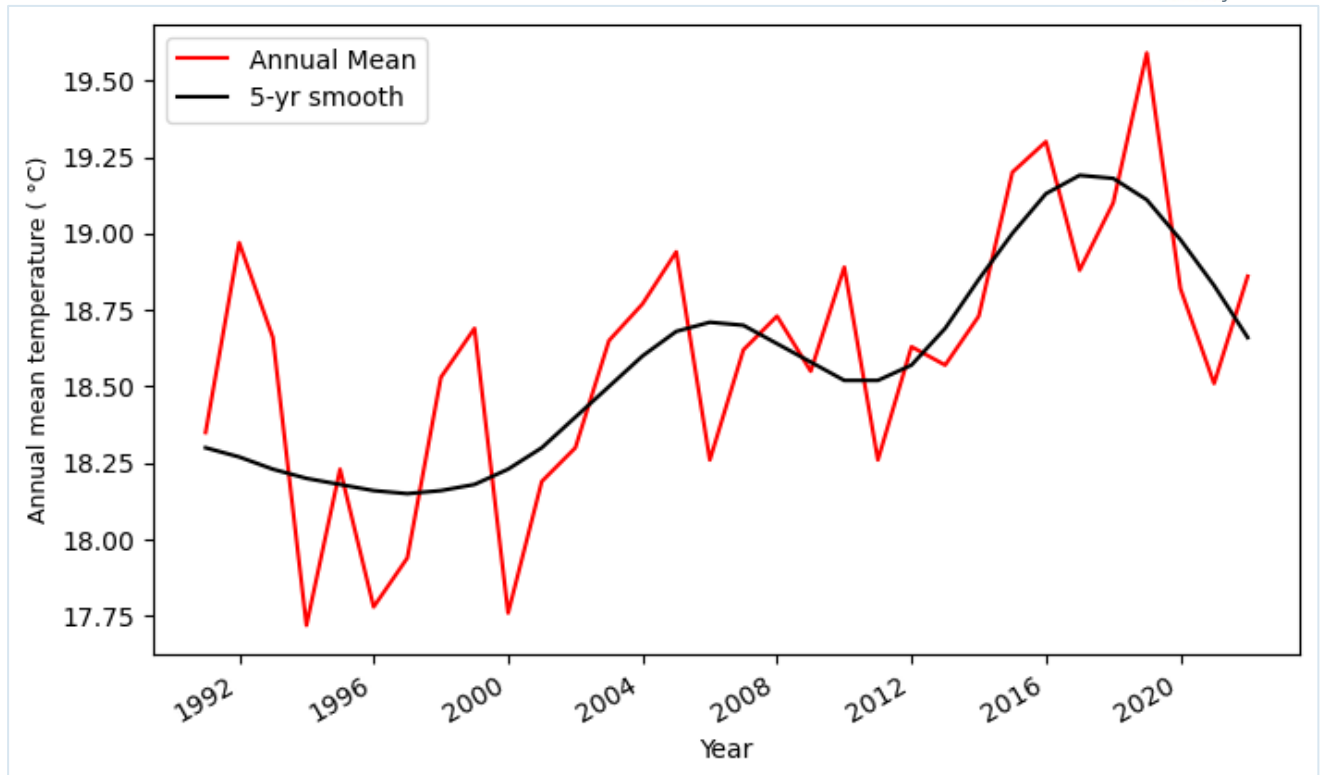


Figure 6-1 - Observed Average Annual Mean Temperature of KwaZulu Natal for 1991 - 2022.

Source: World Bank CCKP

6.1.1.3 Precipitation

Figure 6-2 offers a comprehensive view of historical annual mean precipitation in the KwaZulu Natal region from 1991 to 2022, with a 5-year smoothed curve to indicate long-term trends. Precipitation data like this plays a crucial role in understanding the local climate and its projected changes and impacts. Key observations are summarised below:

- The historical precipitation for KwaZulu Natal, South Africa, from 1991 to 2022, presents the region's precipitation trends over the past 30 years. The annual mean precipitation shows significant fluctuations over the years with some periods of high precipitation (e.g., 2000 with 1218.4 mm) and periods of low precipitation (e.g., 1992 with 560.8 mm).
- The highest annual mean precipitation recorded was in 2000 (1218.4 mm), and the lowest was in 1992 (560.8 mm).
- The 5-year smooth data provide a clear trend, which shows less fluctuation compared to the annual mean. Furthermore, the 5-year smooth precipitation peaks around 1997-1999, indicating periods of higher average precipitation.

Summary:

- **Fluctuations and Variability:** The dataset indicates fluctuations over the years, typical for precipitation data. These fluctuations indicate the importance of analysing long-term trends to understand climatic behaviours.

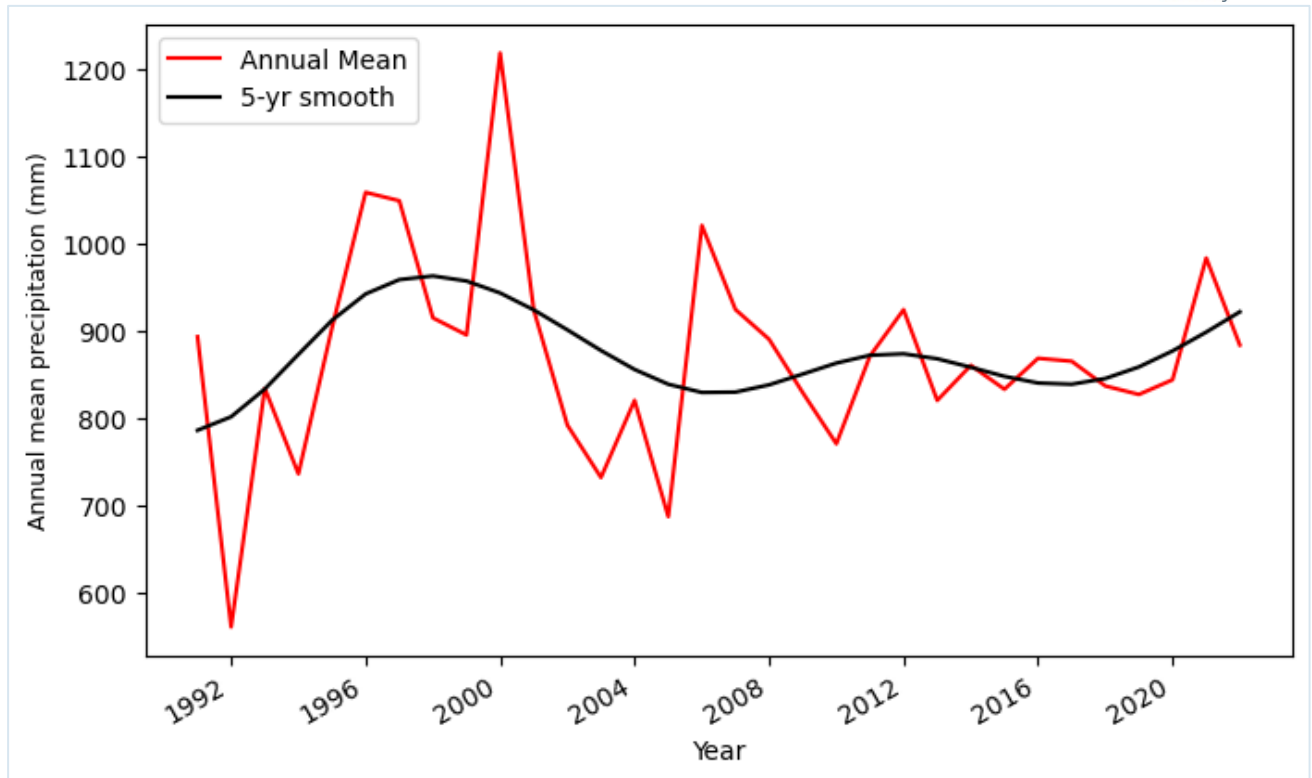


Figure 6-2 - Observed Average Annual Mean Precipitation of KwaZulu Natal for 1991 - 2022.

Source: World Bank CCKP

6.1.1.4 Wind

In KwaZulu-Natal, wind patterns are characterised by seasonal variability. South-westerly winds dominate during autumn and winter, while north-easterly winds prevail in spring and summer. The highest wind speeds are typically observed in spring, with lower speeds in winter. Compared to other coastal regions in South Africa, KwaZulu-Natal generally experiences weaker winds, though coastal areas often have stronger winds than the inland regions (Kruger, 2014). During storms, strong winds can create large waves and storm surges, contributing to erosion and coastal flooding. This highlights the importance of understanding wind dynamics for coastal projects and climate adaptation planning.

Figure 6-3 illustrates the 10-meter (m) wind speed for the project area, representing the horizontal movement of air at 10 m above the Earth's surface. Over the 30-year period (1991–2020), the data indicates that wind speeds have remained relatively stable, fluctuating within a range of approximately 4.78 meters per second (m/s) to 5.49 m/s, with an average of 5.19 m/s. There is no evident upward or downward trend, suggesting that external factors influencing wind speed, such as global wind patterns, ocean temperatures, or atmospheric pressure systems, have not changed significantly over this time. While year-to-year variations exist, the overall consistency in wind speed implies limited impact from large-scale climate drivers during the observed period.

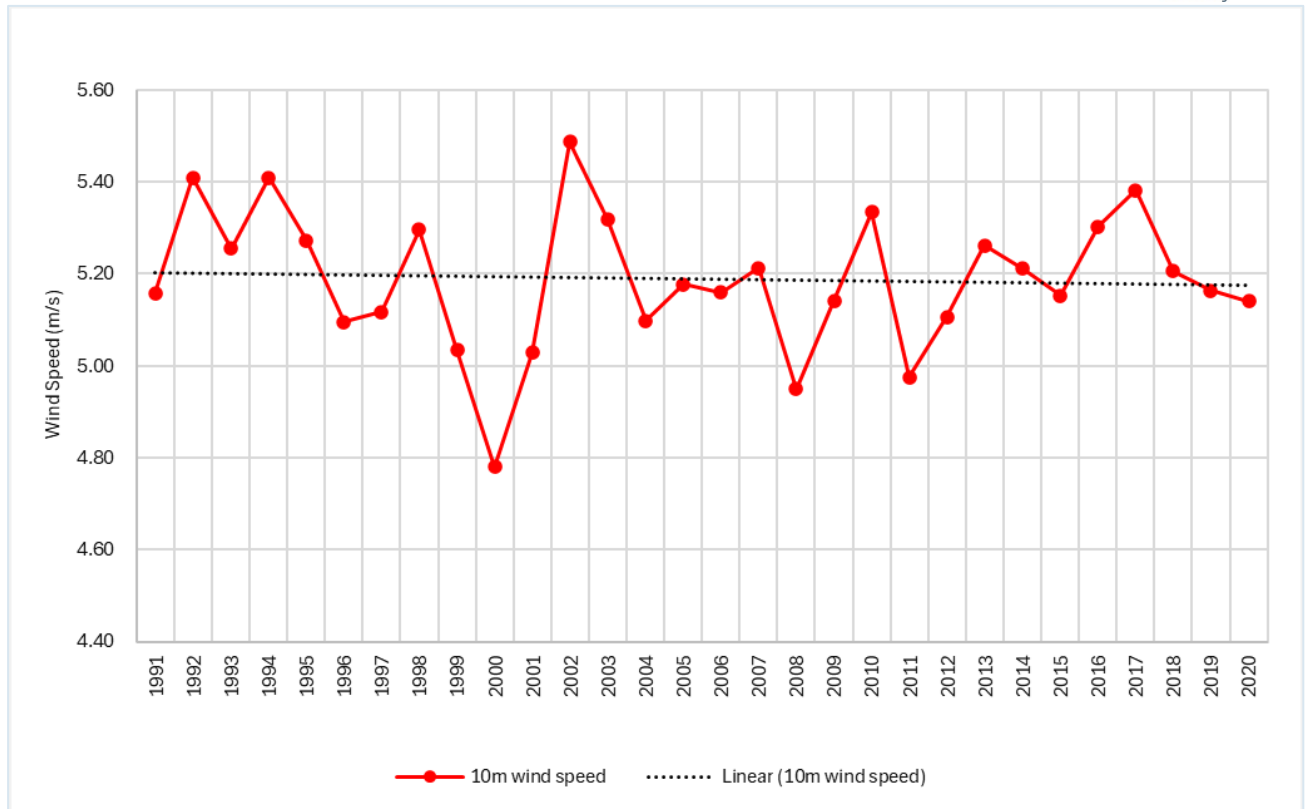


Figure 6-3 – 10m wind speed at Port of Richards Bay from 1991 to 2020. Source: Hersbach et al, 2023.

6.1.1.5 Sea Surface Temperature

Sea Surface Temperature (SST) is crucial in both oceanographic and atmospheric studies. It serves as the lower boundary condition for atmospheric numerical models, which are essential for accurate weather forecasts. For instance, warm ocean temperatures feed hurricanes, so precise knowledge of SST and the heat potential beneath the surface helps predict their path and intensity. Additionally, SST influences marine life, affecting fish feeding and reproductive behaviours (CEOS, 2020).

Figure 6-4 presents the SST data for the 1991-2020. The data shows notable fluctuations in SST over the 30-year period, with values ranging from a low of 21.58°C (in 2019) to a high of 27.37°C (in 1992). The data shows no significant upward or downward trend. Furthermore, there are sharp decreases in certain years (e.g., 2011–2013 and 2019), possibly linked to cooler periods or specific climatic events, such as ocean cooling phases or volcanic activity affecting the atmosphere. The SST show increase in some years after sharp decreases, indicating that ocean temperatures may not follow a strictly linear pattern.

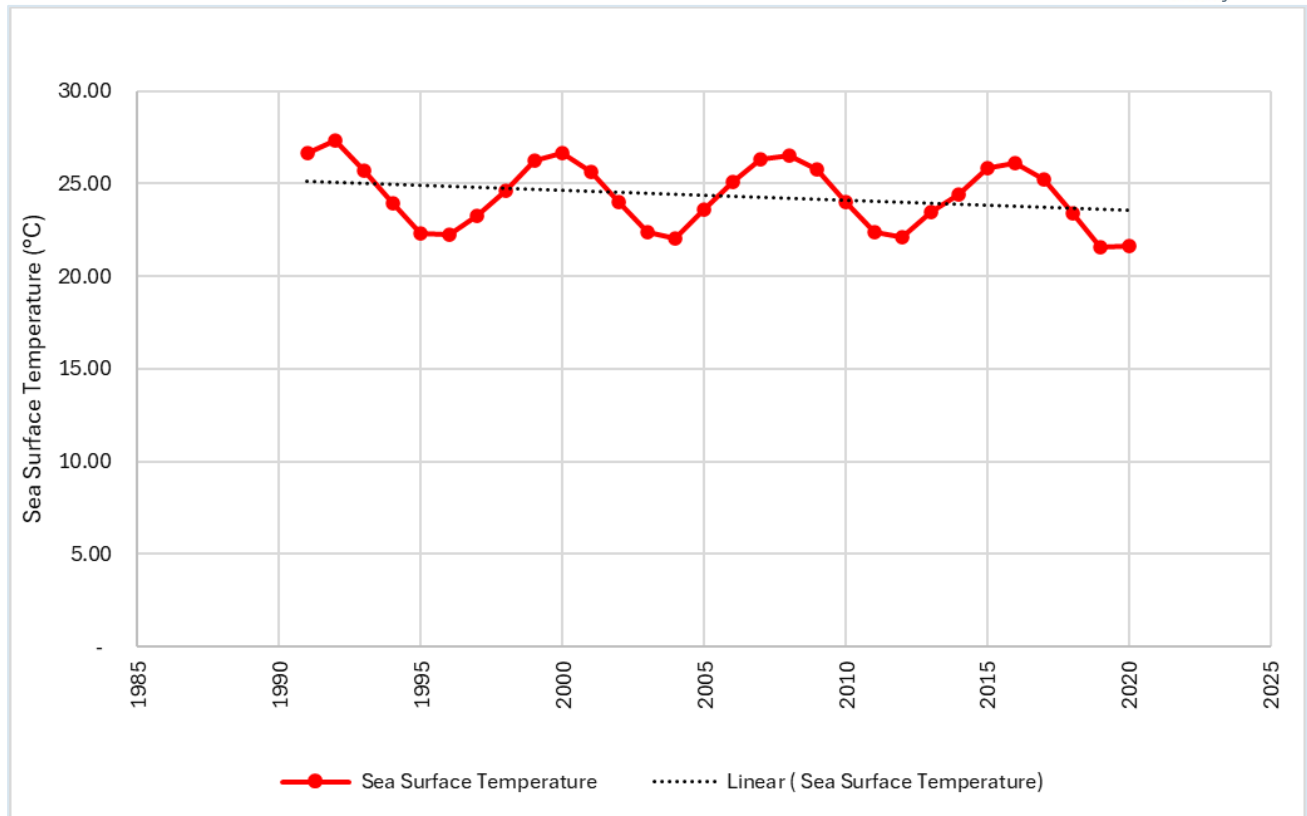


Figure 6-4 – Sea Surface Temperature (SST) at Port of Richards Bay from 1991 to 2020.

Source: Hersbach et al, 2023.

6.1.1.6 Sea Level Rise

Over the past century, the Earth's average surface air temperature has risen, leading to a global rise in sea levels. In southern Africa, data from the past 50 years show sea level rises of approximately 1.87 mm/yr on the west coast, 1.47 mm/yr on the south coast, and 2.74 mm/yr on the east coast, aligning with global trends (Goschen, 2011). Short term processes which can lead to sudden sea level rises include tides, weather and waves. With rising sea levels and more intense storms, the South African coastline is expected to face widespread damage to private and public infrastructure (Mather & Stretch, 2012).

Figure 6-5 presents the IPCC 6th Assessment Report Sea Level Projections for Durban. The projections indicate changes in sea level for the region, with greater increase under the worst-case scenario (SSP5-8.5). This may imply an increase in coastal flooding and erosion, greater tidal influences, exposure to extreme events and possible destruction of infrastructure and property along the coast.

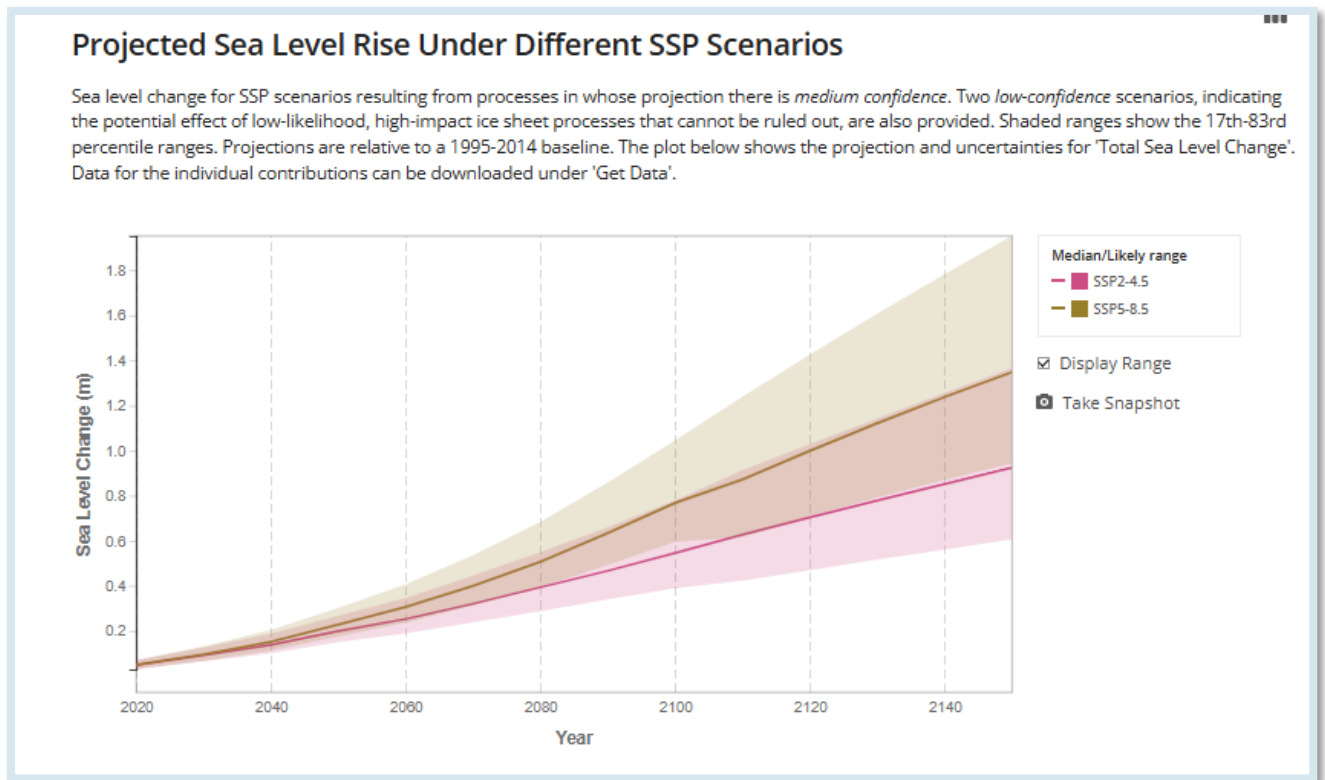


Figure 6-5 - IPCC 6th Assessment Report Sea Level Projections at Durban. Source Nasa Sea level Change Portal

6.1.1.7 Waves

Wind Waves

Figure 6-6 presents the significant height of wind waves at the Port of Richards Bay for the period 1991-2020. Over the 30-year period from 1991 to 2020, the significant height of wind waves ranged from 0.51 m in 2000 to 0.68 m in 2002. Wind wave heights remained relatively constant throughout the years, showing no significant upward or downward trends, although there was some annual variability, with higher values observed in the early 2000s. Although the wind wave data remains relatively stable, wind-generated waves can cause sea level fluctuations at the coast, which can contribute to coastal flooding and erosion.

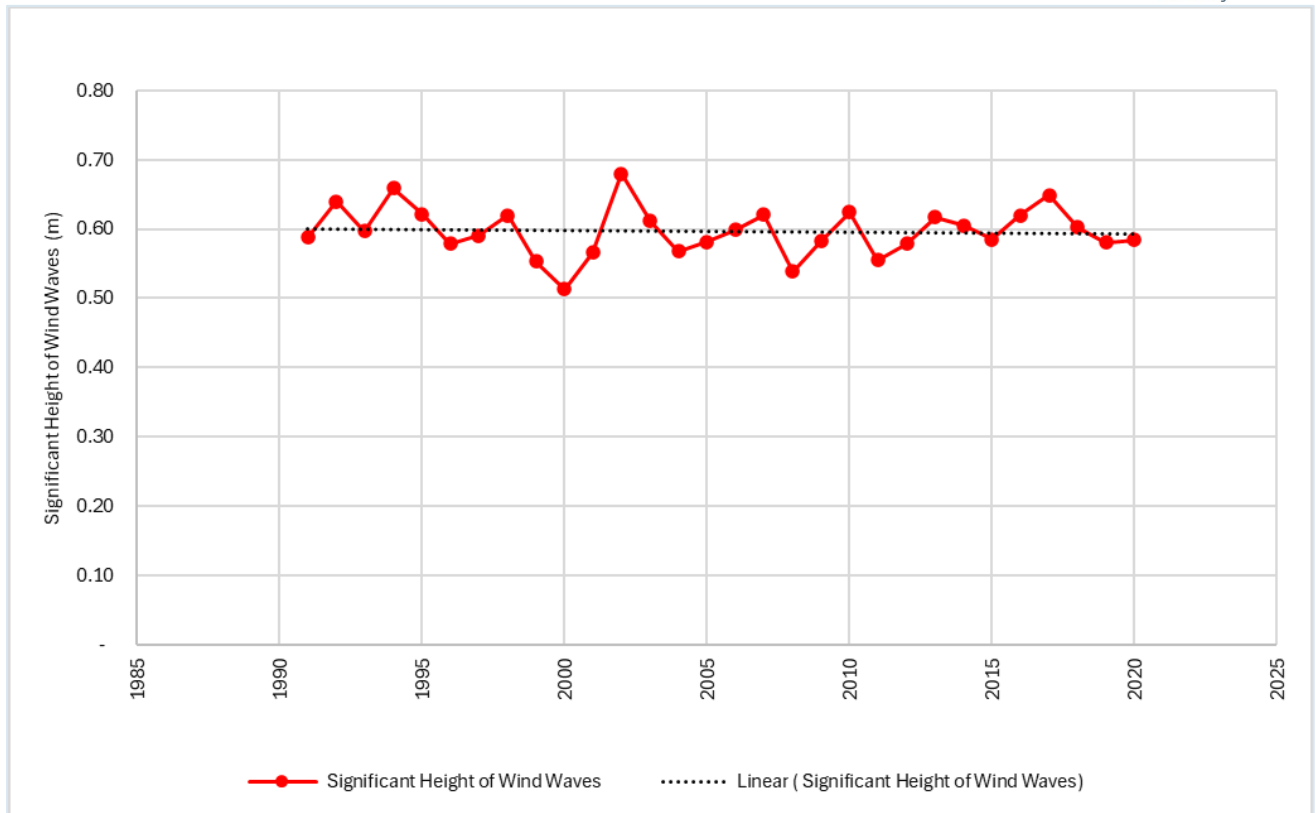


Figure 6-6 - Significant Height of Wind Waves at Port of Richards Bay from 1991 to 2020.
Source: Hersbach et al, 2023.

Total Swell

Figure 6-7 presents the significant height of total swell at the Port of Richards Bay for the period 1991-2020. Over the 30-year period from 1991 to 2020, the significant height of the total swell ranged from 1.41 m in 2004 to 1.62 m in 2011. There was a slight increase in the early years, followed by minor fluctuations. The trend remained relatively stable, with small annual variations that were less pronounced than those of the maximum wave height. The total swell values showed minor increases in the early 2000s before stabilising.

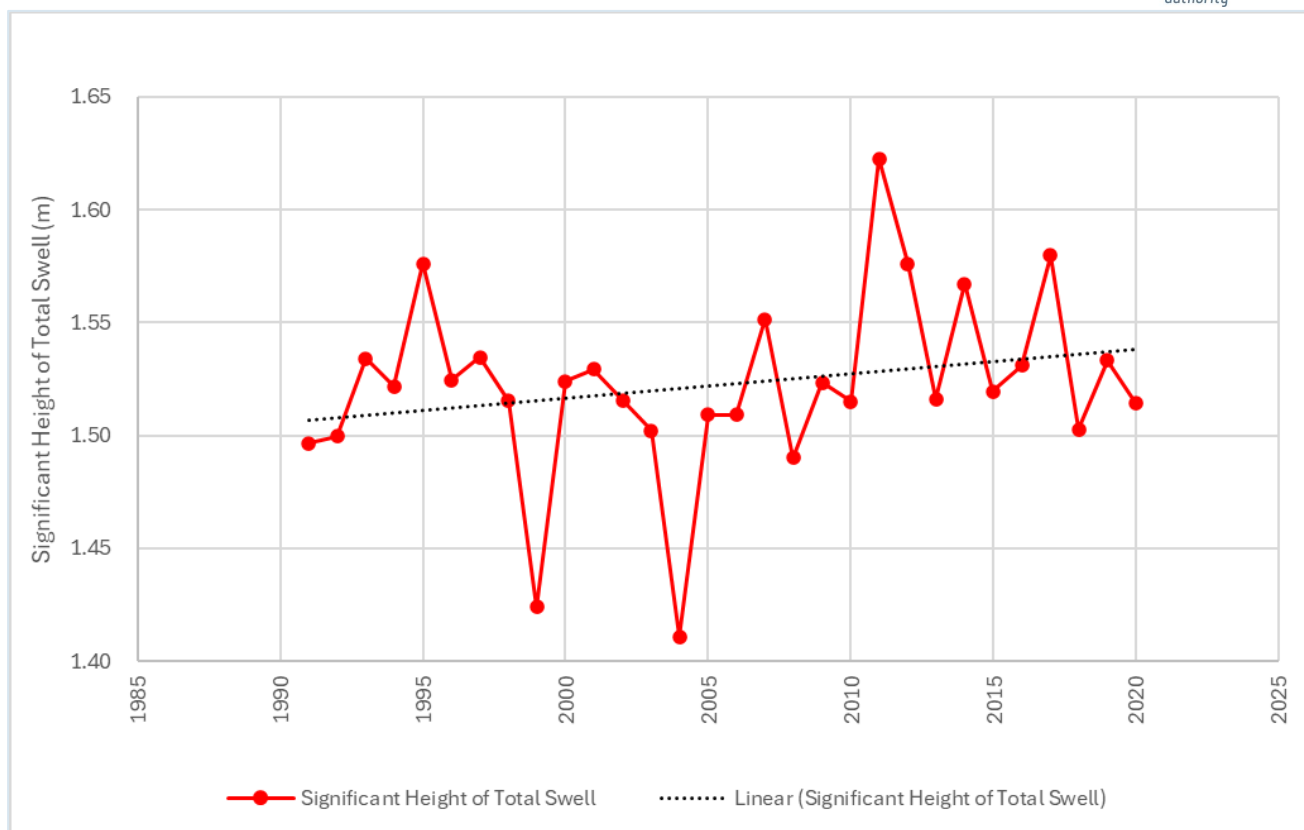


Figure 6-7 - Significant Height of Total Swell at Port of Richards Bay from 1991 to 2020.

Source: Hersbach et al, 2023.

6.1.1.8 Climate change at the PoRB

Recent climate studies (Promethium Carbon 2022a, Promethium Carbon 2022b) linked to projects in the PoRB have highlighted:

- The annual temperature and number of extreme events with higher rainfall during storms and fewer rain days per annum is expected to increase.
- The climate change projections for the larger project area indicate that the median annual ambient temperatures are likely to increase by 0.4-0.8°C by 2030 and 0.8-1.4°C by 2050. Very hot days are forecast to increase to up to 28 days per annum (from 7-10 currently).
- Mean annual precipitation is likely to decrease slightly (<5% change) in the short-term and then stabilises somewhat by 2050.

These reports further highlight the following as the main weather-related risks associated with marine and coastal weather:

- sea surface temperature;
- ocean pH (acidification);
- coastal storm activity and impacts;
- wind; and
- sea level.

Evidence suggests that Richards Bay could become more exposed to tropical storms and cyclones in the future with data indicating an increase in intensity and westward movement of the low-pressure systems. A predicted rise in sea levels results in an increased risk of storm surges and intense wave action which poses a climate related risk to the project.

6.1.2.1 Regional Geology

Figure 6-8 -Geological map of the area around the PoRB New Berth 605. Abbreviations of the rock types are explained in the table below. Map enlarged from the Geological Survey 1: 250 000 map 2732 St Lucia (Bamford, 2025).

Table 6-3 – Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Qs	Quaternary Sands	Alluvium, sands, scree	Quaternary Ca 0,5 Ma
Q	Quaternary sands, dune sands	Sands, aeolian sands	Quaternary Ca 10 kya
Qp	Port Durnford Fm, Maputaland Group	Dune sand, coquina	Late Pleistocene Ca 700 kya

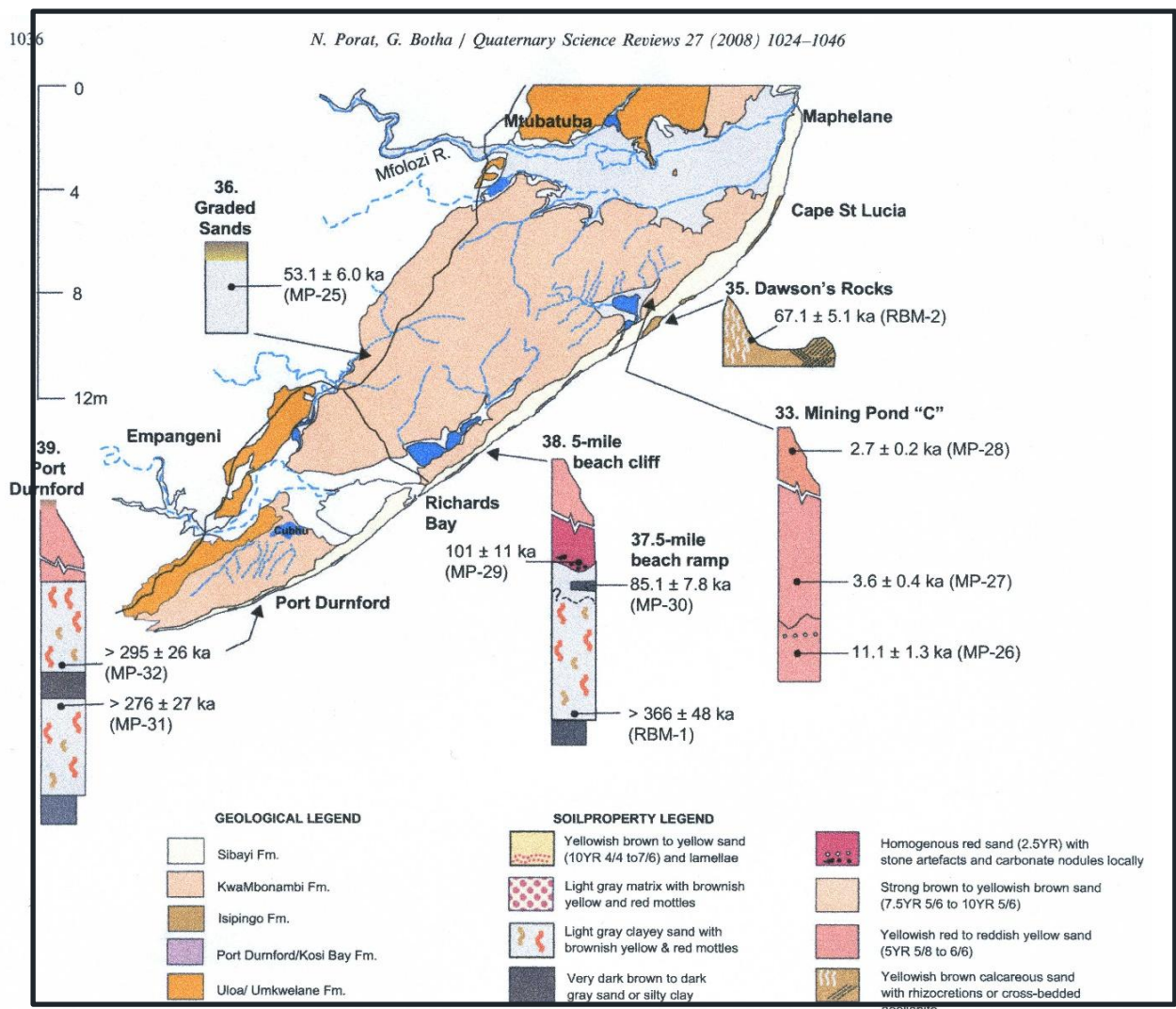


Figure 6-9 -Updated geological map for the Natal north coast (Porat and Botha, 2008).

The Cenozoic deposits of littoral marine, estuarine, fluvial, lacustrine and aeolian origin have developed along the coastal margin of South Africa over the last 60 million years. Onshore deposits are relatively thin but offshore deposits are much thicker, especially in the extensional rift basins and as cones at major river mouth (Bamford, 2025). Reasons for this discrepancy in thickness are that the passive coastal margins are buoyant and the continent has undergone at least two phases of epeirogenic uplift (Bamford, 2025).

Five groups of coastal deposits are recognised, and they vary in width, extent and gradient. In the region the deposits are known as the Maputaland Group.

Figure 6-8 does not differentiate the Quaternary sands but in Figure 6-9 (Porat and Botha, 2008), the northern part of the Port of Richards Bay is on the KwaMbonambi Formation and the south and coastal margin are on the Sibayi Formation.

6.1.2.2 Geology at the PoRB

The PoRB is underlain by Cretaceous Siltstone bedrock of the St. Lucia Formation beneath younger, largely unconsolidated aeolian and estuarine deposits. The geology across the port area is broadly classified in the table below (Sivest, 2018).

Table 6-4 – Geology of the PoRB

Stratum	Sub-Group	Period
Beach and dune sands	Recent Deposits	Quaternary (Holocene)
Sands, silts and clays	Harbour Beds	Quaternary (Upper Pleistocene to Holocene)
Limestone and calcarenite	Uloa Formation	Tertiary (Miocene to Pliocene)
Siltstone	St. Lucia Formation	Cretaceous (Coniacian) to Tertiary Palaeocene

The general geological classification of the proposed site for the quay extension is characterised by a subsurface profile that is sandy in nature and underlain by cretaceous bedrock (Hatch 2019). Silty clays and clayey silts are virtually absent for the subsurface profile in this region. The depth to the bedrock in the quay extension area varies from approximately -10 m CDP to -17 m CDP. The bedrock depth in the basin varies from -5m CD to -30m CD.

Findings from the Geotechnical Investigation conducted by Mukuno (2025) for the Berth 605 project found that:

- The regional geology comprises harbour beds which comprise of sands, silts and clays of the Quaternary period which are underlain by the St. Lucia Formation Siltstone bedrock.
- The test pits and borehole profiles indicate that the site is underlain by Harbour beds (Estuarine deposits) soils and siltstone bedrock.
- The subsoils typically comprise of silty coarse sand, clayey sand, silty clay, sandy clay and clayey silt.
- The upper transported horizon is generally loose to medium dense for the non-cohesive soils and stiff to very stiff for the cohesive soils. As the excavations increase in depth it was noted that the

consistencies of the non-cohesive soils are becoming dense and for the cohesive soils the consistency is becoming very stiff.

- Sidewall collapse was observed during the test pit excavation from depths below 1.25 m.
- Groundwater seepage was intersected in all the test pits at depths of between between 1.10 m and 2.20 m below ground level.

6.1.3 HYDROLOGY

The Berth 605 project area is located Northeast of the Qhubu Lake and Southwest of the Mzingani Dam in KwaZulu-Natal. The development site forms part of the Usutu-Mhlathuze Quaternary Catchment W12F (**Figure 6-10**) with a Mean Annual Evaporation (MAE) of 1 300 mm p.a. and a Mean Annual Precipitation (MAP) of 1 285 mm p.a. The Mean Annual Runoff (MAR) for this quaternary catchment is 47.61 million m³ p.a.

In terms of drainage patterns at this scale, the port is North-North-West of the quaternary catchment's delta (or river outlet) into the Indian Ocean.

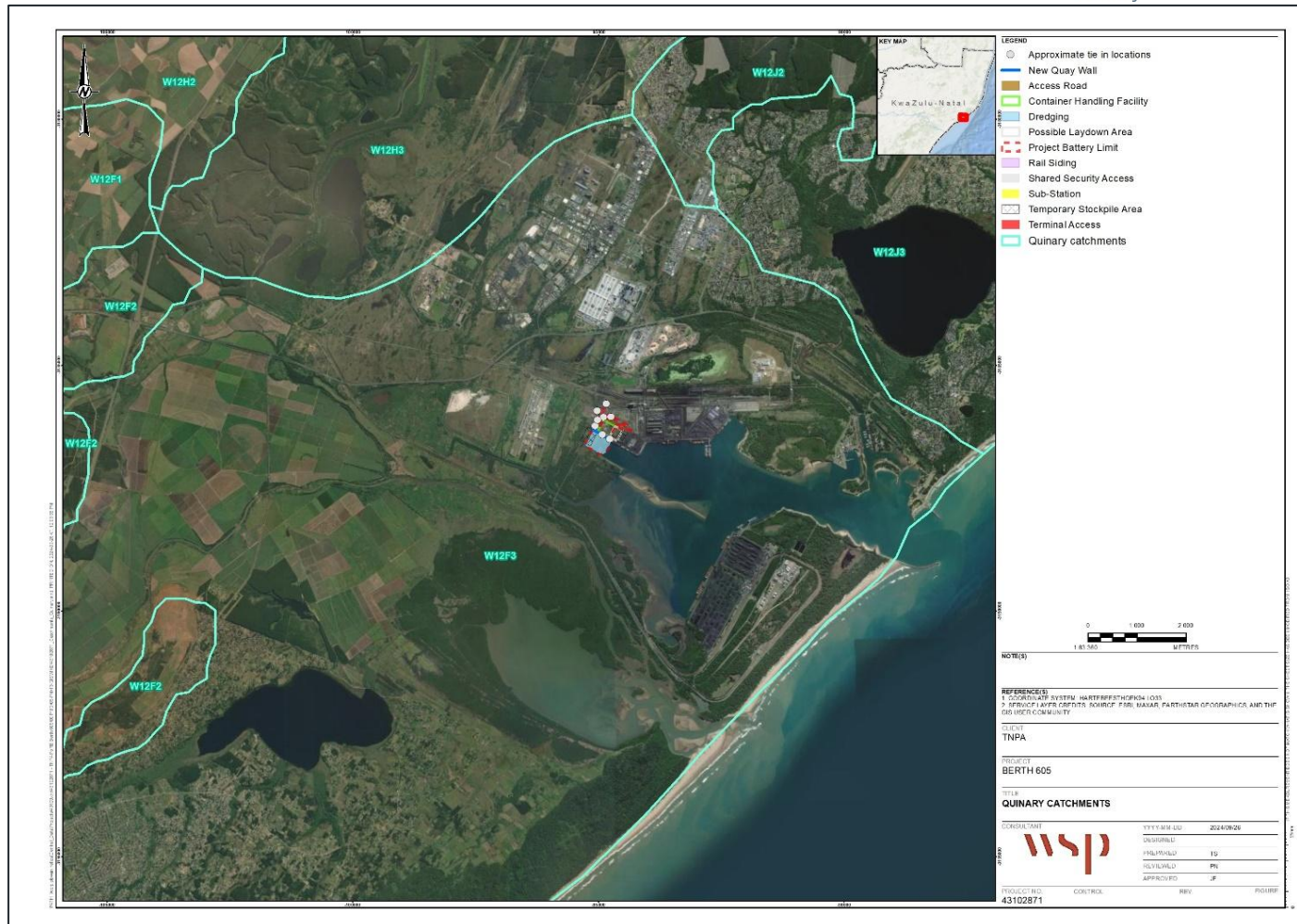


Figure 6-10 – Quaternary Catchment of the project area

6.1.4 ESTUARY AND THE ESTUARINE FUNCTIONAL ZONE

The National Freshwater Ecosystem Priority Areas (NFEPA) are a selection of rivers, wetlands and estuaries which have been identified as systems of strategic importance to the hydrological functioning of South Africa. These systems have been identified using scientific methodologies as well as consensus amongst researchers, government entities and the general public. According to the NFEPA dataset, a NFEPA Estuary will be impacted by the proposed development. This is confirmed by the DFFE Screening Tool in which the site is considered as Very High Sensitivity due to the presence of the estuary and estuary associated wetlands within proximity to the proposed project area (**Figure 6-11**). The desktop assessment and site verification confirmed that the site is located entirely within the Estuarine Functional Zone (EFZ) (**Figure 6-12**).

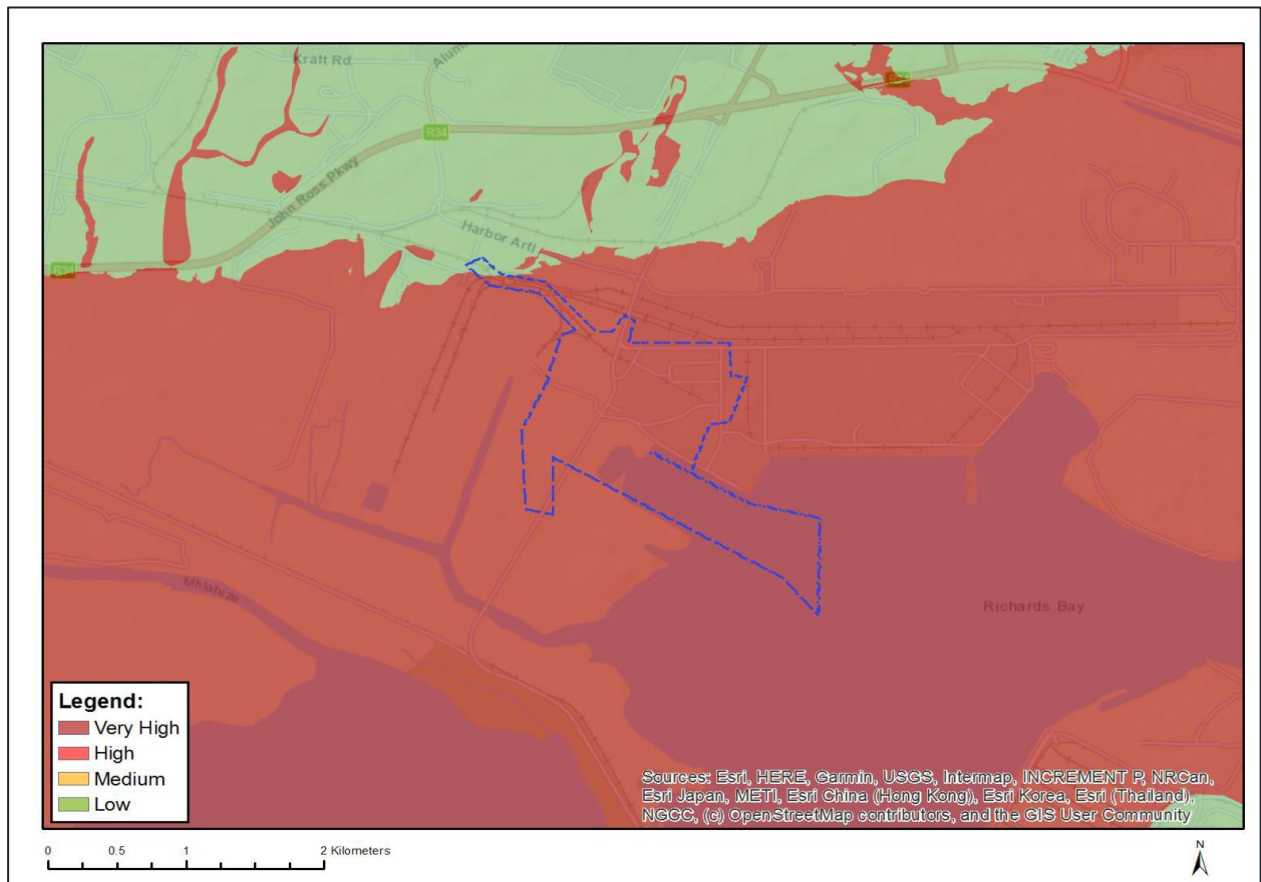


Figure 6-11 – Aquatic Biodiversity Theme Sensitivity (DFFE Screening Tool)

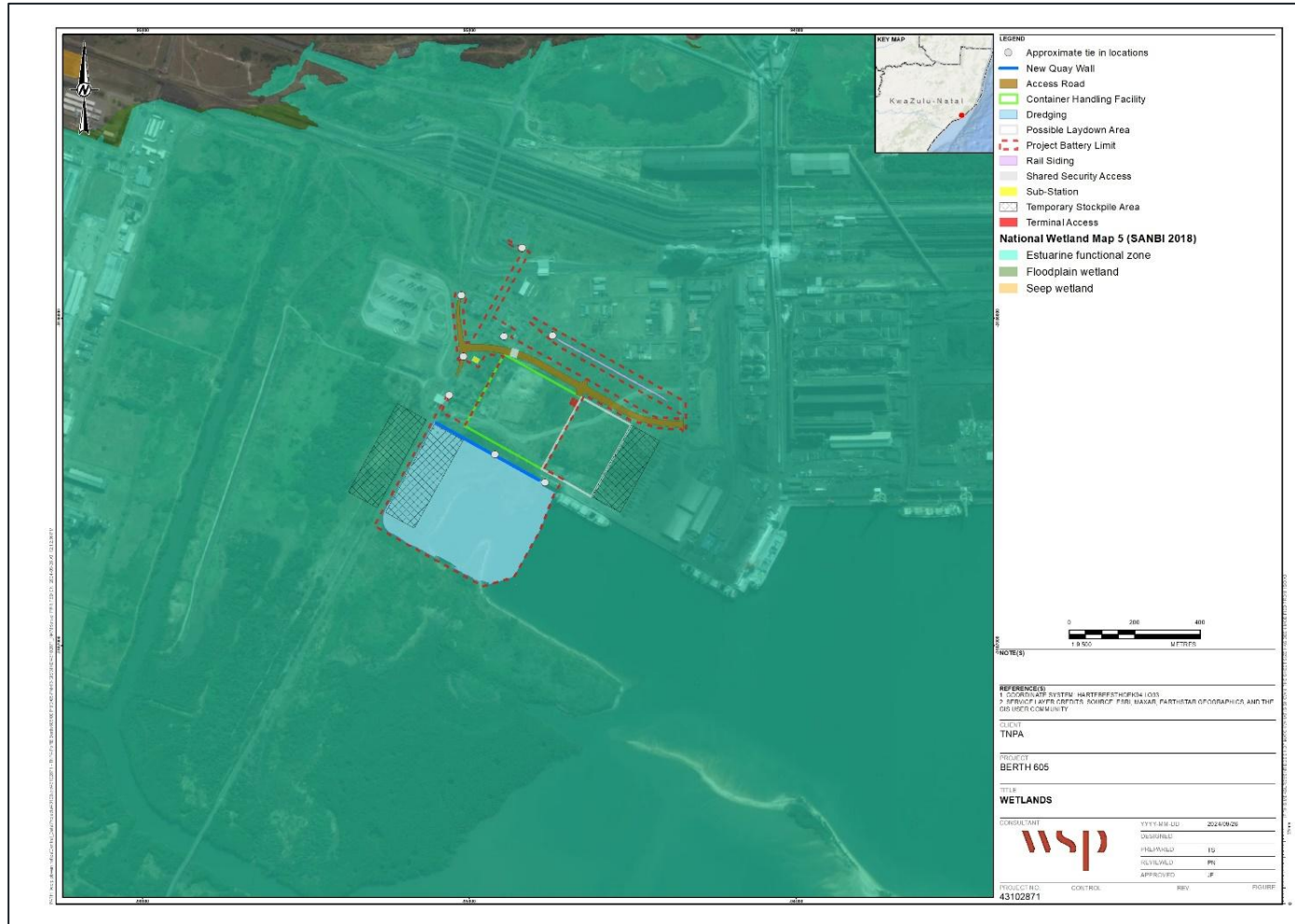


Figure 6-12 – Project area within the EFZ

6.1.4.1 Estuary Type and Delineation

The PoRB is classified as an estuarine bay (originally an estuarine lake). As such, it is representative of the second rarest estuarine type in South Africa. Estuarine bays are large systems (>1000 ha) characterised by a strong marine influence due to a permanent tidal connection to the sea. The only other estuarine bays in South Africa are Durban Bay in KwaZulu-Natal and Knysna Estuary in the southern Cape.

The PoRB is an artificially created estuarine bay, the other two being natural. Nevertheless, based on its rarity alone the PoRB has local, regional, and national ecological and conservation importance. The diversity of estuarine habitats represented in the port, and the relatively unpolluted state of the port reinforce its ecological and conservation significance in comparison to many estuaries in the KwaZulu-Natal area that are degraded. If migrating birds are considered, the port has international (global) ecological and conservation importance.

The EFZ, as defined in terms of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008), is an important concept in the management of estuaries in South Africa. It includes the area encapsulated by an estuary waterbody but also supporting physical and biological processes necessary for estuarine functioning and health. The EFZ encompasses the area around an estuary below the 5 m topographical contour relative to mean sea level however this definition is associated with several shortcomings (Estuarine and Marine Ecology Assessment for Berth 605, CSIR 2025).

The Richards Bay EFZ is ~5509 ha in spatial extent, comprising ~3543 ha (or 64%) developed and/or transformed area and ~1966 ha (or 36%) natural habitat, of which ~869 ha is open water. The habitat breakdown for the estuarine area, excluding open water, is 69.9 ha for saltmarshes, 309 ha of reeds and sedges, 171.0 ha of mangroves, 531.0 ha of sand/mudbanks, and 15 ha of swamp forest.

The EFZ includes Lake Cubhu to the south-southwest and Lake Mzingazi to the north-northeast of the PoRB (Figure 6-13). The lakes were historically connected to the uMhlathuze and Richards Bay Estuary waterbody but are now disconnected by the construction of weirs or other water control measures and function as freshwater lakes. The lakes were consequently not included in the estuarine management unit for the uMhlathuze and Richards Bay Estuarine Management Plan.



Figure 6-13 - Aerial view of the greater Richards Bay area showing the Estuarine Functional Zone for the Port of Richards Bay (Richards Bay Estuary) and Mhlathuze Estuary. The peach shaded area denotes the management unit for the uMhlathuze/Richards Bay Estuarine Management Plan (up to the weirs separating Lakes Mzingazi and Cubhu).

6.1.4.2 Bathymetry of the Estuary

Bathymetry is the measurement of depth of water in oceans, seas or lakes. The Richards Bay Estuary was fundamentally transformed to allow the passage of large ocean-going vessels to berths in the PoRB, for the loading and offloading of cargo. The water column depth over large parts of the port reflects this requirement.

The entrance channel is maintained to a depth of -23.9 m CD offshore of the breakwaters, -21.9 m CD just inshore of the breakwaters, and -19.4 m CD along most of the navigation channel. The 700/800 Berth Basin and Richards Bay Coal Terminal Basin are generally maintained at a depth of -18.9 m CD. The 600 Berth Basin, and parts of the 700/800 Berth Basin are maintained at depths of -14.4 m CD and -14.6 m CD, respectively. The Small Craft Harbour and the approach channel to this harbour are maintained at a depth of -7.9 m CD. The Kabeljous Flats and Bhizolo/Manzanyama Canal complex are shallow water areas, as is the Mzingazi Canal and related areas (CSIR, 2025).

6.1.4.3 Bathymetry of the Existing Offshore Disposal Site

The change in bathymetry on the present disposal site has been significant for the period 2007 to 2022 and a distinct mound had developed on the northwestern corner of the site. The 2025 bathymetry data show that this remained at more or less the same dimensions (Figure 6-15), thus limiting further disposal on this area of the existing disposal site that already poses a potential navigational hazard. For this reason the dredge material disposal onto the site specified in the modelling study is focussed on the southeast corner of the disposal site (Figure 6-16), resulting in a bathymetry (**Figure 6-17**) used for the wave climate and shoreline change modelling study (WSP, 2025), i.e., a water depth of -13.5 m CD over most of the site decreasing to approximately -13 m CD on the existing mound. As noted in the Dredging and Dredge Disposal Report (WSP, 2025), the actual depth changes on the disposal site at the cessation of dredging and dredge material disposal activities is expected to be approximately only 40% to 60% of that indicated in **Figure 6-17**.

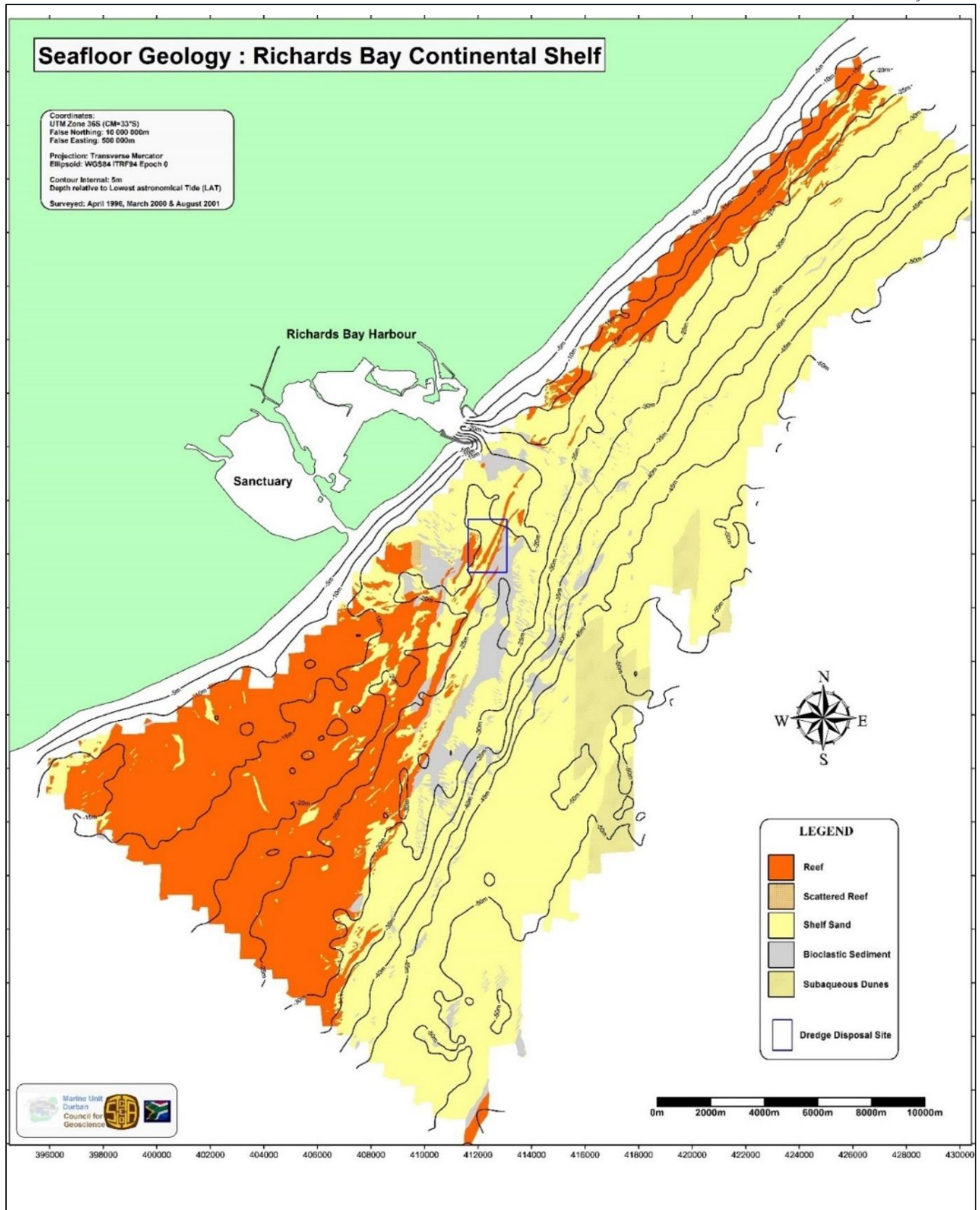


Figure 6-14 - Location of the Disposal Site (Source: Council for Geosciences as reported in CSIR, 2015).

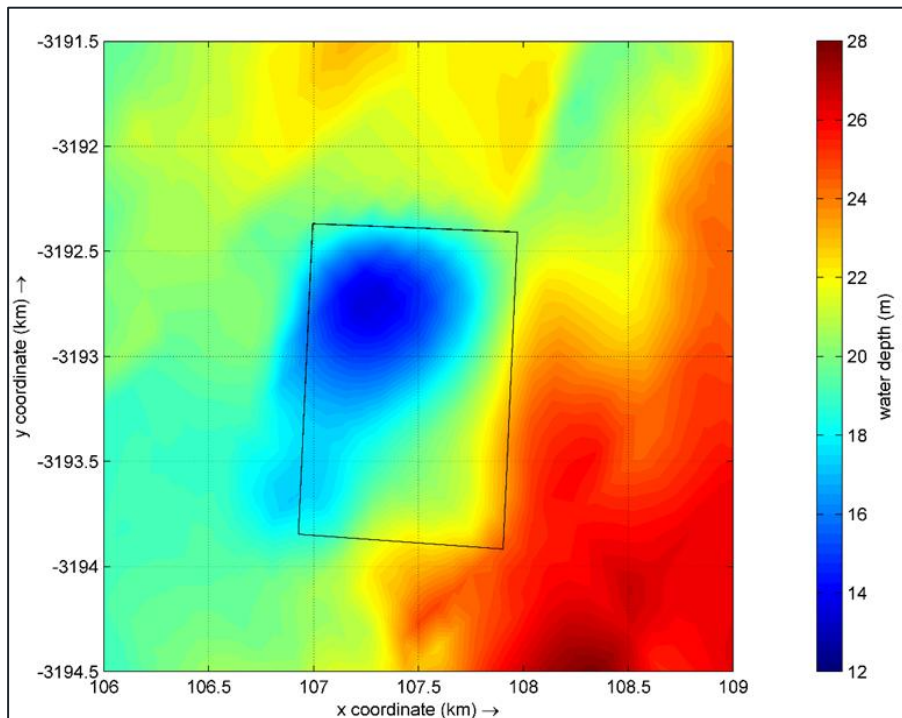


Figure 6-15 - Existing bathymetry (CD) at dumpsite before dredge material disposal activities (2025 Bathymetry survey – TNPA)

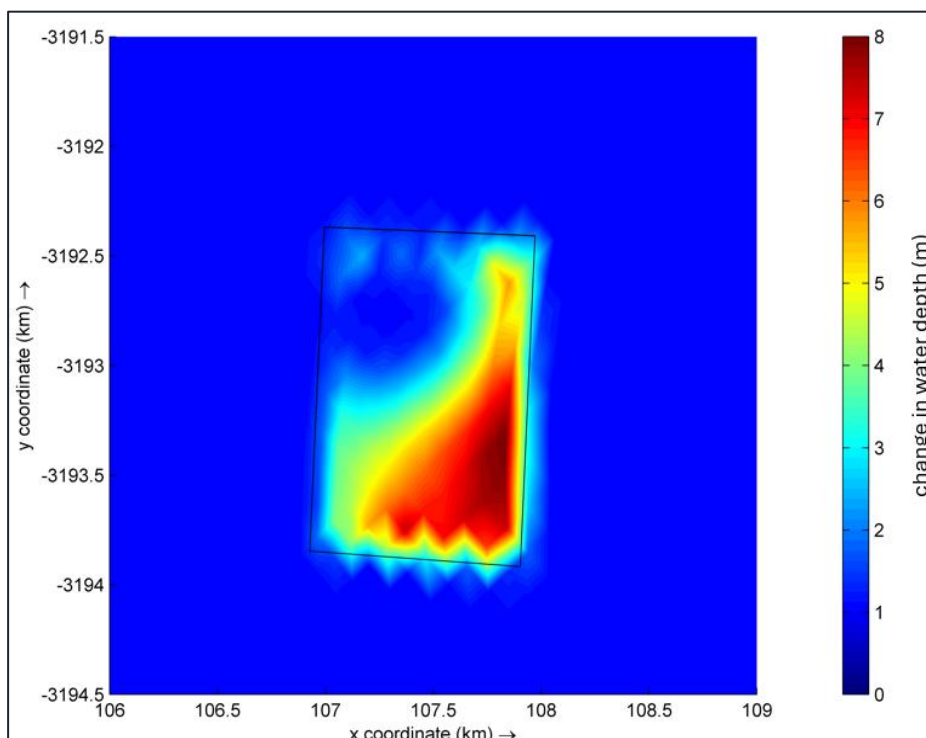


Figure 6-16 - Sediment thickness of material placed on the disposal site in the modelling study

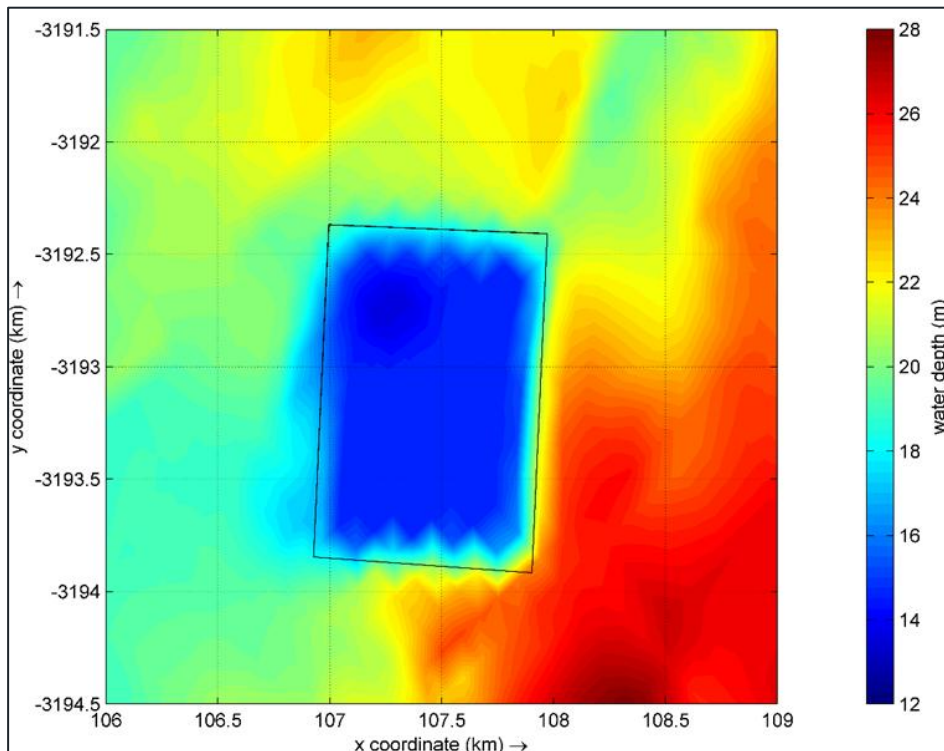


Figure 6-17 - Bathymetry (CD) at dumpsite after dredge material disposal activities

6.1.4.4 Tides

Tidal water level variation in the PoRB comprises predominantly a semi-diurnal tide with a period of approximately 12.4 h and a range of 0.51 m at neap tide, increasing to 1.84 m at maximum spring tide. The mean high-water spring tide level is approximately +2.11 m to Chart Datum of the port or +0.91 m to mean sea level (Chart Datum for the port is 0.90 m below Mean Sea Level) (CSIR, 2025).

6.1.4.5 Hydrodynamic Functioning

A schematic of major hydrodynamic processes in the PoRB is provided in **Figure 6-18**. Although the tidal flow through the entrance to the port is considerable, the cross-sectional area of the entrance channel is large. Tidal currents are, therefore, weak, ranging from a peak, depth-averaged current of 0.03 m.s^{-1} at neap tide to 0.17 m.s^{-1} at spring tide along the centre of the entrance channel as found by means of hydrodynamic modelling

The profile of the entrance channel is such that the tidal flow is concentrated in the deeper part of the channel with small tidal flow on the upper slope close to the shoreline. Wind-driven surface currents normally flow at about 2% to 3% of the wind velocity. This means that by taking typical wind velocities into account (CSIR, 1997), wind-driven surface currents will normally be of the order of 0.10 m.s^{-1} to 0.15 m.s^{-1} during these conditions. The tidal flows diminish towards the inner recesses of the port. Tidal currents are nevertheless also significant in shallow parts of the port, including on the Kabeljous Flats and in the mangrove area near Shark Cove in the southern part of the Richards Bay Coal Terminal basin. Under high southwest winds and spring ebb flow conditions, currents of up to 0.5 m.s^{-1} may be generated on the northern side of the Kabeljous Flats, while under strong northeast winds the flows are somewhat reduced and concentrated on the southern side of the Kabeljous Flats. Under

southwest winds clockwise residual circulation is generated on the Kabeljous Flats during spring flood and ebb tides. Conversely, under northeast winds an anticlockwise residual circulation develops over the Kabeljous Flats during both spring flood and ebb conditions. The magnitude of these residual circulations increases with increasing wind speed (CSIR, 2025).

Accretion and erosion problems occur in the port due to wave action, largely along the southern shore of the main navigation channel. A series of groynes and floating pontoons were installed along this shore to control the erosion and protect infrastructure (CSIR, 2025).



Figure 6-18 - Schematic of the major hydrodynamic processes in the Port of Richards Bay, Mhlathuze Estuary, and shoreline at Richards Bay (from CSIR, 2005)

6.1.4.6 Substrate and Sediment

The PoRB area is underlain by unconsolidated Cenozoic Era sediments of the Maputaland Lithological Group that stretch along the Maputaland coastal plain into Mozambique.

There is a good amount of information on the grain size of sediment in the PoRB, generated through surveys commissioned by TNPA and through independent or collaborative surveys and research by various organisations. Spatially comprehensive surveys on the grain size of sediment in the port were made by the CSIR in 2011 and 2012 (CSIR, unpublished data; CSIR, 2013).

Although the surveys were made over a decade ago, a spatially extensive surveys of sediment grain size made in the port in 2018 and across a large part of the Kabeljous Flats in 2020 show that the broad trends evident in the earlier CSIR surveys were still relevant in the latter surveys. The common patterns in sediment grain size evident amongst the surveys is unsurprising considering there were no major changes to the bathymetry and layout of physical infrastructure in the port, nor major changes in sediment sources to the port in the period since the CSIR surveys.

The sediment in the deepwater channels and basins in the Port of Richards Bay is dominated by mud sized material, although the actual contribution of this material to the bulk weight of sediment is variable. Notable exceptions are in part of the 700 Berth Basin, near the Sandspit, and in the southernmost part of the Richards Bay Coal Terminal Basin, where the sediment is largely dominated by sand.

Sediment in the intertidal and shallow subtidal is usually sandier than in the adjacent deeper channels and basins, largely reflecting exposure to waves and related currents that erode and prevent the accumulation of finer grained material in these areas. These areas are generally the lighter coloured areas along shorelines. The dominant sand grain size class varies quite widely amongst these areas but is generally coarser along the southern shoreline of the main navigation channel where groynes were inserted to limit wave erosion. Areas where mud contributes appreciably or dominantly to the bulk weight of sediment in the intertidal and shallow subtidal include the Kabeljous Flats, in mangrove forests, and in parts of the Bhizolo-Manzanyama Canal complex and Mzingazi Canal. However, the sediment grain size composition in these areas is often highly variable, changing from mud to sand dominated over small spatial scales (CSIR, 2025).

Sediment in the deeper parts of the 600 Berth Basin, including the Assembly Basin, was dominated by mud in historical surveys apart from one of the five stations sampled in the basin in 2022, at which sand contributed ~95% of the bulk sediment weight. In intertidal and shallow subtidal areas in the basin the sediment is dominated by sand.

The most recent information on sediment grain size in basin was generated in November 2024 by the CSIR for the purpose of a capital dredging permit application for the Berth 605 project. Detailed information on the survey is provided in a companion specialist study prepared by the CSIR (2024). The positions where the sediment was sampled are provided in **Figure 6-19**.

The survey confirmed that the sediment in the deeper parts of the basin is dominated by mud, giving way to sandier sediment along the south-southeastern shore (**Figure 6-20**). The most significant change that has occurred in the 600 Berth Basin in recent times is the accumulation of coal fragments and coal particles in the sediment, reflecting losses into the port during the loading of coal onto vessels and via wind and surface runoff erosion from coal stockpiles near the basin. The export of coal through

the basin is a relatively recent development. The dark colour of the sediment at some stations near the quay wall is assumed to reflect the accumulation of coal particles in the sediment. The sediment in parts of the basin is also characterised by sulphur balls, lost into the port during unloading from vessels. Sulphur balls were also evident along the road verge near Stations 15 and 17.



Figure 6-19 - Aerial view of the 600 Berth Basin in the Port of Richards Bay, showing the positions where sediment and soil samples were collected by the CSIR in November 2024, and where soil was sampled in 2009 by the CSIR.

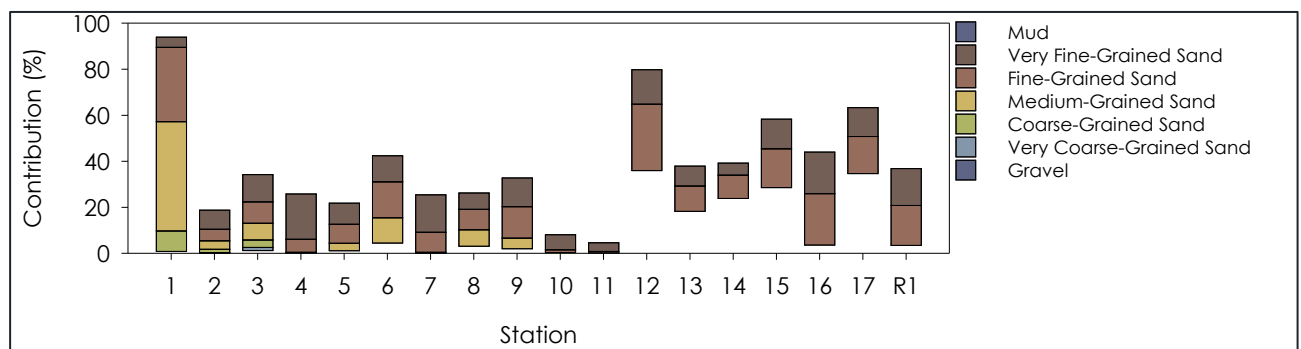


Figure 6-20 - Contribution of various grain size classes to the bulk weight of sediment and soil sampled in and near the 600 Berth Basin in the Port of Richards Bay by the CSIR in November 2024.

The Berth 605 project footprint extends onto land at the western end of the basin. There is a small amount of information on the grain size of soil in this area from surveys by the CSIR in January 2009 and in November 2024. The survey in 2009 was made after the completion of caisson construction in the Assembly Basin for the development of Berth 306. The area was largely devoid of vegetation at the time but is now vegetated (densely in parts). The positions where soil was sampled by the CSIR

in 2009 and 2024 are provided in **Figure 6-19**. The soil sampled in 2009 had a variable grain size composition, comprised nearly equivalently of mud and sand sized material but largely of medium-grained sand with an appreciable contribution of fine-grained sand at Stations 6 and 7. The soil sampled in 2024 generally had a higher contribution of mud sized material apart from Station 12. The regrowth of vegetation thus appears to have trapped fine-grained material at the soil surface in some parts of the Berth 605 project footprint since 2008, noting that there was minimal overlap in positions where soil was sampled in the surveys. The degree to which the soil sampled in 2024 is representative of deeper soil is unknown.

6.1.4.7 Sediment Quality

Sediment is the particulate matter found on the bottom of rivers, estuaries, and the sea. Sediment provides essential habitat for many biological resources, that is, they can only live in or on sediment. Sediment is, however, a major sink for many of the contaminants introduced into aquatic ecosystems by man. There is a considerable amount of information on the geochemistry of sediment in the Port of Richards Bay, generated through surveys commissioned by TNPA, and through independent or collaborative surveys and research by other organisations. The baseline description of sediment quality in the PoRB and in the Berth 605 project footprint below is taken largely from surveys made by the CSIR, supplemented by the findings of other studies where necessary.

Total organic content, which may also be measured as total organic carbon (there are various techniques to make these measurements), is a measure of the amount of particulate organic matter in sediment. The particulate organic matter may come from natural sources, such as the decomposing remains of dead plants and animals, and it may come from anthropogenic sources, such as wastewater. Particulate organic matter is an important food source for many biological resources, such as worms and small crustaceans that live in and on sediment. Particulate organic matter is a natural component of the sediment in healthy aquatic ecosystems.

The most recent information on the total organic content of sediment in the 600 Berth Basin was generated in a survey by the CSIR in November 2024 for the purpose of a capital dredging permit application for the Berth 605 project. Detailed information on the survey is provided in a companion specialist study prepared by the CSIR (CSIR, 2024). The sediment at none of the stations was enriched with particulate organic matter.

It was beyond the scope of the estuarine and marine specialist study to discuss the findings of the numerous studies that have investigated metal concentrations in sediment in the PoRB however it is safe to state that the impression gained from the studies is that sediment in large parts of the 600 and 700/800 Berth Basins was not only consistently metal contaminated was also considerably more metal contaminated than sediment elsewhere in the port. In fact, sediment across most of the port was infrequently metal contaminated, but when it was the contamination was usually not nearly as severe as it was in the 600 and 700/800 Berth Basins.

Metal concentrations were measured in sediment sampled in the 600 Berth Basin in November 2024 by the CSIR, in support of a capital dredging permit application for the Berth 605 project. Detailed information on the survey is provided in a companion specialist study prepared by the CSIR (CSIR, 2024). Nine metals were present at a concentration above the baseline in the sediment at Station 6. Three to six metals were present at a concentration above the baseline in the sediment at most other stations. Cadmium and copper were the most often and significantly enriched metals, present in the sediment at a concentration above the baseline at all but Station 1. Copper was present at a

concentration above the baseline in the sediment at 10 of the 11 stations.

There is less information on the concentrations of organic chemicals in sediment in the PoRB than there is for metals. Polycyclic aromatic hydrocarbons have received the most attention. Polycyclic aromatic hydrocarbons are amongst, if not the most ubiquitous contaminants of sediment in aquatic systems in urban areas and ports. These are chemicals derived largely from fossil fuels, but they may also be generated by natural processes such as bushfires. In urban areas and in ports, polycyclic aromatic hydrocarbons have a predominantly anthropogenic origin that includes the incomplete combustion of fossil fuels (e.g. oil) in vehicles, vessels, and industry, oil/fuel leaks from vehicles and vessels, and the illegal disposal of used oil in waterways. They are of concern since some isomers, which are individual chemical compounds, are known to be carcinogenic while others cause cell damage and tumours.

Polycyclic aromatic hydrocarbons (20 isomers) were measured in sediment sampled across a large part of the Port of Richards Bay between 2015 and 2024 by the CSIR, including at stations in the 600 Berth Basin. Polycyclic aromatic hydrocarbons were nearly ubiquitous in the sediment but were usually present at a low to moderate concentration.

Tributyltin is one of the most common contaminants of sediment in ports and other waterbodies characterised by maritime activities. The concentration of tributyltin was measured in sediment sampled across a large part of the Port of Richards Bay between 2015-2019 by the CSIR. Tributyltin was essentially ubiquitous in sediment in the port in this period, recorded in 88% of the samples.

The CSIR used an index to classify the quality of sediment sampled in the PoRB in 2024. The index ratings can fall in a range from excellent through to poor. The index ratings are provided in **Figure 6-21**. The sediment quality was rated good or excellent apart from in the 600 and 700/800 Berth Basins, where the sediment was rated fair, marginal, or poor apart from one station. The sediment quality at both stations sampled in the 600 Berth Basin was rated marginal as indicated in **Figure 6-22**.

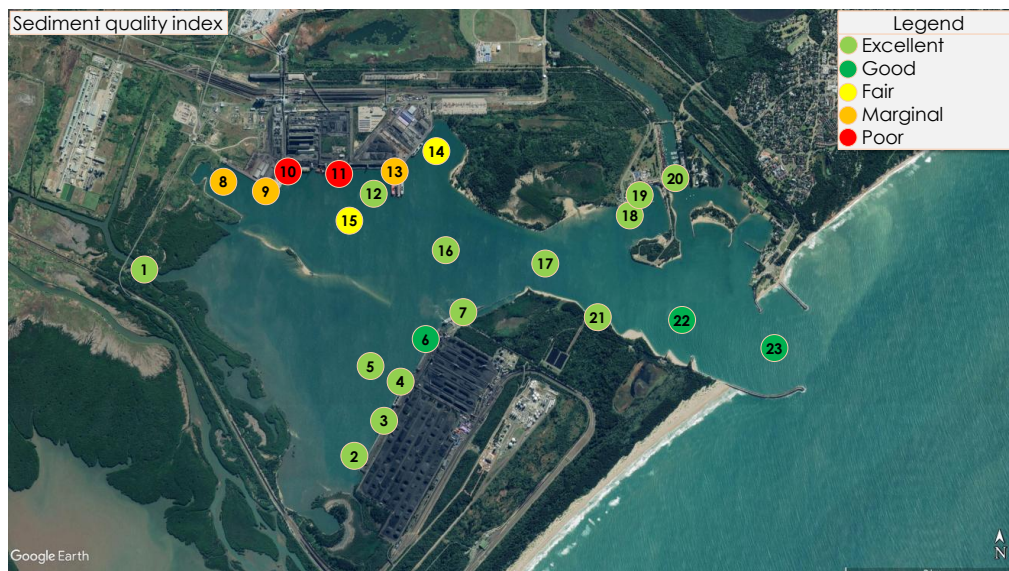


Figure 6-21 - Sediment quality index classification of sediment sampled in the Port of Richards Bay in June 2024.

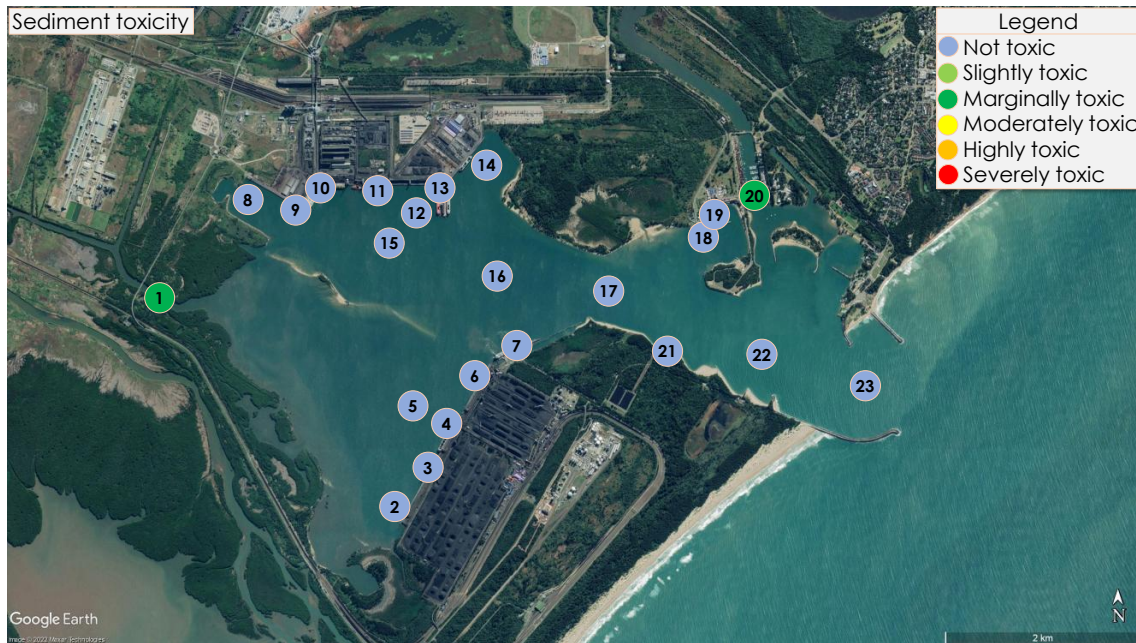


Figure 6-22 - Classification of sediment based on the results of a sediment-water interface toxicity testing of sediment sampled in the Port of Richards Bay in June 2024.

6.1.4.8 Water Quality in the Estuary

The baseline description of water quality in the PoRB and in the Berth 605 project footprint below is taken largely from water quality surveys made by the CSIR between 2015 and 2024, supplemented by the findings of other studies where necessary. The water quality surveys were made consistently at the stations provided in **Figure 6-23** in summer and winter. Water quality measurements were made in situ using an automated water quality monitoring instrument at all the stations shown in **Figure 6-23**, while water samples were collected at 11 of the stations for later analysis in the laboratory.

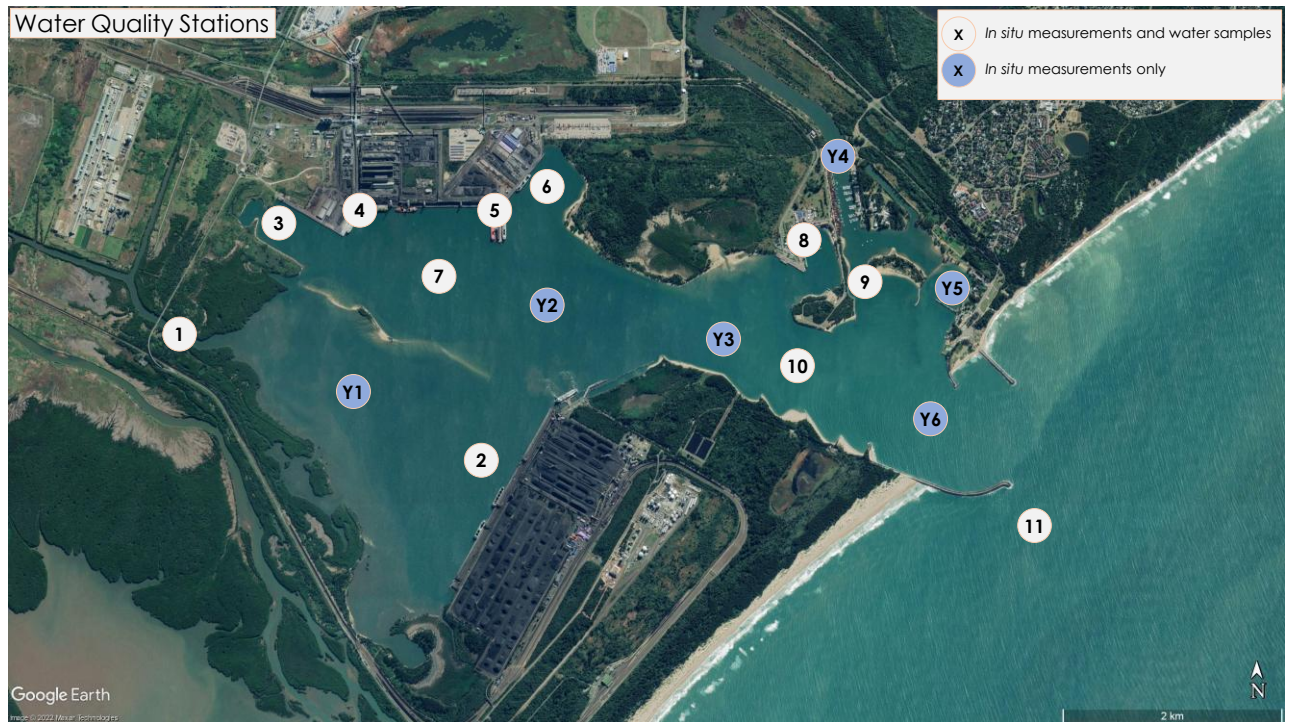


Figure 6-23 - Aerial view of the Port of Richards Bay showing the stations where water quality was monitored in situ and surface water samples were collected by the CSIR for physical, chemical, and biological analysis and toxicity testing in 15 surveys between 2015 and 2024.

The temperature of the water column in the PoRB has an obvious seasonal link, being warmer in summer than in winter. The water temperature was rarely below $\sim 18^{\circ}\text{C}$ or above $\sim 28^{\circ}\text{C}$ in the deeper channels and basins, but in very shallow parts on cloudless summer days it can reach as high as $\sim 35^{\circ}\text{C}$ (CSIR, unpublished data).

The salinity of the water column is broadly comparable to that for seawater in the nearshore marine environment off Richards Bay, if generally slightly lower at the surface. The high salinity reflects the strong marine influence in the port and minimal freshwater inflow. Areas in the port where the salinity is often lower than that for seawater are the Bhizolo-Manzanyama Canal complex (Station 1) and Mzingazi Canal (Stations Y4 and 9). The salinity of water over the Kabeljous Flats is obviously influenced by flows from the Bhizolo-Manzanyama Canal complex, but the depression relative to seawater at the position where water quality was measured was not pronounced.

The pH of surface water in the port is more variable than that for seawater in the nearshore marine environment off Richards Bay but nevertheless reflects the strong marine influence in the port and minimal freshwater inflow. The pH of bottom water is more variable than that for surface at some deeper water stations in the 600 and 700/800 Berth Basins, but generally the variation between surface and bottom waters is small. Areas in the port where the pH is often (if usually only slightly) lower than that for seawater are the Bhizolo-Manzanyama Canal complex (Station 1) and occasionally Mzingazi Canal (Stations Y4 and 9). The pH of water over the Kabeljous Flats is obviously influenced by flows from the Bhizolo-Manzanyama Canal complex, but the influence of these flows at the position where water quality was measured was not pronounced. The lower pH in the canals is linked in part

to the inflow of freshwater, which naturally has a lower pH than seawater, but in the Bhizolo-Manzanyama Canal complex there is strong evidence the low pH reflects an anthropogenic impact that might be related to groundwater and surface runoff from a phosphogypsum stockpile in the Bhizolo Canal catchment. Waste phosphogypsum from a phosphoric acid and fertilizer industry (known as Triomf at the time, but now as Foskor) was stockpiled at this site before deepwater outfall was constructed for its discharge into the sea off Richards Bay.

The dissolved oxygen concentration is relevant to the Berth 605 project since the dredging of sediment invariably remobilises oxygen demanding substances from the sediment into the water column. The water column in the port is generally well oxygenated.

Turbidity is a measure of the cloudiness or haziness of water and is usually related to the mass of fine-grained particles (sediment, plankton) suspended in the water column. The turbidity in the PoRB is typically low ($<10^{\circ}\text{NTU}$), particularly in deepwater channels and basins, but is often higher in shallower parts of the port such as on the Kabeljous Flats, in the Bhizolo-Manzanyama Canal complex, and in Mzingazi Canal. Since deepwater channels and basins constitute the largest water area in the port, and the turbidity of the water column in these parts is generally low, the port can be regarded as a low turbidity (although not necessarily clear water) system. The suspended sediment concentration and related turbidity in the water column increase sharply when large vessels are manoeuvred by tugs due to vessel propeller wash disturbance of bottom sediment.

Faecal indicator bacteria are measured in water quality monitoring programmes to reveal the presence of human sewage because these bacteria are pervasive and abundant in the digestive tracts and faeces of humans, and hence in sewage. Faecal indicator bacteria are found in the digestive tracts and faeces of birds and mammals, but high concentrations of these bacteria in aquatic ecosystems in urban settings (including ports) usually points to the influx of sewage. In surveys made in the port between 2015 and 2024 by the CSIR, *E. coli* and faecal streptococci bacteria concentrations were almost always low, and apart from a few instances for *E. coli* were below South African recreational water use guidelines. The low faecal indicator bacteria concentrations infer there are no significant or consistent inputs of sewage to the port.

Nutrients, such as ammonia, nitrate, orthophosphate, and silica, are essential for the growth of aquatic plants. However, persistently high nutrient concentrations can stimulate the excessive growth of aquatic plants in a process known as eutrophication, which may lead to a host of detrimental ecological effects that include a reduction in the dissolved oxygen concentration in the water column and the development of anoxic conditions in sediment. These effects can stress biological resources and in extreme cases can cause their death. Fish kills linked to eutrophication are a common occurrence in many KwaZulu-Natal estuaries, often linked to excessive nutrient contributions from the breakdown of sewage released into the catchment from wastewater treatment works. In surveys made in the port between 2015 and 2024 by the CSIR, nitrogenous nutrient concentrations in the Port of Richards Bay water column were usually low and showed no trends that allude to a significant or persistent anthropogenic source of these nutrients to the port. The orthophosphate concentration is, however, often elevated in parts of the port. The highest concentrations were often recorded at Station 1 below the confluence of the Bhizolo and Manzanyama Canals. A possible source of the orthophosphate might be groundwater and surface runoff from the waste phosphogypsum stockpile in the Bhizolo Canal catchment mentioned above.

In surveys made in the PoRB between 2015 and 2023 by the CSIR, the (dissolved) concentrations of most of the targeted metals in the Port of Richards Bay water column were low. The concentrations of numerous of the metals were in fact usually below the method detection limit in the water column across the port. The concentrations of some metals (e.g. zinc) were occasionally elevated across a large part of the port, and more often at a Station 1 below the confluence of the Bhizolo and Manzanyama Canals and at Station 4 in the 700/800 Berth Basin. The high concentrations of some metals at Station 1 suggest the anthropogenic introduction of these metals into the canal, but might also reflect the naturally higher concentrations of some metals in freshwater compared to seawater.

In surveys made in the Port of Richards Bay between 2022 and 2024 by the CSIR, the total recoverable hydrocarbon, Benzene, Toluene, Ethylbenzene, Xylene (BTEX), and total polycyclic aromatic hydrocarbon concentration in surface water samples were always below the method detection limit.

The CSIR used an index to rate surface water quality in the PoRB into five categories ranging from excellent to poor. The index considers the values and concentrations for most of the water quality indicators measured in water quality surveys relative to water quality targets. In 2024, water quality in the summer and winter surveys was rated good apart from a station in the 700/800 Berth Basin in the summer survey, where the water quality was rated fair, and at Station 1 below the confluence of Bhizolo and Manzanyama Canals, where the water quality was rated marginal. Water quality at Station 1 was regularly rated fair or marginal in earlier surveys, but at other stations was usually rated good or excellent in most surveys (**Figure 6-24** and **Figure 6-25**).

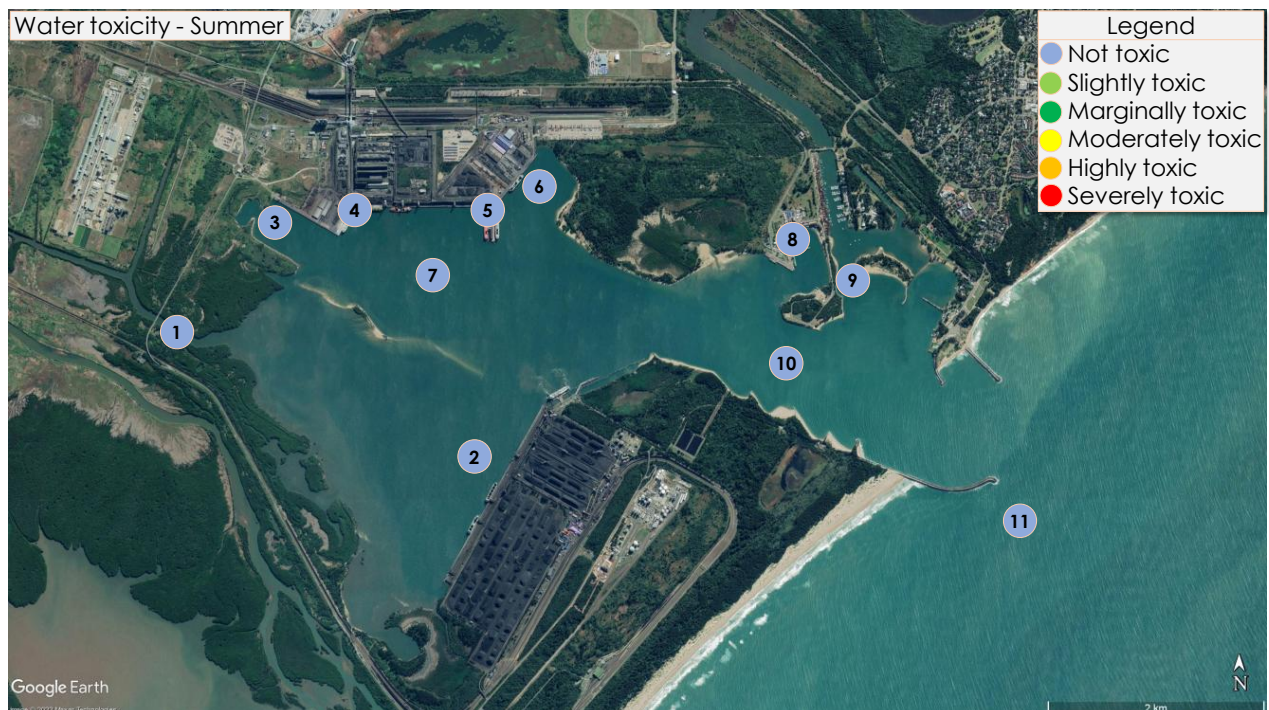


Figure 6-24 - Results of the toxicity testing of surface waters in the Port of Richards Bay in summer

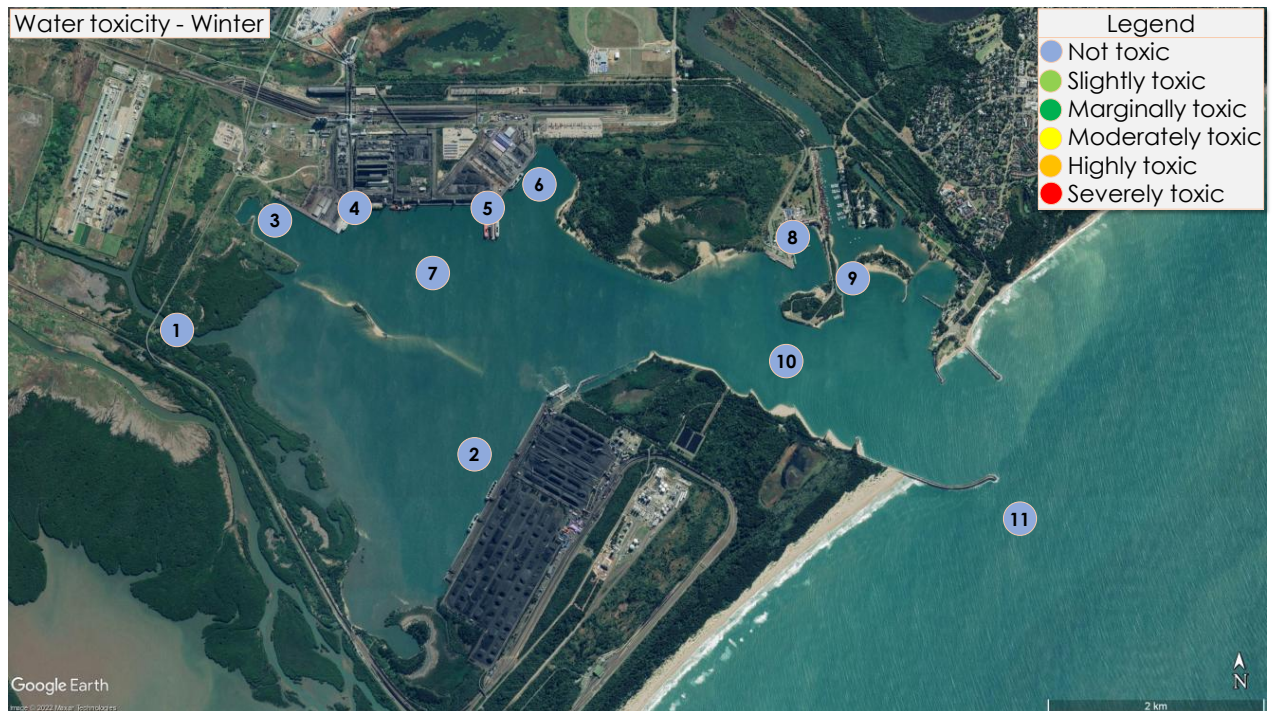


Figure 6-25 - Results of the toxicity testing of surface waters in the Port of Richards Bay in summer

6.1.4.9 Tidally Influenced Pool

In the Berth 605 project footprint, a narrow band of white and black mangroves fringe the small tidally influenced pool inland of the Assembly Basin, while there are scattered mangrove trees in the Assembly Basin. As mentioned above, there is an extensive mangrove forest fringing the Kabeljous Flats to the south of the Sandspit. Mostert (2014) considered the ecosystem functionality of mangroves fringing the small tidally influenced pool to be very high (**Figure 6-26**).

Although the tidally influenced pool currently supports habitat of high ecological value, specialist investigations and historical aerial imagery confirm that the feature is anthropogenic in origin and developed as a consequence of previous construction and port expansion activities. The ecological importance of the pool is therefore associated with ecological succession and habitat establishment that occurred following the original disturbance rather than the persistence of a naturally occurring estuarine system.

The National Forests Act, 1998 (Act 84 of 1998), Section 3 states that “...*natural forests may not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits*”. Section 7 of the Act prohibits the cutting, damaging, disturbance, destruction and removal of any indigenous living or dead protected tree in a forest without a licence. Mangroves are protected according to the Act. The removal of mangroves that fringe the tidally influenced pool inland of the Assembly Basin will thus need to be motivated to the Minister and licence obtained. The specialist recommended that a case of “exceptional circumstances” for their removal would be the construction of Berth 605 in the 600 Berth Basin to enhance the economy in northern KwaZulu-Natal and South Africa.



Figure 6-26 - Aerial view of caissons in the Assembly Basin in the 600 Berth Basin in the Port of Richards Bay. The berm that sealed the basin has been breached in preparation of caisson floating to Berth 306. The existing tidally influence pool referred to in the text is highlighted.

6.1.4.10 Biological Environment of the Estuary

1. Microalgae

Microalgae are single celled plants that live independently or in colonies. Microalgae that remain suspended in the water column are usually referred to as phytoplankton, while those that live on the bottom are referred to as microphytobenthos. As their name implies, microalgae are small, usually invisible to the naked eye, but they may become indirectly visible to the naked eye when the form colonies or when they are present at high densities in the water column (called a bloom) and discolour the water. They may also reach high densities on sediment in the intertidal zone, discolouring the sediment (usually to a green colour). Microalgae are important to the ecological functioning of estuaries by contributing to the primary productivity of these systems (i.e. they form the base of food webs).

There appears to be no information on the species composition of phytoplankton and microphytobenthos in the PoRB, at least not in the peer reviewed literature. Chlorophyll-a, which is the main green pigment in plants responsible for photosynthesis, is used in water quality motoring programmes as a surrogate indicator for phytoplankton and microphytobenthic biomass. The CSIR (unpublished data) has measured the chlorophyll-a concentration in the water column in the Port of Richards Bay for various studies and research. The chlorophyll-a concentration was usually low to moderate but was periodically elevated in the Bhizolo-Manzanyama Canal complex, Mzingazi Canal, and 600 Berth Basin areas of the port (CSIR, 2025).

Microphytobenthos live in the surface few centimetres of bedded sediment where there is adequate light to sustain their photosynthetic needs. Apart from their role in primary productivity and forming the base of the food chain, they also perform an important (bio) stabilizing effect on sediment. Benthic diatoms, for example, produce extracellular polymeric substances that create a biofilm on the sediment surface that increases the critical threshold for erosion, thereby reducing bed erosion and sediment resuspension (Malarkey et al., 2015; Parsons et al., 2016). No measurements on microphytobenthic chlorophyll-a concentrations appear to have been made in the PoRB. However, small areas of sediment in the intertidal in the 600 Berth Basin presented a green tinge during a field survey in 2024, reflecting a high microphytobenthic biomass that will contribute to the primary productivity in the basin. Similar discoloration was not evident on the sinuous Sandspit, but the sediment here is less stable and coarser (due to wind driven waves) and this probably prohibits the formation of dense accumulations.

2. Macroalgae

Macroalgae (seaweeds) are an insignificant component of the primary producer community in the PoRB, being largely restricted to floating structures (e.g. navigation markers, walk on moorings in yacht mole in Mzingazi Canal) and on dolosse forming breakwaters in and near the entrance channel (CSIR, personal observation). In the Berth 605 project footprint, the only macroalga that is present to any degree worth mentioning is the chlorophyte *Ulva* sp (sometimes known as sea lettuce) that fouls navigation markers. It is, however, not found on quay walls, nor on rocks in the intertidal zone in the basin (a common habitat on the coast).

3. Saltmarshes

Saltmarshes cover a comparatively small area (approximately 70 ha) compared to other typical estuarine vegetation in the Port of Richards Bay, being restricted to the upper intertidal in the Kabeljous Flats area and in the Bhizolo-Manzanyama Canal complex. The largest salt marsh area is in fact in the Bhizolo-Manzanyama Canal complex. The dominant salt marsh plants include *Sarcocornia natalensis*, *Juncus kraussii*, *Sporobolus virginicus* and *Paspalum vaginatum*, herbs, such as *Apium graveolens*, and *Salicornia pachystachya* (Adams et al., cited in DEA, 2017). The saltmarsh areas are characterised by a relatively sparse distribution of plants with a high percentage of bare substrate. It, however, forms the ecotone between mangroves and terrestrial vegetation. Information on faunal diversity in these systems is lacking however a few species of crabs are common within this habitat.

4. Seagrass

The eelgrass *Zostera capensis* was an important botanic element in the Richards Bay Estuary prior to the development of the PoRB reportedly covering an area of approximately 62 ha. Numerous species of juvenile fish and prawns were particularly abundant in the eelgrass beds, which constituted an important nursery habitat. The eelgrass beds disappeared during port development, probably due to a combination of habitat loss and excessive turbidity and siltation. A field survey by CSIR scientists in November 2024 showed that the eelgrass is no longer present. The reasons for the loss of eelgrass from the pool is unknown since conditions in the pool appear outwardly to be well suited to its persistence. A possible reason, however, is shading by mangrove trees.

5. Mangroves

There are three major mangrove forest areas in the PoRB, at the eChwebeni Natural Heritage Site, fringing the Kabeljous Flats and extending from there into the Bhizolo-Manzanyama Canal complex and along the berm to the southern part of the Richards Bay Coal Terminal Basin, and in the so-called Casuarinas area. Mangroves also fringe the uppermost part of Mzingazi Canal, and there is a small stand in the eastern most part of the 700 Berth Basin. Three species of mangrove are found in the port, namely white (*Avicennia marina*), black (*Bruguiera gymnorhiza*) and red (*Rhizophora mucronata*), of which white mangroves are by far the most abundant (Mostert, 2014). In fact, the other species are relatively rare and the mangrove forests in some areas of the port are monospecific. Despite their transformation, low species diversity, and some anthropogenic impacts, the functionality of mangrove forests in the port is high (CSIR, 2025).

In the Berth 605 project footprint, a narrow band of white and black mangroves fringe the small tidally influenced pool inland of the Assembly Basin, while there are scattered mangrove trees in the Assembly Basin. As mentioned above, there is an extensive mangrove forest fringing the Kabeljous Flats to the south of the Sandspit. Mostert (2014) considered the ecosystem functionality of mangroves fringing the small tidally influenced pool to be very high.

6. Zooplankton

Jerling (2008) surveyed the zooplankton community in the PoRB and Mhlathuze Estuary at nearly monthly intervals between February 1996 and February 1997. The zooplankton community in the port is relatively diverse, but densities are quite low when compared to many South African estuaries. The zooplankton community that characterised the Richards Bay Estuary prior to port development was dominated by 'typical' estuarine zooplankton (particularly the copepods *Pseudodiaptomus stuhlmanni* and *Acartia natalensis*, Grindley and Wooldridge, 1974), but these have given way to a community dominated by marine taxa, notably the neritic paracalanid copepod *Parvocalanus crassirostris* and the cyclopoid copepod *Oithona spp*, reflecting the strong marine influence in the port. Copepods and their instars were found to be by far the most abundant component of the zooplankton (94% of total density). The zooplankton was fairly uniformly distributed across the port, again reflecting the strong marine influence and uniform salinity. Estuarine copepod taxa that dominated the Richards Bay Estuary prior to port development were found in appreciable numbers only in the Bhizolo-Manzanyama Canal complex and Mzingazi Canal, where there is some freshwater inflow, but at much lower densities than was historically the case (Jerling, 2008). There appears to be no information on the zooplankton community in the Berth 605 project footprint. However, the community is probably like that in the middle part of the 700 Berth basin, where Jerling (2008) recorded 26 taxa. The copepod, *Acartia spinicauda*, is an introduced species that probably reached the port in ballast water discharged from a vessel/s (Jerling, 2008).

7. Ichthyoplankton

The PoRB provides important habitat for many fish species that spend their life in estuaries, and for fish that reside as adults in the marine environment but use estuaries as a nursery habitat. Unsurprisingly, fish larvae are an important component of the plankton in the port. Several studies have recorded the occurrence of larvae and eggs of marine and estuarine fish species in the port (Harris and Cyrus, 1997; Jerling, 2008). Harris and Cyrus (1997) recorded the larvae of 105 taxa from 53 fish families in 12 surveys made in the entrance to the port in 1991 and 1992, with species from

the families *Engraulidae* (anchovies; 50.0%) and *Gobiidae* (gobies; 36.5%) dominating the total catch. The most abundant larvae were those of the thorny anchovy (*Stolephorus holodon*) and an unidentified goby. Other abundant species included the orangemouth anchovy (*Thryssa vitrirostris*), the bulldog eelgoby (*Taenioides esquivel*), the indian pellona (*Pellona ditchela*), and the burrowing goby (*Croilia mossambica*).

8. Benthic Macrofauna

Benthic macrofauna are commonly defined as invertebrate animals >0.5 mm in size that live in and on sediment in aquatic ecosystems. They fulfil many ecological functions, such as forming a link between lower trophic levels and fish and birds. They are widely used as indicators of the health of the sediment environment in aquatic ecosystems.

Numerous surveys of benthic macrofauna have been made in the PoRB. The surveys have revealed the port to have a rich benthic macrofaunal community that comprises a mix of estuarine and marine taxa, although most taxa have a marine origin. Benthic macrofauna are critical food organisms for marine and estuarine fish and coastal seabirds (MER, 2013).

MacKay (2006) recorded 113 benthic macrofaunal taxa in six surveys made at approximately two-month intervals in 2004 and 2005 at three stations on the Kabeljous Flats, at a station in the Bhizolo-Manzanyama Canal complex, and at a station near the Chemical Berth. The highest number of taxa sampled in any survey was 36 and 39 at two stations on the Kabeljous Flats. However, the number of taxa was variable amongst surveys at each station. The benthic macrofaunal community at a station in the Bhizolo-Manzanyama Canal complex (below the confluence of the canals) was dissimilar to the communities at other stations, probably reflecting the fact this station is more affected by freshwater flows (and pollution) than other stations. The benthic macrofaunal communities at other stations were variable and no distinct similarity could be distinguished - each station supported an array of taxa that unique to the station. MacKay (2006) concluded that different areas in the Port of Richards Bay are characterised by different benthic macrofaunal species assemblages, reflecting species preferences and tolerances.

Izegaegbe *et al.* (2020) analysed benthic macrofauna communities at seven sites in the PoRB on a quarterly basis in 2016 and 2017. The sites represent a range of the habitats in the port, including the 600 Berth Basin, Kabeljous Flats, Bhizolo-Manzanyama Canal complex, and Mzingazi Canal. A total of 98 benthic macrofaunal taxa were recorded across the sites, dominated numerically by the crustaceans *Halmyrapseudes digitalis* (a small shrimp-like animal) and *Paratyrodiplox blephariskios* (a small crab), and the polychaetes (worms) *Mediomastus capensis*, *Aphelocheata marioni*, and *Prionospio sexoculata*. The most impoverished community was found in the 600 Berth Basin.

In 2024, the CSIR surveyed the benthic macrofaunal community at 23 subtidal stations in the PoRB. Most of the stations were in deep water channels and basins. A total of 103 taxa were identified across the sites. At the site level, the number of taxa ranged from lows of three at a station in the Entrance Channel and nine at a station at the base of the Finger Jetty in the 700/800 Berth Basin, to highs of 28 taxa at a station alongside the Repair Quay and 30 taxa at a site in the innermost part of the Small Craft Harbour. Polychaete worms (particularly capitellids, cirratulids, and sigambrids) were the most abundant taxa, contributing ≥50% of the total abundance at all but three of the stations (Figures 60 and 61). Bivalves, gastropods, sipunculids, and scaphopods were important at many sites. The status of the benthic invertebrate communities surveyed by the CSIR in 2024 was evaluated using a biotic

index that describes the ecological integrity of the habitat based on the sensitivity of different taxa to pollution and habitat disturbance. The benthic invertebrate communities were identified spanned the range from undisturbed through to heavily disturbed. Although the disturbance ratings for the communities at some stations seem logical, at other stations the ratings appear to hold little relevance.

Benthic macrofauna in and near the Berth 605 project footprint were surveyed in certain of the above studies. In 2024, the CSIR recorded 17 and 18 benthic macrofauna taxa at two stations in the 600 Berth Basin. Polychaete worms contributed by far the largest number of animals to the total abundance at one of the stations (approximately 90% of the 1659 animals.m²), while polychaete worms and bivalves contributed about equally to the total abundance at the other station (approximately 48% of the 2453 animals.m²).

A further impression from studies on benthic macrofauna in the Port of Richards Bay is that species diversity of these fauna is higher, and unique on the Kabeljous Flats compared to other sediment habitat in the port, further emphasizing the ecological importance of the Kabeljous Flats.

Despite being a large and busy port, the benthic macrofaunal community in the PoRB compares favorably with the neighbouring essentially unpolluted Mhlathuze Estuary (Izegaegbe et al., 2020). The benthic macrofaunal community across the port is more species diverse than in the Mhlathuze Estuary during 2016-2017 (Izegaegbe et al., 2020b). Macrobenthic communities in muddy areas in the Mhlathuze estuary were also very similar to that in intertidal mudflat habitat of RBH during the present study (Cyrus et al., 2000).

9. Macrocrustacea

The term macrocrustacea is a loose term but is usually used to refer to decapod crustaceans that are larger than approximately 1-1.5 cm in size. The term is also often used to refer to swimming prawns, shrimps, and crabs that are conspicuous, or that are captured by trawling or seining with nets, but in this study the term is used to refer to all large forms of prawns, shrimps, and crabs, even though some are more often considered to be part of the benthic macrofauna.

There are numerous species of macrocrustacea in the Berth 605 project footprint, but the full inventory is unknown. Where the substrate is sandy in the intertidal of the 600 Berth Basin and in the Assembly Basin, the macrocrustacea include sandprawn (*Kraussillichirus kraussi*), one (*Austruca occidentalis*) of the four fiddler crab species recorded in the port, soldier crabs (*Dotilla fenestrata*), and ghost crabs (*Ocypode spp*) in the higher shore areas. However, the abundance of many of these macrocrustacea is considerably lower when compared to similar habitat in other parts of the port (CSIR scientists, personal experience and observation). Where the substrate in the intertidal comprises rocks, stones, and rubble, a cursory survey showed that two species of marine xanthid crabs and a species of porcelain crab were relatively common. The eastern oval crab is fairly common in muddy sediment in subtidal parts of the 600 Berth Basin. As discussed above, Cyrus and Vivier (2021) recorded several species of swimming prawns in the Assembly Basin.

The species diversity of macrocrustacea is far higher in the tidally influenced pool like area inland of the Assembly Basin. A field survey of this area by CSIR scientists in November 2024 revealed the presence of five species of sesamid crabs, all four species of fiddler crabs recorded in the port, and the mud crab (*Scylla serrata*), sandprawns (*Kraussillichirus kraussi*). All were present in high

abundances. Several species of swimming prawn (penaeids and carids) were recorded by netting. It is clear the tidally influenced pool like area provides a far more ecologically valuable habitat for macrocrustacea than the 600 Berth Basin and Assembly Basin.

10. Fish

Although the PoRB, in its modified state, is undoubtedly more marine than it was in its reference condition, one of its primary ecological values remains that of serving as nursery area for estuarine fishes (and crustaceans, see above). Nhleko and Cyrus (2008 - cited in Cyrus and Vivier, 2021), in a comparative study on the species richness of fish in KwaZulu-Natal estuaries, reported a total of 80 species in the Port of Richards Bay, the 5th highest among the 72 estuaries in the province, after St Lucia, Kosi Bay, Mlalazi Estuary, and Mhlathuze Estuary.

The fish community in the Berth 605 project footprint has not received as much attention as fish communities elsewhere in the port. Cyrus and Vivier (2014) investigated the fish community in the small tidally influenced pool inland of the Assembly Basin. A total of 269 fish belonging to nine species were caught in two seine net hauls – the small size of the pool made it difficult to haul the net. Cyrus and Vivier (2021) investigated the fish community in the Assembly Basin using three types of fishing gear. They recorded 18 fish species in the basin, almost all of which are in some way or other dependent on estuaries to complete their life cycle. Three of the species (two glassies, one goby) recorded spend their life in estuaries (Category I), while six other species recorded are dependent totally on estuaries as a nursery (Category IIa). The vast majority of individuals of the 41 species caught in the port were juveniles, further emphasizing the role of the port as a nursery area.

Of the species that use the port as a nursery area, perch *Acanthopagrus vagus* and elf *Pomatomus saltatrix* are listed as Vulnerable on the IUCN Red List, and dusky kob *Argyrosomus japonicus* is listed as Endangered (Mann *et al.*, 2014; Carpenter *et al.*, 2015; Fennessy, 2020). Also found in the port are bonefish *Albula vulpes*, catface rockcod *Epinephelus andersoni*, and the bronze bream *Pachymetopon grande*, which are all listed as Near Threatened in the IUCN Red List (Adams *et al.*, 2012; Mann *et al.*, 2014; Fennessy, 2018). Additionally, the Vulnerable yellowbelly rockcod *Epinephelus marginatus* and Mozambique tilapia *Oreochromis mossambicus* are also found in the port (Pollard *et al.*, 2018; Bills, 2019).

11. Marine Reptiles

No surveys on marine reptiles (e.g. turtles) in the PoRB could be found in peer reviewed scientific journals or other information sources. Five species of turtle are found along the East Coast of South Africa, namely leatherback (Critically Endangered), loggerhead (Endangered), green (Endangered) turtle, Olive Ridley (Vulnerable), and hawksbill (Critically Endangered) turtles. Leatherback and the loggerhead turtles' nest on the beaches in northern KwaZulu-Natal. Turtles probably enter the port from time to time but are by no means common.

Crocodiles that live in Lake Mzingazi periodically enter the Port of Richards Bay (mainly Mzingazi Canal) but do not appear to remain in the port waterbody for any significant length of time.

12. Marine Mammals

There are two related groups of marine mammals in the nearshore marine environment that might or will be affected by the Berth 605 project, namely dolphins and whales. The most abundant of these

are dolphins, specifically the humpback dolphin (*Sousa plumbea*), a Protected Species in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Threatened or Protected Marine Species Regulations of 2017, and rated as Endangered by the International Union for Conservation of Nature (Braulik et al., 2017). Humpback dolphins reside permanently along east coast of South Africa and are sighted with regularity in the marine nearshore off Richards Bay and to a lesser degree in the Port of Richards Bay (Atkins et al., 2004; Keith et al., 2013; Atkins et al., 2016).

6.1.4.11 Overall Ecological Importance of the PoRB

The PoRB has been extensively transformed. However, the port is still characterised by a wide range of natural habitat types. These habitats support unique biological communities, but do not function in isolation. Various species utilise more than one habitat on various time scales. Prawns (e.g. *Fenneropenaeus indicus*) and fishes (e.g. *Acanthopagrus berda*) leave mudflats on a tidal basis and move into mangroves to feed or take refuge from predators in the rising waters (Weerts et al. 2003, personal observation). In the neighbouring Mhlathuze Estuary, stumpnose *Rhabdosargus holubi* and *Rhabdosargus sarba* use eelgrass during their early life stages before moving to sandflat habitat (Weerts, unpublished data). Similar ontogenetic habitat shifts are likely to be in other fishes and macrocrustaceans in the port. Connectivity between spawning and settlement habitats in the port and the dispersal and spawning grounds in coastal marine waters is also important. The free flow of eggs and larvae between port habitats and the adjacent marine environment is critical to populations within the port as well as the continued contribution of the port to regional stocks and populations.

The entire port can thus be considered ecologically important habitat. Indeed, by virtue of the port being an estuarine embayment, of which it is one of only three in the country, gives it conservation (ecological) significance.

6.1.4.12 Ecologically important habitats and species in and near Berth 605 project footprint

Four of the habitats that the CSIR (2005) rated in terms of their ecological importance in the PoRB, and its immediate environs are represented in the 600 Berth Basin, namely Sandbanks, Mangrove Swamps, Harbour (Marine Embayment), and Deepwater Sediment. Parts of the small tidally influenced pool inland of the Assembly Basin could possibly be regarded as representing Mudflat habitat in addition to Mangrove habitat. The most ecologically sensitive and important habitat in the Berth 605 Project footprint is the small tidally influenced pool inland of the Assembly Basin. The pool is fringed by mangrove trees, including black mangrove, a protected tree in terms of the National Forestry Act. As discussed above, there is a high diversity and abundance of fish and pelagic and benthic invertebrates in the pool.

While the tidally influenced pool represents one of the most ecologically important habitats within the immediate project footprint, specialist investigations also confirmed that the habitat developed within a historically modified environment associated with previous port construction activities. Consequently, the assessment of impacts required consideration of both the present ecological value of the habitat and its historical development context. This understanding informed the development of the Biodiversity Compensation Plan and the proposed habitat replacement measures.



Figure 6-27 - Photographs of the tidally influenced pool inland of the Assembly Basin in the Berth 605 development footprint.

The Kabeljous Flats, including the mangroves that fringe the flats, the Bhizolo/Manzanyama Canal complex and Sandspit are widely acknowledged as the most ecologically sensitive and important habitats in the port.

6.1.4.13 Trends in Ecological State

The Present Ecological State (PES) for a large proportion of the estuaries in KwaZulu-Natal was rated poor, with pollution playing an important role in this regard.

The most recent National Biodiversity Assessment proves an evaluation of the health of South African estuaries (Van Niekerk *et al.*, 2019). Various abiotic and biotic components of estuaries were used to compute an Estuarine Health Index score, also known as the PES. Estuaries were assigned a score based on the similarity to an assumed natural (pristine) condition for abiotic and biotic components. For each component, the change was estimated as a percentage (0-100%) of the natural state. Scores were weighted (25% abiotic, and 20% biotic components) and aggregated (50:50) to provide an overall Estuarine Health Index score that reflects the present health of the estuary as a percentage of that under natural conditions. The degree of similarity in the scoring system is reflected in six broad categories of estuarine condition (A-F scale), ranging from natural to extremely degraded. The categories in turn relate to decreasing levels of ecosystem condition. The change in condition occurs on a continuum. Estuaries >90% similar to their natural state are rated as 'Natural' and those degraded to <40% of natural condition are rated as 'Severely or Critically Modified'. The A-F scale represents a continuum and boundaries between categories are conceptual points along a continuum. There may, therefore, be cases where there is uncertainty on the category to which an estuary belongs, potentially having components that have membership in two categories (Van Niekerk *et al.*, 2019). The assessment is based largely on expert knowledge and opinion rather than empirical measurements of abiotic and biotic components of an estuary.

The PES for a large proportion of the estuaries in KwaZulu-Natal was rated poor, with pollution playing an important role in this regard. None of the estuaries were in good health. Estuaries in urban areas and those with closely linked developments are particularly poor. The Present Ecological State for the Port of Richards Bay was rated 'D-HIGHLY MODIFIED' (41-60% condition of pristine). The Mhlathuze Estuary was also rated 'D-HIGHLY MODIFIED'. This Present Ecological State reflects the loss of a large amount of natural habitat, biological resources, and basic ecosystem functions and processes. Despite the score, as emphasised in many places in the Marine Ecology Study for Berth 605 at the PoRB (CSIR, 2025), the Port of Richards Bay retains an important ecological function, if different to that which existed prior to port development. The importance of the port is reflected in it being identified as a priority estuary for biodiversity protection (Van Niekerk *et al.*, 2019).

Table 6-5 – Desktop Present Ecological Status for the Port of Richards Bay and Mhlathuze Estuary.

Component	Category	
	Mhlathuze	Richards Bay
Hydrology	B	D
Hydrodynamics and mouth condition	D	D

Component	Category	
Water quality	E	D
Physical habitat alteration	E	E
Habitat health score	D	D
Microalgae	C	D
Macrophytes	E	F
Invertebrates	D	E
Fish	F	E
Birds	E	D
Biotic health score	D	E
Present Ecological State	D	D
2018 Condition Status	Heavily Modified	Heavily Modified

The Highly Modified Present Ecological State assigned to the Port of Richards Bay is consistent with the extensive historical transformation that occurred during the establishment and expansion of port infrastructure. Despite this modified condition, the estuary continues to support important ecological functions and biodiversity values and remains a priority system for biodiversity management, conservation planning and environmental mitigation.

6.1.5 WETLANDS AND RIVERS

The National Water Act (No 36 of 1998) defines a wetland as, “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.” This definition includes all naturally occurring wetlands and pans, but excludes rivers, lakes, and artificial wetlands. The transition zone from the river or lake and the terrestrial ecosystem may be included in some cases.

Due to the presence of the estuary and associated EFZ which covers the entire project area, the desktop assessment did not reveal any wetlands present within the project area. However, based on information presented in the Draft EIA Report for the Proposed Gas to Power Project at Port of Richards Bay, Umhlathuze Municipality, KZN (Tripl4 2022), several wetlands were identified during the specialist assessment of the site.

The site visit and delineation by the freshwater specialist for the Berth 605 project conducted in November/December 2024 revealed that the process of the delineation of freshwater ecosystems within the study area is complex as a result of the dynamic and unique influence of the adjacent estuary (SASS, 2025). As a result of fluctuating water levels which leads to overlapping zones of wetland and estuarine influence, sediment deposition which deposits sediment across various areas of the wetlands, causing morphological changes in the landscape and variable salinity which are an

influence of the estuarine system, over-time the transitional zones between the boundary of the freshwater ecosystems and estuary overlap or lack clear boundaries. Linked to these natural dynamics, surrounding industrial activities, developed artificial drainage systems, including artificial channels/canals, historical excavations and depositions of sediments further add to the complexity of as these activities have the potential create new, unnatural boundaries.

The specialist confirmed that there is freshwater depression wetlands present within 500 m from the project area (DWS regulated zone) however no freshwater wetlands were identified within 32 m from the project area (**Figure 6-28**).

The freshwater assessment confirmed that no freshwater wetlands occur within the direct Berth 605 development footprint and that no direct loss of freshwater wetland habitat is anticipated. Consequently, freshwater ecosystem losses were not included in biodiversity compensation calculations associated with the proposed development. The identified freshwater wetlands occur outside the direct development footprint and will be protected through the implementation of the recommended mitigation measures and existing separation distances.

6.1.6 PES AND EIS OF THE DELINEATED WETLANDS

The PES Category of the wetlands were calculated to be Category D translating to a largely modified systems. This is likely as a result of historical and ongoing activities which include historical infilling which contributes to encroachment by terrestrial vegetation, catchment hardening, dredging of sediments associated with port operations and construction of infrastructure such as access roads. The input of water from hardened surfaces has in addition altered the hydroperiod of the wetland and has augmented wetland response observed in some parts of the system. The vegetation community was largely uniform, dominated by *Phragmites australis* (Common reed).

The ecoservice provision by the wetlands was assessed to be very low to moderate. Important ecological services provided by the system include services such as toxicant assimilation, flood attenuation, sediment trapping and nitrate assimilation due to presence of broad vegetation which increases roughness. The demand for such services was, ascertained to be moderately high due to the prevalence of sediment, excess nutrients and toxicants is higher due to surrounding activities such as stockpiling and movement of heavy-duty vehicles which increases prevalence of dust.

Furthermore, given the robust vegetation within the wetland, it is considered likely that it is also an important feature in the landscape for biodiversity maintenance, particularly for amphibians such as reed frogs.

The system is considered moderate in relation to Ecological Importance and Sensitivity (EIS) as a result of its important for the provision of ecoservices such as toxicant assimilation, flood attenuation, sediment trapping and nitrate assimilation. The wetland vegetation group within which the investigation occur is the Indian Ocean Coastal Belt Group 1 wetland vegetation group which is classified as Least Threatened (Mbona et al., 2015) and this limits the ecological sensitivity of the system to a degree.

The Recommended Management Objective (RMO) based on the PES and the EIS scores is to maintain the ecological integrity of the system. Given the existing impacts that the wetlands are subjected to, no further degradation should occur, and any future developments must ensure that they do not result in further impacts to the system.

6.1.7 FRESHWATER ECOSYSTEM DRIVERS AND RECEPTORS

The wetlands within the investigation area are primarily driven by sub-surface inputs (potentially influenced by the presence of the estuary) and these areas where the wetlands are found are considered to be areas where the water table is exposed in topographical depressions. The hydrological regime of the wetlands is likely impacted to a degree by stormwater runoff from increased catchment hardening from the roads and surface infrastructure which is likely to increase water inputs into the system. The presence of infrastructure such as roads and railway lines has also resulted in the disruption of freshwater ecosystem connectivity and altered the natural flow, pattern and timing of water in the landscape.

The disturbances associated with the development of roads and access routes within the study area has in addition impacted on the natural geomorphological processes within the wetland. Historical deposition of sediments potentially from dredging activities has also impacted on the geomorphological balance within the wetland. Presence of hardened areas such as TNPA permit offices, and the trucking area contributes to changes in sediment balances within the wetlands.

At the time of the assessment no surface water was present within the assessed wetlands and no water quality sampling was taken. No sampling was taken within the estuary areas due to safety and access restrictions into the areas.

The wetland was observed to consist of robust vegetation (predominantly the common reed and *Imperata cylindrica* which is likely to provide habitat for faunal and avifaunal species. In addition, the reeds potentially provide breeding and feeding habitat for faunal species such as the reed frog. The vegetation cover has been impacted to a degree by activities associated with the construction of access roads, historical infilling and general disturbances within the site which has led to invasion by alien and invasive species which include *Psidium guajava*, *Lantana camara* and *Chromolaena odorata*. Furthermore, shrub species such *Chrysanthemoides monilifera* and *Helichrysum kraussii* as were observed to have significantly invaded portions of the wetland areas.

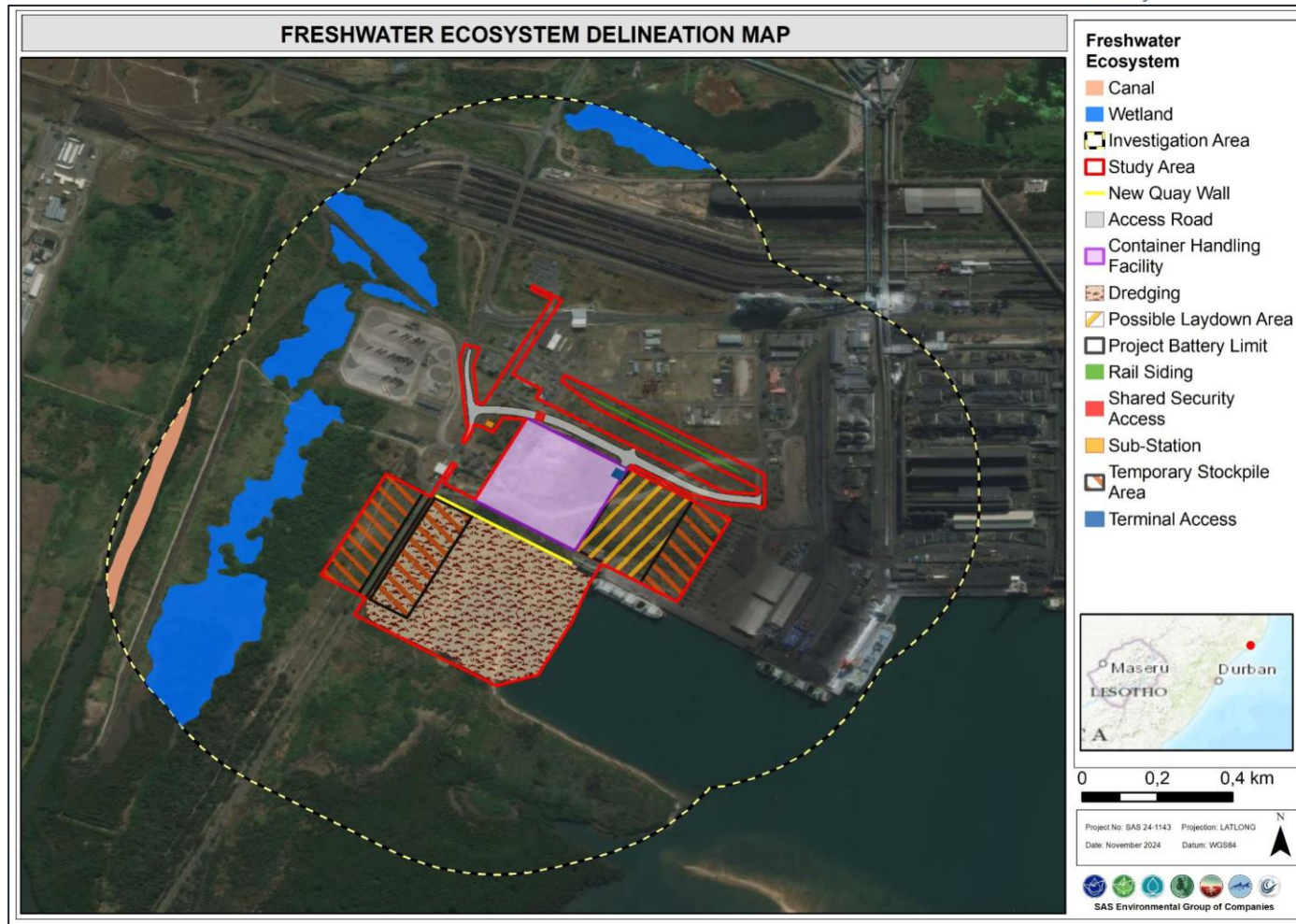


Figure 6-28 – Delineated wetlands for the Berth 605 project area

6.1.8 TERRESTRIAL BIODIVERSITY

6.1.8.1 DFFE SCREENING TOOL

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the following ratings overlap with the project area.

- Terrestrial Biodiversity- Very High Sensitivity;
- Animal Species- High Sensitivity; and
- Plant Species- Medium Sensitivity.

The Terrestrial Biodiversity Theme for the project area is rated 'Very High Sensitivity' due to its overlap/proximity with land mapped as:

- Critical Biodiversity Areas (CBA) 1: Irreplaceable.
- National Protected Areas Expansion Strategy (NPAES); and
- Endangered Maputaland Coastal Belt.

The National Web Based Screening Tool also indicated that the project area is considered to be of 'Medium' sensitivity in terms of the Plant Species Theme on account of the potential presence of at least 17 flora species of conservation concern (**Table 6-6**). Certain species names have been withheld due to their vulnerability to illegal harvesting- in line with SANBI protocol.

The biodiversity assessment therefore considered both biodiversity importance and site condition. While various biodiversity planning tools classify the area as highly significant from a conservation planning perspective, field verification confirmed that sections of the project footprint have been altered through historical development activities. The assessment of impacts and significance ratings were consequently informed by detailed field observations, habitat condition assessments and specialist verification rather than desktop biodiversity mapping alone.

Table 6-6 – Potentially occurring plant SCC flagged by the DFFE screening tool

Species Name	Conservation Status
<i>sensitive species 89</i>	Vulnerable
<i>sensitive species 1252</i>	Vulnerable
<i>sensitive species 649</i>	Near Threatened
<i>sensitive species 1221</i>	Vulnerable
<i>sensitive species 191</i>	Vulnerable
<i>Aspalathus gerrardii</i>	Vulnerable
<i>Thesium polygaloides</i>	Vulnerable
<i>Freesia laxa subsp. Azurea</i>	Vulnerable
<i>Fimbristylis aphylla</i>	Vulnerable

Species Name	Conservation Status
<i>Pachycarpus concolor subsp. Arenicola</i>	Vulnerable
<i>Nidorella tongensis</i>	Endangered
<i>Senecio ngoyanus</i>	Vulnerable
<i>Wolffiella denticulata</i>	Vulnerable
<i>Cassipourea gummiflua var. verticillate</i>	Vulnerable
<i>Oxygonum dregeanum subsp. Streyi</i>	Endangered
<i>Pavonia dregei</i>	Vulnerable
<i>Zostera capensis</i>	Vulnerable

The project area is considered to be of 'High' sensitivity in terms of the Animal Species Theme, due to the potential presence of at least 25 animal SCC (**Table 6-7**). Certain species names have been withheld due to their vulnerability to illegal harvesting- in line with SANBI protocol.

Table 6-7 - Potentially occurring animal SCC flagged by the DFFE screening tool.

Species Class	Species Name	Conservation Status
Mammals	<i>sensitive species 8</i>	Vulnerable
Aves	<i>Podica senegalensis</i>	Endangered
	<i>Circus ranivorus</i>	Vulnerable
	<i>Nettapus auritus</i>	Vulnerable
	<i>Stephanoaetus coronatus</i>	Vulnerable
	<i>Hydroprogne caspia</i>	Vulnerable
	<i>Neotis denhami</i>	Vulnerable
	<i>Balearica regulorum</i>	Endangered
	<i>Pelecanus onocrotalus</i>	Vulnerable
	<i>Microparra capensis</i>	Vulnerable
	<i>Halcyon senegaloides</i>	Endangered
	<i>Pelecanus rufescens</i>	Vulnerable
	<i>Ephippiorhynchus senegalensis</i>	Endangered

Species Class	Species Name	Conservation Status
	<i>Circaetus fasciolatus</i>	Critically Endangered
	<i>Geokichla guttata</i>	Vulnerable
	<i>Aquila rapax</i>	Endangered
	<i>Mycteria ibis</i>	Endangered
	<i>Terathopius ecaudatus</i>	Endangered
Amphibia	<i>Hyperolius pickersgilli</i>	Endangered
Insecta	<i>Deloneura millari millari</i>	Rare
	<i>Teriomima zuluana</i>	Vulnerable
Reptilia	<i>Crocodylus niloticus</i>	Vulnerable
	<i>Pelusios rhodesianus</i>	Vulnerable
Invertebrate	<i>Arytropteris basalis</i>	Vulnerable
	<i>Pomatonota dregii</i>	Vulnerable

6.1.8.2 Regional Terrestrial Biodiversity Context

The project area falls within the Maputaland-Pondoland-Albany Biodiversity hotspot which is recognized as the second richest floristic region in Africa: containing approximately 80 % of the of South Africa's remaining forests, rich birdlife and many other significant flora and fauna species. The uMhlathuze Municipal Area supports a total of 170 Red Data species, which has been reported as amongst the highest in the country for an area of its size. This remarkable concentration of Red Data Species is one of the main reasons that the remaining percentage of its surface area under indigenous cover is considered largely irreplaceable by KZN Wildlife for meeting its conservation objectives in the province. (uMhlathuze Local Municipality, 2022).

Mangrove coverage in Richards Bay have experienced a rapid decline in recent years demonstrating the sensitivity of these trees to anthropogenic disturbance and highlighting that there is no practical way to restore mangroves to their prior state despite the efforts of extensive rehabilitation. Despite the overall decline of mangroves in the greater Richards Bay area, there has been sporadic growth of mangroves at the PoRB even in areas where these have not been identified in prior studies. Taking this into consideration detrimental effects on mangroves must be considered before any development can commence. It is advised that management practices of mangroves are in place. This includes the establishment of an ongoing monitoring program, such as a Biodiversity Management Plan, to promptly identify any negative changes on mangrove trees.

The Richards Bay and uMhlathuze Estuaries have long been recognised as important in terms of the diversity and abundance of bird populations that they support, providing extensive and varied habitat for waterbirds. Once again, there has been a dramatic reduction in bird numbers, and that this trend could continue, given the development and expansion of the port, with increases in pollution and

industrial and recreational activity, habitat loss due to agriculture and urban expansion in the surrounding areas, and external factors affecting water bird populations at broader scales.

The project area is situated within the Subtropical Alluvial vegetation type (Aza 7), which has a conservation status of Least Concern. However, this vegetation type is not well studied and poorly conserved (Mucina and Rutherford, 2006). In addition, Richards Bay Game Reserve (IBA) occurs South of the Project area as is a Key Biodiversity Area (KBA).

6.1.8.3 Historical Transformation and Ecological Recovery

Historical aerial imagery and specialist investigations confirm that substantial portions of the Berth 605 project footprint have been subjected to previous disturbance associated with the development of the Port of Richards Bay and the 600 Series Berths (see Section 2.2 including Table 2-3, Figure 2-4 and Figure 2-5). Disturbance activities included dredging, filling, stockpiling, excavation and the construction of temporary and permanent infrastructure.

Following the cessation of these activities, portions of the site underwent natural ecological succession and habitat re-establishment, resulting in the development of secondary terrestrial vegetation, estuarine habitats and associated fauna communities. While these habitats currently provide ecological value and support species of conservation concern, their present condition reflects ecological recovery within a historically modified landscape.

This historical disturbance context formed an important consideration in the assessment of site sensitivity, evaluation of alternatives and development of biodiversity compensation measures.

6.1.8.4 KZN Biodiversity Sector Plan

The project area was compared to relevant available spatial biodiversity planning datasets, i.e. the uMhlathuze Local Municipality Integrated Development Plan (2022) and KwaZulu-Natal (KZN) Biodiversity Sector Plan (2016) (KZNBSP) to assess the local and regional biodiversity context of the Project area.

The KZNBSP outlines the following as critical for conservation targets:

- **Critical Biodiversity Areas (CBAs):** These are areas that are crucial for conserving biodiversity and maintaining ecosystem functioning. They include habitats for threatened species and ecosystems that are not well-represented in protected areas.
- **Ecological Support Areas (ESAs):** These areas are essential for supporting the ecological functioning of CBAs. They help maintain ecological processes and provide connectivity between different habitats.
- **Other Natural Areas (ONAs):** These are areas that are not classified as CBAs or ESAs but still contain natural habitats that contribute to overall biodiversity and ecosystem health.
- **Protected Areas (PAs):** These are legally designated areas managed for long-term conservation of nature, including national parks, nature reserves, and other conservation areas.

Additionally, the uMhlathuze Local Municipality Integrated Development Plan (2022) outlines the following as critical for conservation targets:

- **Nature Reserves (Level 1):** Areas of high biodiversity and environmental significance that require a high level of legal protection. Included are unique habitats or areas that are considered important at International, National or Provincial level; estuaries, lakes, major wetlands, natural forests,

coastal buffers and critically endangered habitats that are protected in terms of international or national legislation and/or treaties. It is recommended that these areas be proclaimed as nature reserves in terms of relevant legislation such as the National Environmental Management Protected Areas Act.

- **Conservation Zone (Level 2):** Areas of biodiversity / environmental significance, which are not viable for proclamation as nature reserves, but that require some form of legal protection. Included are unique or regionally important natural habitats; wetland and forest areas that are protected in terms of national legislation; and all areas that fall within the 1:100-year flood line. No transformation of the natural assets or the development of land for purposes other than conservation should be permitted in this zone. Sustainable use of renewable resources is permitted.
- **Open Space Linkage Zone (Level 3):** Areas that provide a natural buffer for Level 1 and 2 Zones, areas that provide a natural link between Level 1 and 2 Zones and areas that supply, or ensure the supply of, significant environmental services. Transformation of natural assets and the development of land in these zones should only be permitted under controlled conditions.
- **Development Zone (Level 4):** Areas that are not included in Level 1, 2 and 3 zones. Areas in this zone are either already developed or transformed and contain land and natural assets that are not critical for environmental service supply. However, it is recognized that the development of these zones can impact on environmental services supply. As such, they should be developed in a manner that supports, or at least does not adversely impact on, the sustainability of environmental service supply in Level 1, 2 and 3 zones.

The Local Study Area and most of the Regional Study Area is located within a CBA 1, irreplaceable in accordance with the KZN Biodiversity Sector Plan (2016) (**Figure 6-29**). CBAs are areas of high biodiversity value which are at risk of being lost and identified as important in meeting provincial and national biodiversity targets. These areas, at a local scale, align with wetlands, forested land and grasslands as presented in the national landcover dataset (GTI, 2020).

The motivation for the CBA 1 designation is crucial and from communication with EKZNW (2025) was specifically motivated by the presence of Maputaland Coastal Grassland (Endangered) and Mangrove forests (Endangered) as reflected in the Biodiversity Offset in KwaZulu Natal (EKZNW, 2013). The continued integrity and protection of these CBA's is crucial to meet conservation targets. It is nevertheless important to recognise that biodiversity planning products such as the KZN Biodiversity Sector Plan are developed at a landscape scale and do not necessarily reflect the current condition or disturbance history of individual sites. Specialist field verification therefore formed an important component of the environmental assessment process to determine actual on-site ecological conditions and habitat quality. The presence of CBA 1 land in the Local Study Area is therefore a concern with respects to terrestrial biodiversity management. However, specialist field investigations confirmed that portions of the project footprint have been historically disturbed through previous port-related earthworks, dredging, stockpiling and infrastructure development activities. The environmental assessment therefore considered both the strategic biodiversity importance of the area and the existing level of transformation when evaluating environmental significance and mitigation requirements.

However, it is important to note that the CBAs have not been adopted by the Regional Competent Authority and therefore has not been included as Listing Notice 3 triggering activities.

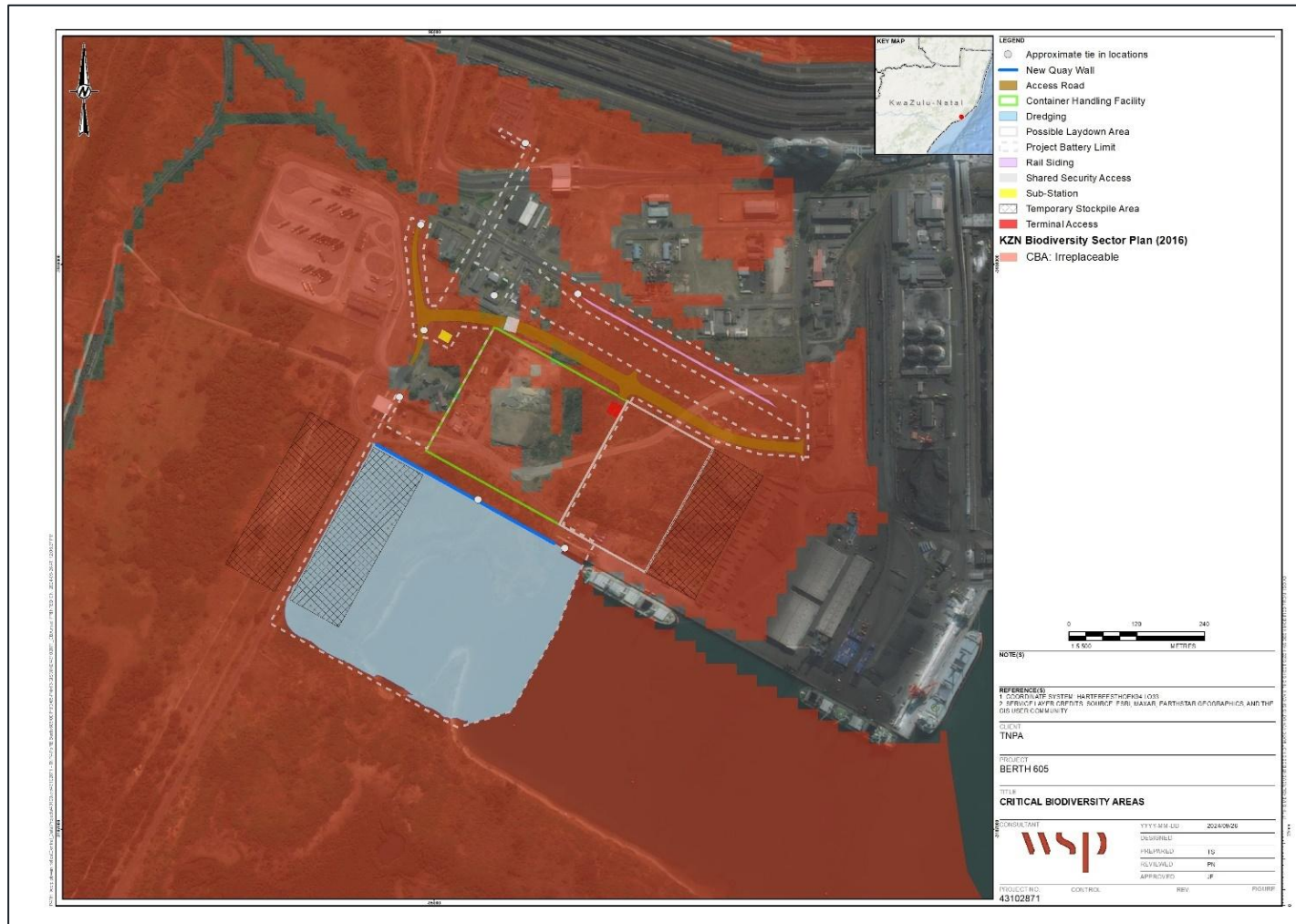


Figure 6-29 – CBA: Irreplaceable areas associated with the Berth 605 project

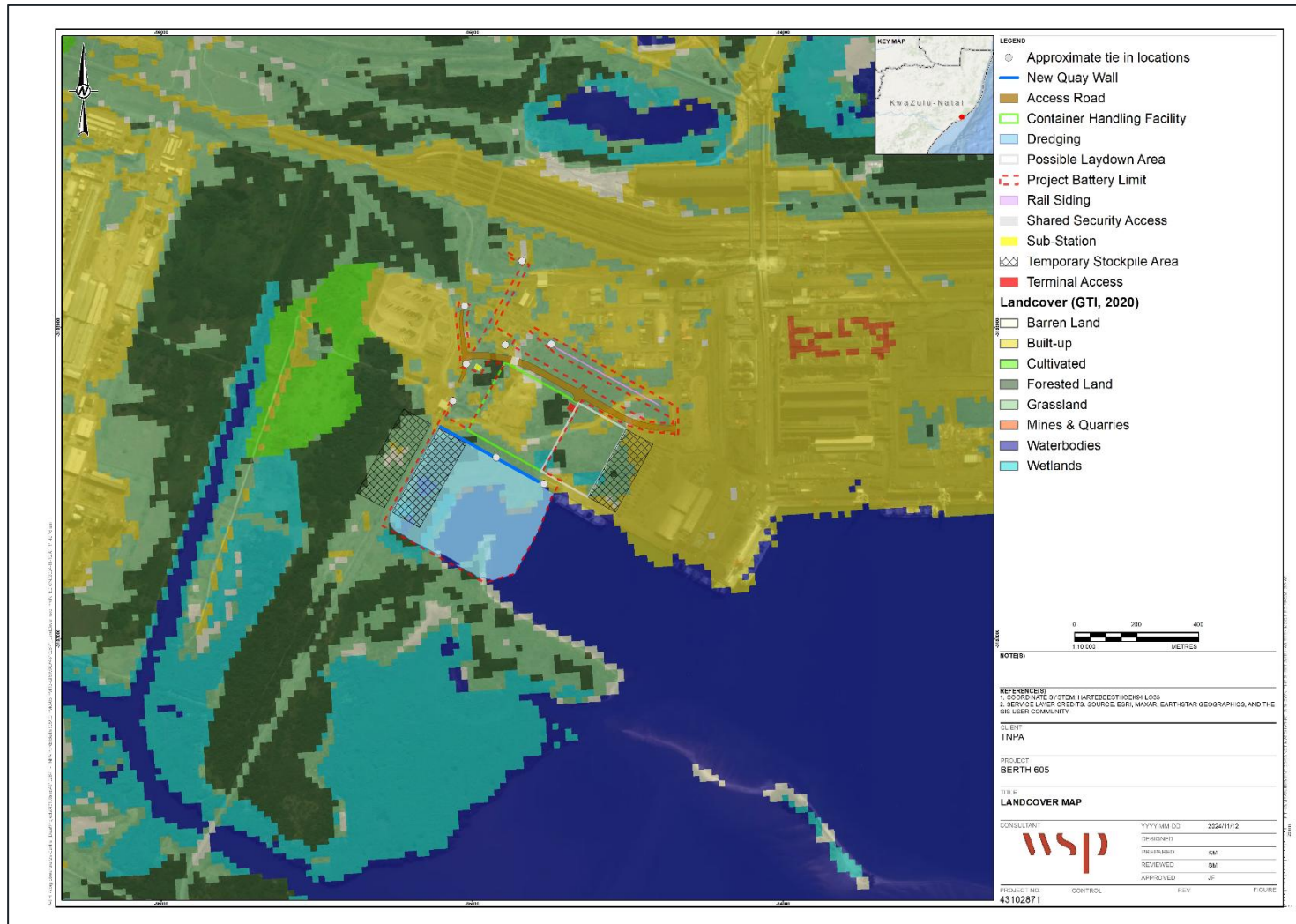


Figure 6-30 - Landcover dataset for the project area (GTI,2020)

6.1.8.5 Priority Areas for Protected Area Expansion and Protected Areas

The entirety of the project area coincides with Priority Focus Areas as part of the National Protected Area Expansion Strategy (2018) (**Figure 6-31**). No nationally protected areas are situated within the project area however, the Richard Bay Game Reserve is listed on the National Protected Areas Register (DFFE, 2022) and occurs approximately 2 km South of the project area (**Figure 6-32**).

6.1.8.6 Important Bird Areas

Richards Bay Game Reserve is an IBA that occurs approximately 2 km South of the project area (**Figure 6-33**). It holds more than 10 000 waterbirds. The wetland supports a complex community of water-associated birds that is seldom dominated by any particular species. The abundances of different species vary considerably as water levels and other conditions shift. The avifauna is diverse, largely as a result of the mosaic nature of the marginal vegetation along the water's edge, and the fact that several species reach the most southerly limit of their Afro-tropical distribution here. (Birdlife International, 2024). The following avian species trigger the assessment.

- Regionally threatened species are Pink-backed Pelican (*Pelecanus rufescens*)-Vulnerable;
- Caspian Tern (*Sterna caspia*)-Vulnerable;
- Mangrove Kingfisher (*Halcyon senegaloides*)-Endangered;
- Great White Pelican (*Pelecanus onocrotalus*)- Vulnerable;
- Greater Flamingo (*Phoenicopterus roseus*)-Vulnerable;
- Little Tern (*Sterna albifrons*)-Least Concern; and
- Whiskered Tern (*Chlidonias hybrida*)-Least Concern.

6.1.8.7 Key Biodiversity Area's (KBA)

Key Biodiversity Areas are 'sites that contribute significantly to the global persistence of biodiversity', which means they are the most important places in the world for species and their habitats – whether these be in terrestrial, freshwater, estuarine or marine ecosystem (SANBI, 2024).

The Global Standard for the Identification of Key Biodiversity Areas, published in 2016, sets out internationally agreed scientific criteria for the identification of KBAs worldwide. Sites qualify as global KBAs if they meet the specific standardised criteria and quantitative thresholds focused on one or more of five trigger aspects:

- Threatened biodiversity;
- Geographically restricted biodiversity;
- Ecological integrity;
- Biological processes; and
- Irreplaceability through quantitative analysis.

The entirety of the project footprint occurs within a KBA (**Figure 6-34**) namely 'Richards Bay Coast (100896).'

Richards Bay Coast is a terrestrial site found in KwaZulu-Natal, South Africa. The site includes a large estuarine lake ecosystem and industrial port, and other smaller predominantly open estuaries to the south. The shore component of the site is mostly sandy. There are species-rich, tall/medium-height subtropical coastal forests occurring on stabilised coastal dunes. These forests have well-developed tree, shrub and herb layers. *Mimusops caffra*, *Sideroxylon inerme*, *Dovyalis longispina*, *Acacia kosiensis* and *Psyrdrax obovata subsp. obovata* are the most common constituents of the tree layer.

Herbaceous vines and woody climbers are important structural determinants in these forests. Includes a flat coastal plain originally densely forested in places with a wide range of interspersed forest plant communities including dry grasslands (which include palm veld where special conditions prevail), hygrophilous grasslands and thicket groups.

This project area qualifies as a Key Biodiversity Area of international significance that meets the thresholds for 3 criteria described in the Global Standard for the Identification of KBAs.

Five species meet one or more KBA criteria, inclusive of amphibians, fish, and plants. The project area meets criterion A1 due to the presence of significant proportions of the global populations of 4 threatened species. The project area regularly holds 1 individual geographically restricted species, therefore meeting criterion B1. An assemblage of co-occurring range-restricted species in the Amphibia taxonomic group regularly present within the site meets criterion B2. A quantitative analysis of irreplaceability indicates that the site is 100% irreplaceable for the global persistence of 2 species, therefore meeting criterion E. The site holds significant proportions of the global extent of 2 geographically restricted ecosystems (meeting criterion B4) (SANBI, 2024).

The following terrestrial species trigger the KBA criteria:

- Forest thread snake (*Leptotyphlops sylvicolus*)- Least Concern;
- Spotted snout-burrower (*Hemisus guttatus*)- Near Threatened; and
- Pickersgill's reed frog (*Hyperolius pickersgilli*)- Endangered.



Figure 6-31 - Project area in relation to National Protected Area Expansion Strategy (2018)

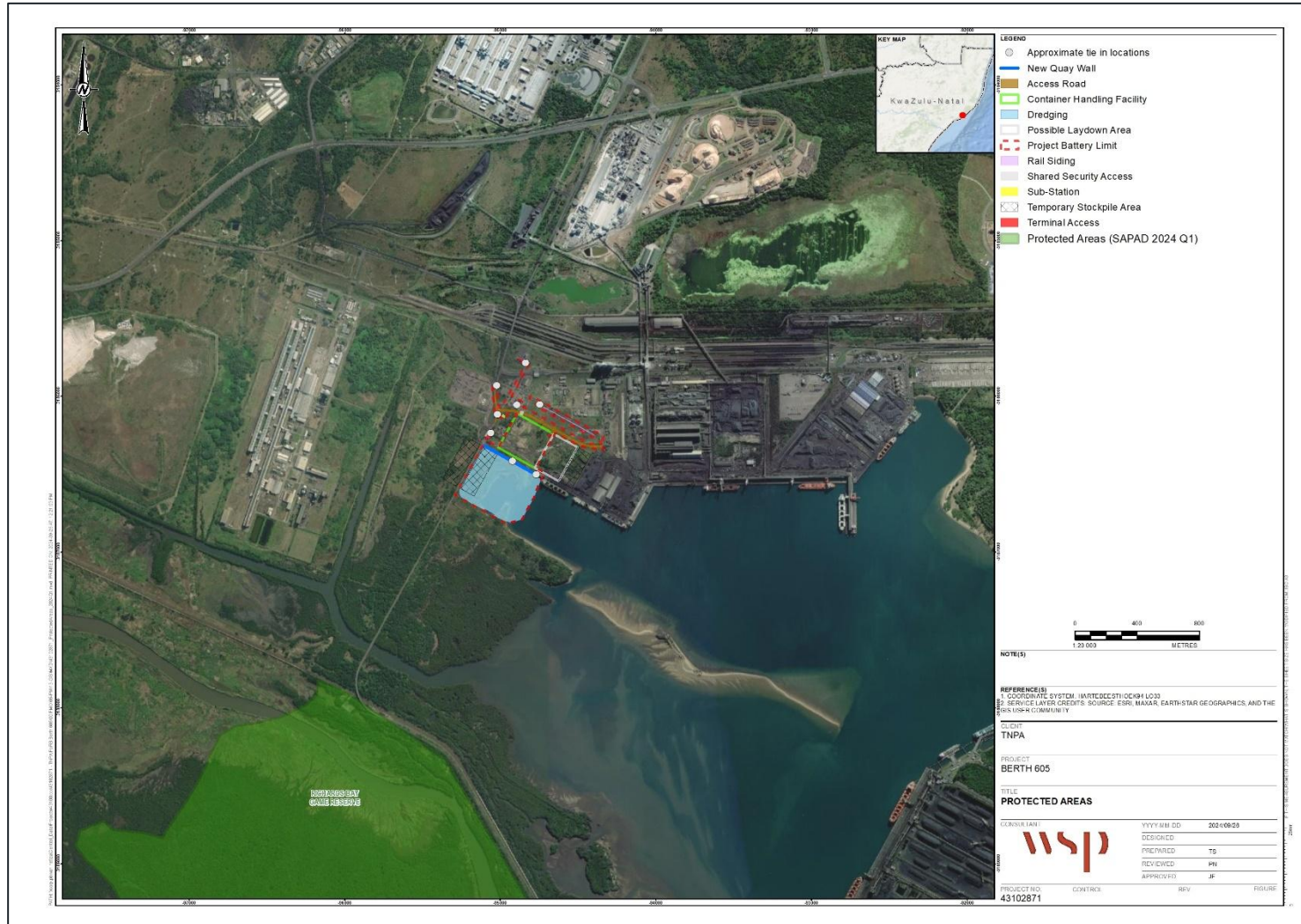


Figure 6-32 - Project area in relation to South African Protected Area Database (2023)

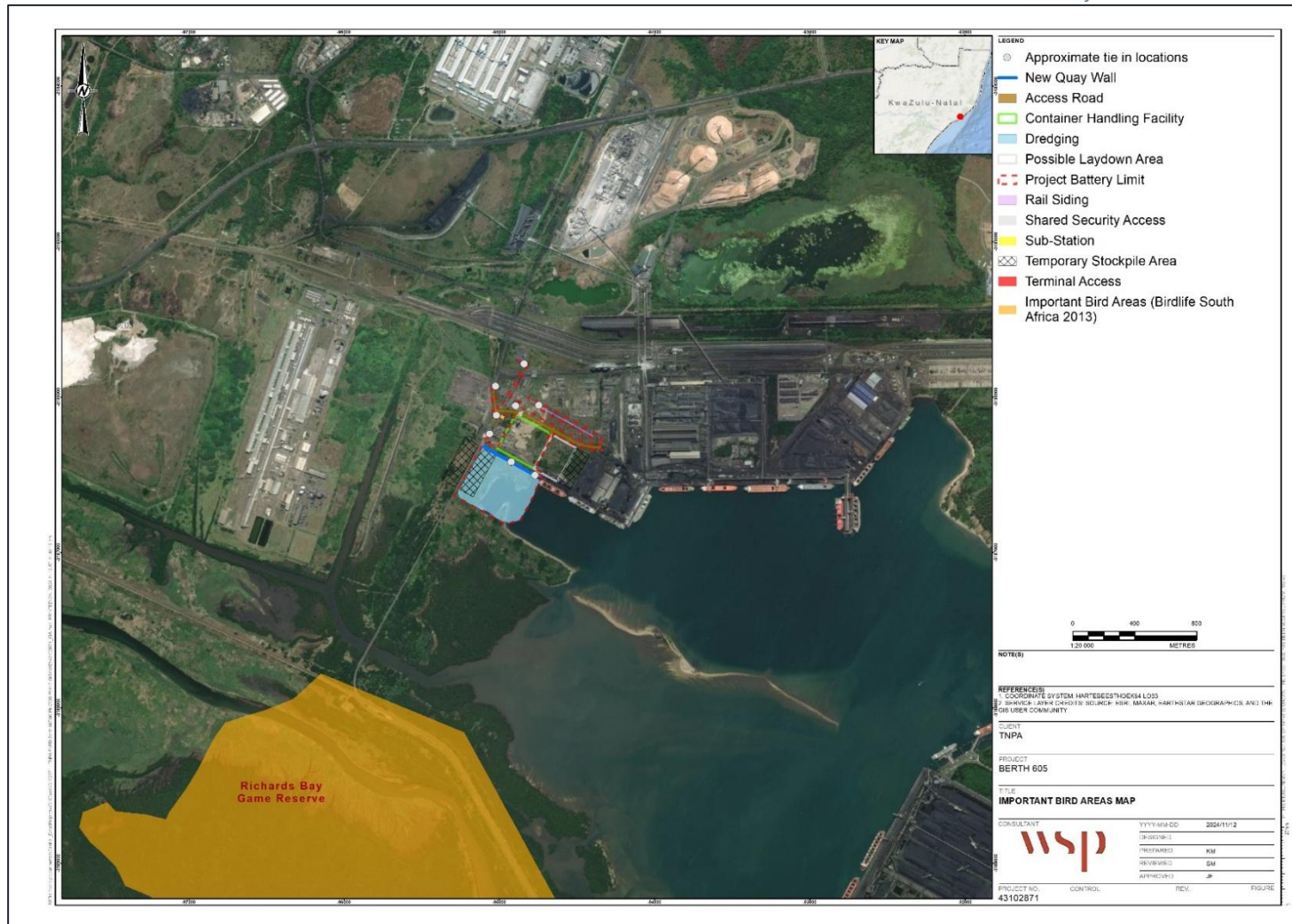


Figure 6-33 - Project area in relation to Important Bird Areas (Birdlife South Africa,2013)



Figure 6-34 - Project area in relation to Key Biodiversity Areas (KBA's) (SANBI,2024)

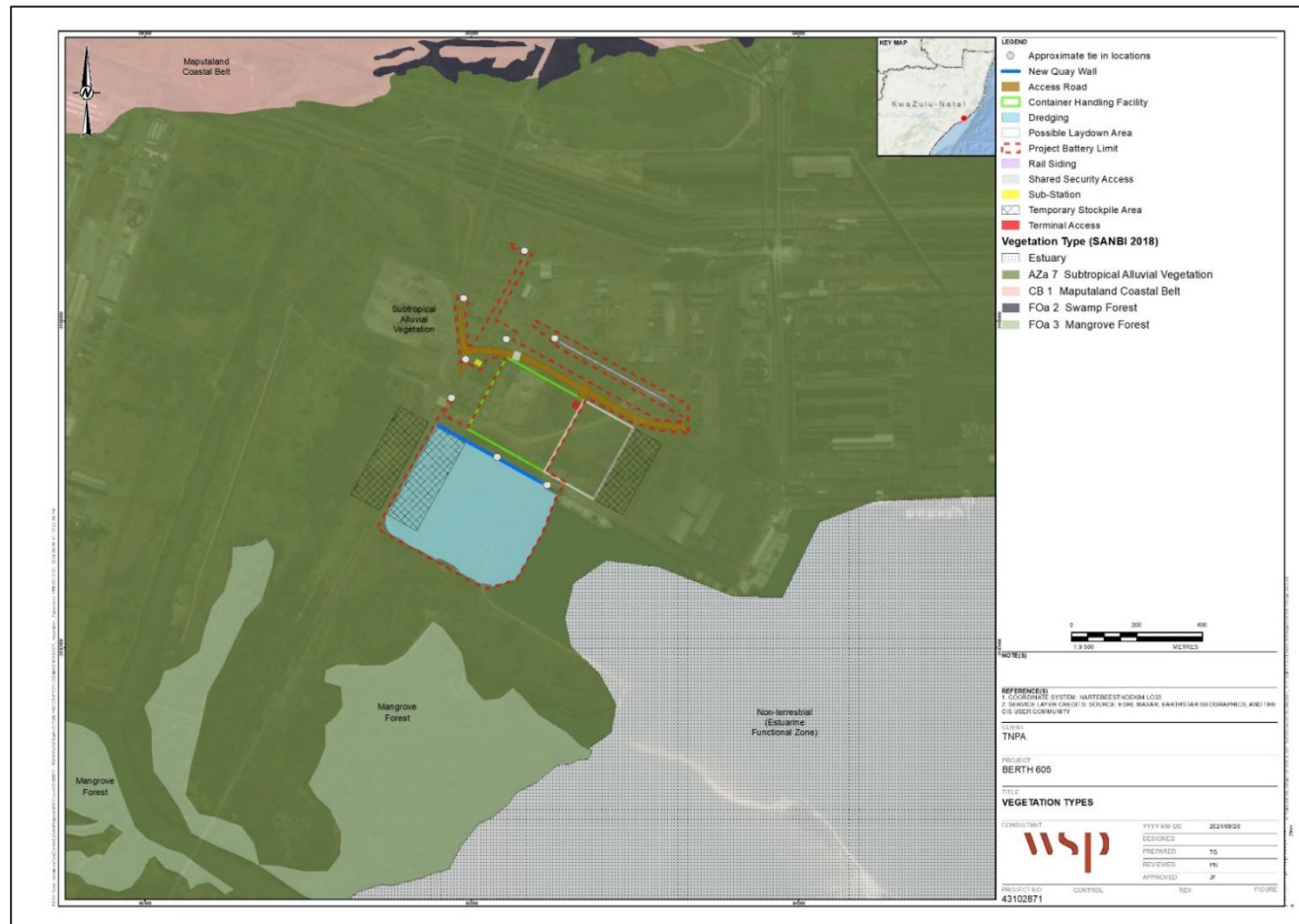


Figure 6-35 - Project area in relation to National Vegetation Types

6.1.8.8 Terrestrial Vegetation and Plant Species

The Local Study Area falls within the Maputaland-Pondoland-Albany Biodiversity hotspot which extends along much of the coast of KwaZulu-Natal, the Transkei and parts of the Eastern Cape province and is recognized as the second richest floristic region in Africa: containing approximately 80% of South Africa's remaining forests, while also rich in birdlife and hosting many significant floral and faunal species. The uMhlathuze Municipal Area supports a total of 170 Red Data species, which has been reported as amongst the highest in the country for an area of its size. This remarkable concentration of Red Data Species is one of the main reasons that the remaining percentage of its surface area under untransformed indigenous cover is considered largely irreplaceable by EKZN Wildlife for meeting conservation objectives in the province (uMhlathuze Local Municipality, 2022).

The project area is also situated within the Subtropical Alluvial vegetation type (Aza 7) (**Figure 6-35**). This vegetation type is classified as Least Concern (Red List of Ecosystems, 2022). It is noteworthy that this vegetation type is not well studied and poorly conserved (Mucina and Rutherford, 2006).

6.1.8.9 Plant Species

The project area is considered to be of 'Low sensitivity' in built-up areas and of 'Medium sensitivity' in undisturbed areas in terms of the Plant Species Theme of the National Screening Tool. This is on account of the potential presence of at least 17 SCC Flora (**Table 6-8**). The table below shows species recorded on site during the October 2024 survey and those likely to occur on the site.

Table 6-8 – Plant Species in the Project Area

Occurrence	Common Name	Species Name	SANBI Conservation Status
Present	Dayflowers	<i>Genus Commelina</i>	Least Concern
Present	Monarch Fern	<i>Microsorium scolopendria</i>	Least Concern
Present	Eastern Sourfig	<i>Carpobrotus dimidiatus</i>	Least Concern
Present	Common Glasswort	<i>Salicornia natalensis</i>	Least Concern
Present	Kosie Thorn	<i>Vachellia kosiensis</i>	Least Concern
Present	White Pear	<i>Apodytes dimidiata</i>	Least Concern
Present	Coast Silver-Oak	<i>Brachylaena discolor</i>	Least Concern
Present	Coastal Goldenleaf	<i>Bridelia micrantha</i>	Least Concern
Present	Beach Sheoak	<i>Casuarina equisetifolia</i>	Least Concern
Present	Chrysanthemum necklace	<i>Chrysanthemoides monilifera</i>	Least Concern
Present	Cat's-Whiskers	<i>Clerodendrum glabrum</i>	Least Concern
Present	Common Wild Fig	<i>Ficus natalensis</i>	Least Concern

Occurrence	Common Name	Species Name	SANBI Conservation Status
Present	Sea Hibiscus	<i>Hibiscus tiliaceus</i>	Least Concern
Present	Common Lantana	<i>Lantana camara</i>	Least Concern
Present	Common Guava	<i>Psidium guajava</i>	Least Concern
Present	Baboon Grape	<i>Rhoicissus digitata</i>	Least Concern
Present	Coasta Curranthus	<i>Searsia nebulosa</i>	Least Concern
Present	Yellow Trumpet Flower	<i>Tecoma stans</i>	Least Concern
Present	Oriental Trema	<i>Trema orientalis</i>	Least Concern
Present	Balloonplant	<i>Gomphocarpus physocarpus</i>	Least Concern
Present	confetti spikethorn	<i>Gymnosporia senegalensis</i>	Least Concern
Present	starry wild jasmine	<i>Jasminum multipartitum</i>	Least Concern
Present	broadpod robust thorn	<i>Vachellia kosiensis</i>	Least Concern
Present	Marsh Fern	<i>Cyclosorus interruptus</i>	Least Concern
Present	Bedding grass	<i>Imperata cylindrica</i>	Least Concern
Present	Red mangrove	<i>Rhizophora mucronata</i>	Least Concern
Present	heath phylica	<i>Scutia myrtina</i>	Least Concern
Present	Natal Wild Banana	<i>Strelitzia nicolai</i>	Least Concern
Present	Golden Leather fern	<i>Achrostichum aureum</i>	Least Concern
Present	white ironwood	<i>Vepris lanceolata</i>	Least Concern
Present	Bead vine	<i>Abrus precatorius</i>	Least Concern
Present	White Passionflower	<i>Passiflora subpeltata</i>	Least Concern
Present	Egyptian Riverhemp	<i>Sesbania sesban</i>	Least Concern
Present	Manyflower Asparagus	<i>Asparagus multiflorus</i>	Least Concern

Occurrence	Common Name	Species Name	SANBI Conservation Status
Present	Madagascar Periwinkle	<i>Catharanthus roseus</i>	Least Concern
Present	Green Cliff Brake	<i>Cheilanthes viridis</i>	Least Concern
Present	Caustic Vine	<i>Sarcostemma viminale</i>	Least Concern
Present	bedding grass	<i>Imperata cylindrica</i>	Least Concern
Present	Guinea Grass	<i>Panicum maximum</i>	Least Concern
Likely	Monkey Rope	<i>Adenia gummifera</i>	Declining
Likely	Green wood orchid	<i>Bonatea lamprophylla</i>	Vulnerable
Likely	Large Yellow Eulophia	<i>Eulophia speciosa</i>	Declining
Likely	Forest freesia	<i>Freesia grandiflora</i>	Vulnerable
Possible	-	<i>Kniphofia leucocephala</i>	Critically Endangered
Possible	Red hot poker	<i>Kniphofia littoralis</i>	Near Threatened
Present	Swamp Fig	<i>Ficus trichopoda</i>	Protected Tree
Present	Powder-puff tree	<i>Barrintonia racemosa</i>	Protected Tree
Present	Black mangrove	<i>Bruguiera gymnorhiza</i>	Protected Tree
Present	<i>Mimusops caffra</i>	Coastal Red Milkwood	Protected Tree
Present	<i>Rhizophora mucronata</i>	Red Mangrove	Protected Tree
Present	<i>Sideroxylon inerme</i>	White Milkwood	Protected Tree
Present	<i>Avicennia marina</i>	Grey Mangrove	Protected Tree
Present	<i>Bruguiera gymnorhiza</i>	Orange Mangrove	Protected Tree
Likely. Ideal habitat	<i>Bonatea lamprophylla</i>	Green Wood Orchid	Vulnerable

Occurrence	Common Name	Species Name	SANBI Conservation Status
conditions present.			
Likely. Ideal habitat conditions present.	<i>Dioscorea sylvatica</i>	Forest Elephant's Foot	Vulnerable
Present in Regional study Area.	<i>Zostera capensis</i>	Cape Eelgrass	Vulnerable

6.1.8.10 Terrestrial Fauna

A total of 140 Mammal species has the potential to occur in the project area. Although the National Screening tool only flags one Mammal SCC (Sensitive Sp. 8 Vulnerable) an additional 14 SCC are possible to occur in the general project area. These species could be present in undisturbed areas of Forested Land and grasslands. Two mammal SCC species were recorded in the project area during the 2024 field survey. These include African Clawless Otter (*Aonyx capensis*)- Near Threatened and Samango Monkey (*Cercopithecus mitis labiatus*)- Vulnerable.

The national screening tool flags two herpetofauna species: Nile Crocodile (*Crocodylus niloticus*) - Vulnerable and Mashona Hinged Terrapin (*Pelusios rhodesianus*)-Vulnerable. An additional six SCC with potential to occur have been identified from desktop assessment. The Richards Bay area hosts very high frog species diversity with over 40 species occurring generally in the Richards Bay area.

Two mammal SCC species were recorded in the Local Study Area during the field surveys completed during 22nd to the 25th of October 2024 and again from the 20th to the 23rd of February 2025 and December 2025 for the Berth605 container handling project (Terrestrial Biodiversity Impact Assessment Report (Including Plants and Animals) (WSP 2025). These include African Clawless Otter (*Aonyx capensis*) - Near Threatened, and Samango Monkey (*Cercopithecus mitis labiatus*) - Vulnerable. An additional 12 SCC were identified as likely to occur in the LSA, with a further eight possibly occurring. Species specific details are presented in the table that follows (Table 6-9).

Table 6-9 – Threatened and Protected fauna species that occur or potentially occur on-site

Occurrence	Common Name	Species Name	Conservation Status
Present	African Clawless Otter	<i>Aonyx capensis</i>	Near Threatened
Present	Samango Monkey	<i>Cercopithecus mitis labiatus</i>	Vulnerable
Likely	Red Duiker	<i>Cephalophus natalensis</i>	Near Threatened

Occurrence	Common Name	Species Name	Conservation Status
Likely	Blue Duiker	<i>Philantomba monticola</i>	Vulnerable
Possible	Leopard	<i>Panthera pardus</i>	Vulnerable
Likely	Common Dasymys	<i>Dasymys incommutatus</i>	Near Threatened
Likely	Four-toed Elephant Shrew	<i>Petrodromus tetradactylus</i>	Near Threatened
Likely	African Striped Weasel	<i>Poecilogale albinucha</i>	Near Threatened
Likely	Swinny's Horseshoe Bat	<i>Rhinolophus swinnyi</i>	Vulnerable
Likely	Red Bush Squirrel	<i>Paraxerus palliatus</i>	Near Threatened
Likely	Dark-footed Mouse Shrew	<i>Myosorex cafer</i>	Vulnerable
Likely	Anchieta's Pipistrelle	<i>Hypsugo anchietae</i>	Near Threatened
Likely	Schreibers's Long-fingered Bat	<i>Miniopterus schreibersii</i>	Near Threatened
Likely	Light-winged Lesser House Bat	<i>Scotoecus albobfuscus</i>	Near Threatened
Likely	Common Hippopotamus	<i>Hippopotamus amphibius</i>	Vulnerable
Possible	Sclater's Mouse Shrew	<i>Myosorex sclateri</i>	Endangered
Possible	Common Dasymys	<i>Dasymys incommutatus</i>	Near Threatened
Possible	Least Dwarf Shrew	<i>Suncus infinitesimus</i>	Data Deficient
Possible	Hottentot Golden Mole	<i>Amblysomus hottentotus</i>	Data Deficient
Possible	Butterfly Bat	<i>Glauconycteris variegata</i>	Near Threatened
Possible	Geoffroy's Horseshoe Bat	<i>Rhinolophus clivosus</i>	Near Threatened
Possible	Sundevall's Leaf-nosed Bat	<i>Hipposideros caffer</i>	Rare

The national screening tool flags four potential SCC invertebrate species. The East African Fiddler Crab (*Austruca occidentalis*), although not SCC is an important ecosystem indicator species. They frequented the project area estuary habitat and can be used to infer the ecological functioning of the system. A total of four species is indicated as Vulnerable, Flat-necked Shieldback (*Arytropteris basalus*), East Coast Katydid (*Pomatonota dregii*), Gossamer-winged Butterfly (*Teriomima zuluana*),

Millar's buff (*Deloneura millari*), (Terrestrial Biodiversity Impact Assessment Report (Including Plants and Animals) (WSP 2025).

Species present in the project area, in addition to species flagged by the screening tool is provided in the table below:

Table 6-10 – Invertebrate Species in the Project Area

Common Name	Species Name	Conservation Status
Longhorn Kitespider	<i>Gasteracantha milvoides</i>	Data Deficient
Giant Blonde Snail	<i>Lissachatina immaculata</i>	Least Concern
Truncated Mangrove Snail	<i>Cerithidea decollata</i>	Least Concern
	<i>Anisoptera sp.</i>	-
Flat-necked Shieldback	<i>Arytropteris basalis</i>	Vulnerable
East Coast Katydid	<i>Pomatonota dregii</i>	Vulnerable
Gossamer-winged Butterfly	<i>Teriomima zuluana</i>	Vulnerable
Millar's buff	<i>Deloneura millari millari</i>	Vulnerable
African Honeybee	<i>Apis mellifera scutellata</i>	Least Concern
	<i>Taphronota calliparea</i>	Data Deficient
Lawn Wolf Spider	<i>Hippasa holmerae</i>	Data Deficient
Goldband Thyene Jumping Spider	<i>Thyene natalii</i>	Data Deficient
East African Fiddler Crab	<i>Austruca occidentalis</i>	Least Concern

6.1.8.11 Site Sensitivity Verification Outcomes

The following habitat types have been identified in the project area. **Figure 6-36** illustrates the habitat boundaries and their associated Site Ecological Importance (SEI).

- Completely Transformed Habitat (Very Low SEI);
- Transformed Secondary Grassland (Very Low SEI);
- Transformed Secondary Grassland/ Woodland (Low SEI).
- Secondary Grassland/Woodland with Habitat refugia (Medium SEI);
- Natural State Vegetation- Estuarine Habitat (Very High SEI); and
- Natural State Vegetation-Forest Habitat (Very High SEI).

The habitat sensitivity assessment confirms that habitat quality and ecological functioning vary considerably across the project area. While portions of the southern project area retain habitat of high ecological importance associated with estuarine and forest systems, other parts of the footprint consist of transformed and previously modified habitats that have resulted from historical development

activities within the Port of Richards Bay. This distinction was important in the assessment of impacts and the development of biodiversity compensation measures.

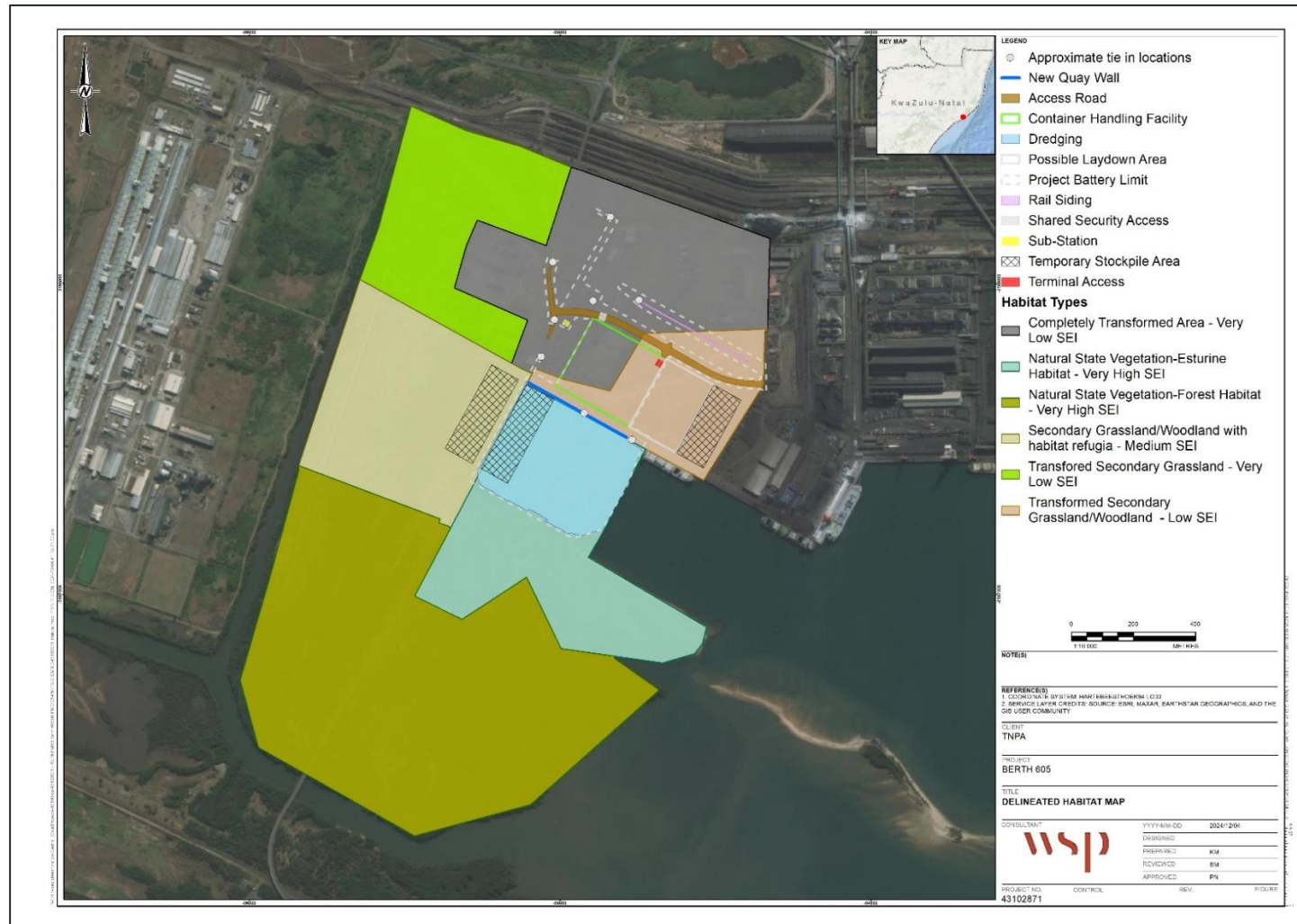


Figure 6-36 –Habitat Units in the project area and their associated SEI (Site Ecological Importance) Ratings

6.1.9 AVIFAUNA

6.1.9.1 Existing baseline

Avifaunal field surveys of the Berth 605 project area were conducted on 29 Nov. and 3 Dec. 2024, and 22 and 30 Jan. 2025. All bird observations, both of waterbirds and other bird species, were made by one or two observers working together either on foot or from a motor vehicle. Access to the Sand-spit Island on 22 Jan. 2025 was by means of a boat used for the hydrographic surveys.

According to the report generated using the National Environmental Site Screening Tool, the general Berth 605 project is ranked as of 'High sensitivity' in terms of the Animal Species Theme (and of 'Very high sensitivity' relevant to both the Aquatic and Terrestrial Biodiversity Themes).

Sixteen bird species are identified as relevant in this regard by the tool (**Table 6-11**).

Table 6-11 – The 16 sensitive species identified by the National Environmental Site Screening Tool in the Berth 605 project area

Species	Sensitivity
<i>African Finfoot Podica senegalensis</i>	High
<i>African Marsh Harrier Circus ranivorus</i>	High
<i>African Pygmy Goose Nettapus auritus</i>	High
<i>Caspian Tern Hydroprogne caspia</i>	High
<i>Crowned Eagle Stephanoaetus coronatus</i>	High
<i>Denham's Bustard Neotis denhami</i>	High
<i>Great White Pelican Pelecanus onocrotalus</i>	High
<i>Grey Crowned Crane Balearica regulorum</i>	High
<i>Lesser Jacana Microparra capensis</i>	High
<i>Mangrove Kingfisher Halcyon senegaloides</i>	High
<i>Pink-backed Pelican Pelecanus rufescens</i>	High
<i>Saddle-billed Stork Ephippiorhynchus senegalensis</i>	High
<i>Southern Banded Snake Eagle Circaetus fasciolatus</i>	High
<i>Spotted Ground Thrush Geokichla guttata</i>	High
<i>Tawny Eagle Aquila rapax</i>	High
<i>Yellow-billed Stork Mycteria ibis</i>	High

The analysis of existing avifaunal data revealed that the three most recent counts (Allan & McInnes 2002, Allan 2009 and Anchor Environmental Consultants & The Biodiversity Company 2023) compiled

their respective count information separately for separate sections of the Project Area of Influence. For example, the 12 sections in the PAOI covered by the sixth source (Anchor Environmental Consultants & The Biodiversity Company 2023) is shown in the figure below. The author of the current report was responsible for the final of the 16 counts represented in that source.



Figure 6-37 –The 12 sections (white lines) in the Project Area of Influence (red lines) covered by the sixth source (Anchor Environmental Consultants & The Biodiversity Company 2023)

The avifaunal baseline report synthesised existing information on the baseline position relevant to the Berth 605 development, in particular relevant to the avifauna of the Project Area of Influence. The baseline avifaunal information largely comes from the National Environmental Site Screening Tool, the Southern African Bird Atlas Project 2 (SABAP2), six sources of previous waterbird-count information (covering some 55 individual counts) and the Important Bird and Biodiversity Area initiative. Particular attention is paid to identifying Red Data species in the Project Area of Influence.

Twenty-nine of the 362 species recorded in the SABAP2 database in the two relevant pentads covered by the Berth 605 Project Area of Influence are Red Data species (Taylor et al. 2015). Twenty-two Red Data waterbird species have been recorded during the waterbird counts made by the six sources described above.

Attention is also paid to identifying where waterbird count information for specific waterbird species meets thresholds established relevant to Important Bird and Biodiversity Areas and Ramsar Wetlands of International Importance. Two areas situated relatively close to the actual Berth 605 project footprint

are identified as being of particular importance to waterbird populations. These are the Sand-spit roost site and the Kabeljou-flats inter-tidal mudflat foraging area.

6.1.9.2 Avifaunal field surveys for the Berth 605 project area

A total of 108 bird species were recorded during the four days of field surveys (29 November 2024 and 3 December 2024 and 22 and 30 January 2025) for the avifaunal assessment.

Totals of 16 species and 100 individual birds were recorded during the 3 December 2024 waterbird count at low tide along the shoreline of the Berth 605 project area and looking out across to the Sand-spit Island and Kabeljou Flats. Eight species and 21 individuals were counted in the Berth 605 project area, nine species and 64 individuals on the Sand-spit Island, single individuals of two species on the Kabeljou Flats, and 11 individuals of three species were observed flying over the area. Coverage of the Kabeljou Flats was highly incomplete as access to this area was not deemed safe and curtailed as there were illegal gill-netting trespassers in the area.

Six avifaunal Red Data Species were encountered during the field surveys for the Berth 605 project:

- Pelican, Pink-backed (VU/LC)
- Pelican, Great White (VU/LC)
- Stork, Yellow-billed (EN/LC)
- Plover, Grey (LC/VU)
- Godwit, Bar-tailed (LC/NT)
- Tern, Caspian (VU/LC)

All of these species have been previously recorded in the earlier investigations discussed under the baseline studies.

6.1.10 ARCHAEOLOGY AND CULTURAL HERITAGE

6.1.10.1 Terrestrial Heritage

The desktop study conducted by Umlando, 2025 consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. Anderson and Anderson (2009, 2010a-b, 2015, 2004 – 2018, 2005 - 2014) have undertaken several surveys in the general area where a variety of sites have been recorded, sampled and excavated. These cover the Early, Middle and Late Stone Ages, Early and Late Iron Ages, Historical Period and the 20th century. These are not well-defined archaeological sites, rather a continual lag deposit of stone tools that occur throughout the area. In the past, they were recorded as individual sites where in fact they were continuations of the same feature.

The historical maps indicate that human settlements did exist in the general area but not in the marsh/swamps. No sites occur within the study area. Early and Middle Stone Age sites could occur within the study area when it was not a marsh/swamp. These sites would be of low significance. In summary, the historical maps and history of the lagoon and harbour shows that all remotely possible maritime heritage from this area has been removed.

The field survey was undertaken on 22 October 2024 by Umlando to confirm that the footprint was disturbed. The location of Berth 605 occurs on previous swamp lands. The temporary stockpiles occur in highly disturbed area that has been backfilled from the original harbour and Berth 600. No

archaeological sites will occur on this section. The area for Berth 605 and the Temporary Stockpile Area is on reclaimed swamp. No archaeological sites will occur in these areas.

6.1.10.2 Marine Heritage

A Marine Heritage Assessment was conducted by Maritime Archaeology in 2025. A desktop survey of the project area revealed that the area around Richards Bay has been utilised since the Earlier Stone Age. When the harbour was originally built there was no legislation governing the impact on the environment and cultural heritage resources. These only came in effect with the implementation of the NHRA in 1999. The only sites that have been recorded are as a result of various Heritage Impact Assessments done since 1999. These include several Earlier, Middle and Later Stone Age sites that are unfortunately now only scatters. There are also some Early and Late Iron Age settlements. The sites are seen as scatters due to previous development of the area (Anderson 2009; 2010).

The desktop survey also indicated that there is a very low probability of Maritime and Underwater Cultural Heritage Resources (MUCH) resources being found. Although there are some known shipwrecks in the vicinity of Richard's Bay, Richard's Bay was not a natural harbour like Saldanha, Cape Town, Port Elizabeth, etc. The SS Newark Castle was found in the Richards Bay channel in the 1970s, during construction of the harbour and either removed completely or partially, anecdotal evidence is contradictory. However, it is not in the area under consideration. There are no other known shipwrecks within Richards Bay.

A magnetometer survey was also undertaken by Maritime Archaeology in January 2025. A magnetometer survey is a geophysical technique that measures and maps variations in the Earth's magnetic field to reveal subsurface features and structures, including buried objects, geological formations, and anomalies. Within the context of the project, the magnetometer survey was used to locate and map potential buried archaeological sites, features, and objects.

Thirteen anomalies were noted during the survey. However, the Terrestrial HIA conducted by Umlando in 2025 states that there will be no maritime heritage in the harbour; it was all removed by dredging. A chance find protocol for maritime heritage should form part of the EMP, despite the fact that this area has been terrestrial for thousands of years.

6.1.11 PALAEOLOGY

According to the DFFE Screening Tool, the project site is located within an area of low to medium paleontological sensitivity. The project area consists of deposits that occur 3m – 5m below the surface. These deposits were noted during the harbour expansion project.

According to the Desktop Palaeontology Assessment undertaken for the Berth 605 project conducted in November/December 2024, the proposed site lies on the moderate to low sensitive rocks of the KwaMbonambi and Sibayi Formations (Quaternary; Maputaland Group) that might preserve marine molluscs, diatoms and peat but the site is highly disturbed. Based on this information the specialist recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer or other designated responsible person once excavations or drilling activities have commenced.

6.1.12 SOCIO-ECONOMIC

6.1.12.1 Demographics

The 2016 Community Survey indicates that the population of Umhlathuze Municipality has increased by just over 22% between 2011 and 2016. In context of population growth, a portion of the population increase is the result of an enlarged municipal area following the inclusion of three (3) wards from the former Ntambanana post the 2016 Local Government Elections. Population growth scenarios have been applied to the base figure from the 2016 Community Survey. Adequate data and research are not available at this time to apply a historic growth trend as the composition of the municipality, in terms of boundaries and wards, has changed post the Local Government Elections of 2016. The following base data has therefore been used (City of Umhlathuze, 2022):

- A baseline population in the Umhlathuze Municipality of 410 465 people in 2016 as per the Community Survey.
- A calculated household size of 3.95 as derived from 2011 census data.
- A total number of 103 915 households in the municipal area derived from the above Community Survey.

Based on the potential population growth scenarios, the IDP deduced the following:

- At a steady population increase of 1,5% per annum, the municipal population will surpass 500 000 people by 2030.
- At a 5% per annum population growth rate the number of households in the municipality will double by 2030.

6.1.12.2 Population Distribution

A total population of 58% resides within rural areas, followed by urban area where 39 % of the total population resides, thirdly is small percentage of the population of 3% that resides in farmlands. The municipality has an extensive area classified as tribal (City of Umhlathuze, 2022).

6.1.12.3 Population by age categories

The population age cohort <15 has been declining at the district and Umhlathuze Local Municipality level while the population cohort for the 15-64 age group has shown an increase at both the district and local municipality level between 2001 and 2011. The latter could be indicative of increased perceptions of employment opportunities in the Umhlathuze area resulting in an in-migration into the area. An increase in the older age cohort (65+) is also observed between 2001 and 2011. Such could be indicative of the elderly deciding to reside in the area upon retirement or of improved health care facilities and an improved standard of living (City of Umhlathuze, 2022).

6.1.12.4 Labour Dynamics

In Richards Bay, over 50% of the population is employed, which is higher than the employment rates in the City of uMhlathuze (41%) and in King Cetshwayo (30%). Richards Bay also boasts the lowest unemployment rate at 13%. Conversely, a majority of the working-age population in the City of uMhlathuze (40.7%) and King Cetshwayo (53.8%) are not economically active. The labour absorption rate, also known as the employment-to-population ratio, is the proportion of the working-age population that is employed. The labour absorption rate for the City of uMhlathuze in 2023 was 36%, which is higher than the labour absorption rate for King Cetshwayo of 27%. For the development of

Berth 605, assessing the labour absorption rate helps identify the potential for job creation, determine the skills required, and measure the long-term impact on the local labour market. It also provides insights into the economic health of a region, helping stakeholders to plan for workforce needs, infrastructure development, and training programs. Furthermore, understanding the labour absorption rate helps gauge the social benefits of a project, including reduced unemployment, improved income levels, and better quality of life for local communities. In turn, this can attract further investment and stimulate broader economic growth, ensuring that the project not only contributes to its immediate goals but also fosters sustainable development in the area. The proposed development is expected to create temporary job opportunities during the construction phase and sustained employment during its operation directly at the Port and indirectly through multiplier effects. This increase in employment is likely to boost labour force participation.

The labour force participation rate refers to the percentage of the working-age population aged 15-64, that is either employed or actively seeking employment. The labour force participation in the City of uMhlathuze was 40% and in King Cetshwayo was 51% in 2023. The proposed project can help boost the labour force participation rate by creating employment opportunities during both the construction phase and once the berth is operational. For example, workers may be needed for construction jobs, skilled labour for maintenance, and operational staff for handling cargo once Berth 605 is fully functional. If the project attracts workers who were previously outside the labour market (such as those who were not actively seeking work), it could increase the local labour force participation rate, contributing to reduced unemployment and greater economic inclusion. Moreover, the project might also stimulate further employment in related industries, such as logistics, retail, and services, thereby encouraging even more people to engage in the labour market.

6.1.12.5 Employment Trends

Employment trends in the King Cetshwayo and City of uMhlathuze regions reveal notable disparities between adults and youth. The adult population shows relatively stable employment, with employment rates of 56.4% in King Cetshwayo and 56.1% in the City of uMhlathuze, indicating greater integration into the labor market and better access to job opportunities. In contrast, youth unemployment is significantly higher, with rates of 71.7% in King Cetshwayo and 73.2% in the City of uMhlathuze, highlighting a critical issue in youth employment. These high unemployment rates suggest systemic barriers such as limited job opportunities, insufficient vocational training, and economic instability.

Additionally, a large proportion of the economically inactive population in both regions is comprised of youth, 69.7% in King Cetshwayo and 79.0% in the City of uMhlathuze, indicating a troubling disengagement from the labour market. This suggests that youth may face barriers preventing their participation in the workforce, such as inadequate education, limited access to training, and economic pressures. To address these challenges, targeted interventions are needed, including expanded vocational training, tailored job opportunities, and programs bridging education and employment. These efforts are essential for fostering a more inclusive labour market and ensuring the economic stability and growth of both regions.

The employment trends in the King Cetshwayo and City of uMhlathuze regions are particularly relevant to the Berth 605 development. As the project aims to significantly enhance the Port's capacity and efficiency, it presents an opportunity to address the high youth unemployment rates observed in both regions. With unemployment rates for youth reaching as high as 73.2% in the City of uMhlathuze, Berth 605 can play a critical role in creating both direct and indirect employment opportunities,

particularly in sectors such as construction, logistics, and Port operations. This development could provide much-needed jobs for young people and promote skills development, especially in vocational training and apprenticeships, which are key factors in improving youth employment outcomes.

Moreover, the increased industrial activity spurred by Berth 605 is likely to attract new businesses and industries, generating additional job opportunities in the surrounding areas. This aligns with the need to tackle systemic barriers to youth employment, such as limited access to training and job opportunities. By fostering a more diverse and robust labour market, Berth 605 could help bridge the gap between education and employment for young people, thereby reducing their economic inactivity. Additionally, the project could stimulate the local economy, leading to growth in service industries such as hospitality, retail, and transportation, which also offer potential employment for youth.

6.1.12.6 Industry Trends

The employment profile across the Richards Bay region, City of uMhlathuze, and King Cetshwayo highlights the varying industrial bases and economic activities that shape labour market trends. In all three areas, community, social, and personal services remain the largest employment sector, underscoring the importance of public and personal services, healthcare, and education in supporting local economies. This trend reflects broader regional priorities around social infrastructure but also points to a potential area for job creation and economic diversification in light of the region's reliance on these sectors.

The wholesale and retail trade, catering, and accommodation sector is also a significant source of employment across all regions, particularly in the City of uMhlathuze, where it represents 22.5% of employment. This reflects the strong role of consumer services, retail, and tourism in driving economic activity. However, these industries are generally characterized by lower wages and may not provide sustainable career pathways for the youth, who are particularly impacted by high unemployment rates.

Manufacturing is another key sector, contributing 18.5% of employment in Richards Bay and 12.4% in uMhlathuze, though it is less prominent in King Cetshwayo (12.8%). The Berth 605 development directly addresses the importance of manufacturing and industrial activity by expanding the Port of Richards Bay's capacity, facilitating increased exports of manufactured goods, and potentially attracting new manufacturing investments to the region. This could help elevate manufacturing as a more significant employment sector, providing more stable and well-paying jobs, particularly for young people who face significant barriers to entering the labour market. Additionally, financial, insurance, real estate, and business services represent a notable portion of employment in the City of uMhlathuze and Richards Bay, but these sectors tend to employ a more skilled workforce, which may limit their potential to address youth unemployment without targeted interventions in education and skills development.

In King Cetshwayo, the presence of agriculture, forestry, and fishing as a notable sector (12.8%) indicates the region's reliance on primary industries, which, while critical, are often less lucrative than secondary or tertiary industries. The Berth 605 development could support economic diversification by increasing the export potential for agricultural products, potentially linking agricultural activities with the Port's logistics network. This could foster growth in agricultural trade, offering new employment opportunities in related fields such as food processing, logistics, and trade services.

The development of Berth 605 has the potential to bolster sectors such as manufacturing and trade in the Richards Bay region, contributing to greater job creation and economic diversification. By

expanding Port capacity and improving infrastructure, it can help strengthen key industries while addressing employment gaps, particularly among the youth, and supporting regional economic stability. Expanding manufacturing and trade could reduce the regions' over-reliance on sectors like retail and personal services, thereby creating a more

6.1.13 VISUAL

The site visit and assessment of the project area by the specialist conducted in November/December 2024 revealed that the proposed development is situated within the PoRB, the landscape character is considered industrial with numerous anthropogenic activities actively taking place, therefore the sense of place of the area is that which is associated with an industrialised area as well as that associated with a harbour– continuous movement (vehicle and human).

Visual impacts are only experienced when there are receptors present to experience the impact and with the sparse receptors present within the receiving environment and given the location of the proposed facility within the harbour (approximately 6 km from the seashore) and where public access is possible, there are not likely many visual impacts experienced. Although the cumulative impact may be affected as the bulk appearance of port infrastructure will increase. The outcome of the field assessment indicated that the subtropical vegetation of the receiving environment assists in screening the view toward the proposed development.

6.1.14 NOISE

The existing noise climate surrounding the Berth 605 site is predominantly influenced by anthropogenic sources including shipping and port activities, industries and vehicles. With limited natural surrounding land, influences from natural sources like birds and insects are assumed to be minor. The closest identified receptor to the proposed project area is the Richards Bay Seafarers Club. The noise sources could also impact persons working within the PoRB.

As part of the Noise Baseline Study for the Berth 605 project, ambient sound level measurements were undertaken on 19 - 21 November 2024 at four on-site locations (including the Richards Bay Seafarers Club, which borders the project to the west) and at the nearest off-site sensitive receptor location (Arboretum) (**Figure 6-38**). Daytime and night-time measurements were conducted for fifteen minutes each, allowing monitoring to be adequately representative.

Noise levels (LAeq) at all monitoring locations were below the respective guideline rating levels. From the daytime monitoring campaign, it is evident that the current noise climate surrounding the Project site is predominantly traffic and port-related, with smaller influences from natural sources like birds and insects.



Figure 6-38 - Noise monitoring locations surrounding the site

Average LAeq noise levels at two (Pt 02 and Pt 05) of the five monitoring locations exceeded the guideline level for night time monitoring. The main sources of noise identified at each location include:

- Pt 01 (Richards Bay Seafarers Club): Truck movement on a nearby gravel road, trucks idling and insects.
- Pt 02 (Onsite (south)): Port operations including constant fan noise from nearby ships, truck movements, trucks idling, people talking and insects.
- Pt 03 (Onsite (east)): Distant vehicle movement and insects. Port activities were not audible.
- Pt 04 (Onsite (north)): Vehicle movement at port entrance, trucks idling and insects.
- Pt 05 (Arboretum Residential): Vehicles on nearby roads, dogs and insects. Port activities were not audible.

From the night-time monitoring campaign, it is evident that the current noise climate surrounding the project site is predominantly traffic and port-related, with smaller influences from natural sources like insects.

6.1.15 TRAFFIC AND SITE ACCESS

The road network providing access to the PoRB can be summarised as follows:

- The National Route 2 (N2): The N2 is a national route functioning as a north-south link in KwaZulu-Natal providing access to Richards Bay.

- John Ross Parkway (R34): John Ross Parkway is a provincial road that connects the port (and surrounding industries) to the N2. The road is a dual carriageway and functions as the main link between Richards Bay and Empangeni (a neighbouring town of Richards Bay). There are currently two road-over-rail bridge structures in John Ross Parkway. The design speed of the road is 100km/h and the speed limit is 80 km/h.
- West Central Arterial: The road provides access to the western entrance of the port, linking with the port internal road, Urania Road. The West Central Arterial is the main access road to the discard coal and liquid bulk terminals. The arterial also provides access to the Richards Bay Central Business District (CBD).
- Harbour Arterial: The road provides access to the Alusaf Bayside smelters. To the eastern end of the road, it becomes Ferro Close and connects to the John Ross Parkway.
- Medway Road: Medway Road provides access to the eastern entrance of the port. It also provides a link to the Multi-Purpose Terminals (MPT) series 7 and the Ferro and Timber storage areas.
- Bayview Boulevard: Bayview Boulevard, together with Bridgetown Road, provides access to the eastern section of the port, i.e. The Village (referring to the Richards Bay Waterfront, small crafts harbour, Naval Island and the commercial developments) (AECOM, 2013).

The internal road network provides access to a number of berths and developments. The main internal routes to the site are:

- Newark Road: Forms the main east-west collector/distributor. The road provides access to the MPT, Dry Bulk Terminal (DBT) and the port's administration complex. The road is divided into two sections:
 - West of the eastern access: The main access road to the DBT.
 - East of the eastern access: A public road that provides access to The Village.
- Urania Road / Duine Road: Provides access to the South Dunes area, where the privately owned Richards Bay Coal Terminal and the Island View bulk liquid storage areas are situated. Urania Road is also the main public road in the port.
- Ventura Road: The road links with Newark Road and is the main road to the port's administration complex (AECOM, 2013).

Direct rail and road links have been developed between the major South African cities and the PoRB to enable the transportation of goods to and from the port. The port handled approximately 22 million tonnes of cargo in 2011. Over the years, the volume of trucks accessing the port has increased, resulting in higher levels of congestion. In January 2012, more than 3 900 trucks accessed the port terminal (AECOM, 2013).

7-day 24-hour traffic surveys were undertaken during October 2024 by WSP, initial analysis indicates the following vehicle volumes:

- 1285 heavy vehicles enter and exits the Port per day.
- 4406 total vehicles average per day (in and out).
- The heavy vehicle proportion is approximately 30% of the total vehicle volumes.

Based on an assessment of the existing road networks, the CHF is constrained by land size, placement and throughput. The current road infrastructure of the PoRB cannot provide sufficient and

safe access to the facility. A shared access road with security control is proposed to provide a supplementary road access to the Port, the facility, and adjacent undeveloped land parcels. The access road will also provide access to a future rail sidings to be located north of the CHF (WSP, 2024).

The number of additional trucks associated only with the Berth 605 project to the PoRB is low i.e. 13 additional trucks per hour and did not trigger a full TIA.

The City of Umhlathuze requested that a TIA be conducted in their comments on the Scoping Report. However, there were several engagements with TNPA and the City in which TNPA presented the planned road and rail feasibility studies for the PoRB. The City then confirmed that the TIA is not required at this stage but will be required at Building Plan Stage.

6.1.16 LAND USE

According to the Umhlathuze Land Use Scheme Regulations, the study area is situated within an area zoned as harbour, with permitted uses as listed:

- Industry – General
- Industry – Light
- Industry – Service
- Utilities Facility

The above uses are in line with the intent of the harbour land use, including – land for administrative purposes, customs, industrial uses, and areas for bulk storage, terminals, custom posts, limited commercial activity, social, health and recreational activities.

There are also vegetated areas of the proposed project site which will be used for the CHF footprint as well as the temporary stockpile storage areas.

6.1.17 EXISTING SERVICES AND INFRASTRUCTURE

In addition to normal port activities and operations, the port has a key role in the economy of the Umhlathuze Municipality (embracing the towns of Empangeni and Richards Bay) with its growing industrial base. The port enjoys a strategic relationship with the Richards Bay Industrial Development Zone SOC (RBIDZ), which is situated in close proximity to the port, a prime industrial business and trade hub, attracting export-orientated investors as one of the leading Special Economic Zones.

The Bayview Precinct in which the proposed Berth 605 project area is located, was identified as a strategic location for the handling and consolidation of general cargo (dry bulk, liquid bulk (Phosphoric Acid and Liquid Pitch and break bulk, including containers) in the Port of Richards Bay. The precinct is situated on the northern side of the port, between the old BHP Billiton Bayside Aluminium Smelter in the west, Thulazihleka pan in the north and Tuzi-Gazi in the east. Effectively the precinct accommodates dry bulk, break bulk and liquid bulk terminals which include significant road, rail, building and services infrastructure.

The proposed site for the Berth 605 is adjacent to the existing Berth 606. Utilities infrastructure is available at the port and includes water, sewerage, electricity and stormwater management.

The project area is therefore situated within an environment that has historically been planned and utilised for port development and associated infrastructure. Existing land use, zoning and

infrastructure patterns confirm the strategic role of the Bayvue Precinct within the long-term development framework of the Port of Richards Bay.

7 ENVIRONMENTAL IMPACT ASSESSMENT

The EIA process, including a PPP is prescribed by the EIA Regulations as a requirement for the Berth 605 project. Thus, the EIA process for the project must comply with the EIA Regulations in order for the application to be valid.

The process applicable to Berth 605 project's application is S&EIR.

The methodology used to assess the potential impacts is described in Section 5 of this report. The findings of the assessment of the potential impacts and risks associated with the proposed project and alternatives, as well as identification of mitigation measures are documented within this chapter of the Draft EIR.

7.1 AIR QUALITY

7.1.1 CONSTRUCTION PHASE

Construction activities are a source of dust emissions that can have a significant but transient impact on local air quality. The amount of dust emitted from construction operations depends on the area of land being worked, the proportion of land lying exposed at any time, the clearing and dozing equipment used, the number and type of vehicles on temporary roads and the duration of the construction phase.

Although the increased dust and emissions from construction activities may not significantly impact air quality, increased dust can be a nuisance to the nearby receptors and site workers. Considering the temporary nature of construction and the nature of the proposed activities, impact on air quality is anticipated to be moderate before mitigation. There are also no sensitive receptors within the direct vicinity of the project area as the site is within the PoRB. The nearest receptor is the Seafarers club approximately 400 m away from the Berth 605 project area.

According to the Annual Air Quality Report (Richards Bay Clean Air Association, 2023), the Harbour West Monitoring Station (closest station to the Berth 605 project area), exceeded the threshold for PM_{2.5} daily average by 405% (the limit is 40_{ug}/m³). The SO₂ threshold was also exceeded for the hourly and 10-minute averages. This suggests that the project area is already being adversely impacted upon by existing activities at the port and surrounding industries.

With the implementation of appropriate control measures, the impact on sensitive receptors will be reduced to be low post-mitigation.

The potential impact on air quality during construction is indicated in **Table 7-1**.

Table 7-1 – Impact on ambient air quality during construction

Potential Impact: Impact on air quality during construction	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	5	50	Moderate	(-)

Potential Impact: Impact on air quality during construction	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
With Mitigation	2	1	1	2	5	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Black ash/dust is common at the site and cannot be mitigated from a project perspective. However individual and collective construction activities can be managed to mitigate the anticipated impacts. Make use of wet suppression techniques to minimise dust entrainment during periods of high wind speeds. Port imposed speed limits must be adhered to. Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and soil/material stockpiles especially. This includes wetting of exposed soft soil surfaces and not conducting dust generating activities during high wind periods which will increase the likelihood of dust being generated. All stockpiles (if any) must be restricted to designated areas and topsoil stockpiles may not exceed a height of two (2) metres. Ensure that all vehicles, machines and equipment are adequately maintained to minimise emissions. It is recommended that the clearing of vegetation from the site should be selective, be kept to the minimum feasible area and be undertaken just before construction so as to minimise erosion and dust potential. All materials transported to, or from, site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials. No burning of waste, such as plastic bags, cement bags and litter is permitted. Once construction is complete, initiate rehabilitation (e.g., re-vegetation) procedures to reduce the impact of wind across exposed surfaces. 							

7.1.2 OPERATIONAL PHASE

The ambient air quality of the Berth 605 project could be adversely affected by the movement of vehicles, machinery and ships, however these impacts are expected to be moderate as the probability is definite and the impacts of the emissions released by movement of ships, machinery and vehicles are irreversible despite the magnitude of the impact being low. It must be noted that the ambient air quality around the site is already irreversibly impacted by port and industrial related activities.

Table 7-2 – Impact on ambient air quality during operation

Potential Impact: Impact on air quality during operation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	5	5	5	60	Moderate	(-)
With Mitigation	1	1	5	5	5	60	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Impacts on ambient air quality during the operational phase is irreversible as the movement of ships, vehicles and machinery will contribute to the overall impact on air quality. 							

7.2 CLIMATE

Projected climate change trends can have a direct impact on the project's vulnerability and adaptability. The current section presents sea level rise, tidal flooding and tropical cyclone data for Durban. Regional coastal climate datasets and projections available for Durban were utilised as a proxy for certain coastal climate indicators due to the comparable coastal characteristics and geographic proximity of Durban and Richards Bay. These datasets provide an appropriate basis for understanding regional coastal climate trends relevant to the proposed development. In summary the following trends are expected for the Berth 605 project area:

- Overall Temperature Increase: Both the annual mean and the 5-year smooth temperatures indicate an overall warming trend from 1991 to 2022.
- Fluctuations and Variability: There are periods of higher temperatures (e.g., 2015-2019) and lower temperatures (e.g., 1994-1997), but the general trend shows an upward trajectory which is indicative of a warming trend.
- Impacts: With temperatures rising up to 4.13°C by the end of the century worst case scenario extreme weather events and significant impacts on water resources and human health are likely to occur. These projected changes in mean monthly temperature indicate the need for climate action and adaptation strategies for the project and the KwaZulu Natal considering the profound impact that they may have on human health, water resources and infrastructure.
- An increase in the number of hot days is associated with heatwaves. The data therefore suggests that heatwaves will become more frequent by the end of the century. These changes may have significant impact on the work force and labour productivity and may further affect infrastructure.
- These projections indicate the urgency of adaptation measures (e.g., healthcare responses to heatwave, heat management plan etc..) to help minimise and address the impacts of these projected changes on the region and Project area.
- The projected increases in precipitation during the summer months could result in flooding risks, while the reduction in precipitation could lead to potential drought conditions thus exacerbating water shortages for the Project and the region. Effective adaptation measures will be required for the project to cope with the risk of flooding and drought.

- The projections indicate changes in sea level for the region, with greater increase under the worst-case scenario. Sea level rise may also alter water depths around ports, modifying wave propagations and patterns potentially worsening or improving port operability. This may lead to an increased coastal flooding and erosion challenges as well as greater tidal influences, particularly for coastal areas such as Durban, which characterised by its low elevation and number of rivers and tributaries.
- The increasing trend in minor flooding days indicates the need for improved coastal infrastructure and flood management systems in coastal regions such as Durban and Port of Richards Bay. The data aligns with the findings of recent studies on global trends of rising sea levels and frequent flooding events.
- Frequent tropical cyclones and coastal storms in Durban region are likely intensify the effects of sea level rise in the area. This impact becomes significantly more severe when such events coincide with high tidal activity further exacerbating sea level rise around Durban. The same is true for the PoRB.
- Wind waves may cause wave storms which are intense oceanic conditions characterised by powerful waves. Wave storms significantly affect port activities and studies predict an increase frequency of extreme events which may potentially cause adverse effects on harbour operations.
- Fire days, although a low risk has been considered in the Climate Change Impact Assessment.
- An increase in and exposure to very hot days and heatwave increases the risk of heat stress which may affect physical work capacity, cause dehydration and other occupational health problems and has been considered as part of extreme weather events.

Extreme or intense rainfall can lead to flooding; however, the data shows that some settlements located within the local municipality will experience a very low to low potential increase in flooding exposure while others may not be affected by such conditions.

Climate-related coastal risks were considered together with the findings of the Wave Climate and Shoreline Change Assessment. The combined findings of these specialist investigations provide the basis for assessing the potential influence of sea level rise, storm surge activity, wave conditions and shoreline dynamics on the proposed development over its anticipated operational lifespan.

The Climate Change Impact Assessment considered both the potential impacts of climate change on the proposed Berth 605 development and the contribution of the development to climate change through greenhouse gas emissions. The assessment evaluated projected changes in temperature, precipitation, sea level rise, storm surge risk, wave climate, extreme weather events and associated implications for the long-term resilience of the proposed infrastructure.

In addition to assessing the impacts of climate change on the proposed development, the Climate Change Impact Assessment also considered the potential contribution of the project to greenhouse gas emissions. The assessment identified capital dredging, construction activities, temporary power generation and electricity consumption during operations as the primary sources of greenhouse gas emissions associated with the project. A high-level decarbonisation framework was developed to support future emissions reduction through energy-efficient infrastructure, lower-emission construction practices and alignment with ongoing renewable energy initiatives within the Port of Richards Bay.

The assessment concluded that climate-related risks are primarily associated with increased temperatures, flooding risks, sea level rise, storm surge activity, wave action and changes in

precipitation patterns. These risks have been considered in the engineering design process and informed the development of adaptation and management measures aimed at improving the long-term resilience of the proposed development

7.2.1 CONSTRUCTION PHASE

Table 7-3 – Increase in extreme weather events

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Increased rainfall intensity and frequency, including extreme precipitation events, may cause flooding at construction sites. This could lead to waterlogging, erosion and damage to materials and equipment, impacting construction activities such as the shared road and quay wall. These impacts may result in significant delays in the Project schedule.								
Without Mitigation	4	1	3	2	3	30	Low	(-)
With Mitigation	1	1	1	2	5	25	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ Ensure Project schedules are flexible to account for unavoidable delays during extreme rainfall events.■ Install sandbags and water-filled barriers as flood defence strategy to stop approaching floodwater.■ Create temporary drainage channels to divert rainwater away from the construction site. This should be done during the pre-construction phase.■ Use real-time weather monitoring tools or subscribe to meteorological services for early warnings of heavy rainfall.							

Table 7-4 – Impact on personnel health and safety

Potential Impact: Projections show an increase in temperature and slight increase in the number of hot days (>35°C). This may result in heat wave conditions leading to heat stress, dehydration and reduced productivity among the workforce, ultimately impacting worker well-being and potentially causing delays to the Project schedule during the construction phase.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	1	3	2	4	40	Moderate	(-)
With Mitigation	3	1	3	2	3	24	Low	(-)

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Projections show an increase in temperature and slight increase in the number of hot days (>35°C). This may result in heat wave conditions leading to heat stress, dehydration and reduced productivity among the workforce, ultimately impacting worker well-being and potentially causing delays to the Project schedule during the construction phase.							
Mitigation and Management Measures							

Table 7-5 – Impact on construction activities and personnel safety

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Strong winds and storm events during the construction phase may damage temporary installations (e.g., scaffolding, cranes) and construction materials. These events may increase worker safety risks, delay installation timelines and disrupt the supply chain, ultimately leading to Project delays and cost implications.							
Without Mitigation	3	1	3	2	3	27	Low
With Mitigation	2	1	3	2	3	24	Low
Mitigation and Management Measures							

Table 7-6 – Impact of costal erosion and storm surges on the project

Potential Impact: Costal erosion and storm surges as a result of rising seas level rise may erode unstable soils and undermine foundational stability in low-lying construction areas. This could lead to delays, increase costs for repair and reinforcement and risks to worker safety. Secondary impacts include sediment displacement, affecting nearby drainage systems and marine ecosystems.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	1	3	2	4	40	Moderate	(-)
With Mitigation	3	1	3	2	4	36	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Consider conducting pre-construction surveys to identify areas vulnerable to erosion. Monitor storm forecasts and implement or subscribe adaptative construction schedules. 							

Table 7-7 – Impact of heavy rainfall and dredging

Potential Impact: Heavy rainfall and dredging may increase sediment runoff. Therefore, high salinity levels and sedimentation may limit access to dredged areas, disrupt marine construction equipment and reduce efficiency during operations. Prolonged sedimentation can clog navigation routes and compromise water quality, leading to higher costs for material transport and equipment maintenance.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	2	3	27	Low	(-)
With Mitigation	2	1	3	2	2	16	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Conduct regular maintenance dredging to prevent sediment buildup in construction areas. Use silt curtains to prevent sediment spread and minimise disruptions to nearby waterways. 							

Table 7-8 – GHG emissions during the construction phase

Potential Impact: GHG emissions as a result of construction activities and dredging	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	5	50	Moderate	(-)
With Mitigation	2	1	3	2	3	24	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ Dredging operations are significant contributors to emissions due to the extensive use of diesel-powered equipment. The following are mitigation measures for dredging operations: <ul style="list-style-type: none"> • The Project should specify performance requirements in contracts for energy-efficient dredging in line with IMO emission standards. • Where possible the Project should consider the use of dredged material for reclamation or as infill where geotechnically and environmentally appropriate, reducing emissions from offshore disposal. • Contractors should provide fuel logs and implement real-time monitoring to improve transparency and enable future benchmarking. • Adopt alternative fuels such as hydrotreated vegetable oil (HVO) or green hydrogen to power dredging equipment where possible. • Schedule operations to avoid unnecessary standby time and idle fuel use. ■ Construction activities involve significant use of materials and equipment, leading to substantial emissions: <ul style="list-style-type: none"> • Implement the use of cement alternatives where available and encourage the replacement of standalone diesel generators with hybrid or grid-based alternatives where possible. • Where possible, select materials with lower embodied carbon, such as recycled steel or alternative concrete mixes, to reduce emissions during construction. • Where possible, access to temporary grid connections from nearby substations should be pursued to reduce off-grid generator reliance. • Design quay walls for extended service life to amortise emissions over a longer period and reduce the need for frequent rebuilds. • Where possible Implement generator efficiency protocols or use hybrid/electric site power where grid access is unavailable. ■ For the road construction: 							

Potential Impact: GHG emissions as a result of construction activities and dredging	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
						<ul style="list-style-type: none"> The Project can consider enforcing reduced equipment idle time through scheduling protocols and engine-off requirements. Where available, the Project may consider specifying hybrid or fuel-efficient construction equipment for major activities such as clearing, grading and paving. Earthworks planning can be optimised to limit unnecessary excavation and reduce equipment runtime. Where technically feasible, locally sourced aggregates and asphalt should be prioritised to minimise transport emissions. 	<ul style="list-style-type: none"> Railway siding <ul style="list-style-type: none"> The Project can consider optimising the rail alignment and earthworks design to reduce cut-and-fill volumes and associated diesel use. Equipment scheduling protocols can help reduce idling and maximise operational efficiency. Where feasible, locally sourced ballast, sleepers and steel components should be prioritised. Temporary power systems <ul style="list-style-type: none"> The Project should specify the use of hybrid solar-diesel generators where grid connection is not feasible where possible. Consider automatic shutoff controls to avoid unnecessary idling. Generators should be appropriately sized for their expected load to reduce fuel wastage. Where feasible, access to temporary grid supply should be prioritised to displace generator reliance. Temporary stockpile and laydown areas <ul style="list-style-type: none"> Idle-reduction protocols could be enforced, and equipment usage should be limited to essential operating periods. Where possible, operational hours should be restricted to periods of peak productivity and equipment should be monitored to prevent unnecessary use.

7.2.2 OPERATIONAL PHASE

Table 7-9 – Impact of temperature increases and frequency of hot days

Potential Impact: The projections show an increase in mean temperatures under worst case scenarios and more increase, in the future. Additionally, the number of very hot days show minor increases however an increase in mean annual temperature and the number of hot days (>35°C) may increase the likelihood of heat stress, dehydration and heat stroke among workers. These conditions could reduce workforce productivity and compromise health and safety at Berth 605 and the port.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	1	3	4	4	48	Moderate	(-)
With Mitigation	3	1	3	4	3	33	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ The HSE Plan/EMPr must outline procedures, responsibilities and actions to prevent and address heat-related health issues. ■ Develop and implement or subscribe to an early warning system to help employees prepare for and respond to climate change risks such as high temperatures and extreme heat. ■ Consider modifying work schedules to minimise outdoor activities during the hottest times of the day, such as rescheduling strenuous tasks to cooler morning or late afternoon hours. ■ Monitor weather conditions during operations to prepare for extreme conditions such as extreme temperatures (exceeding 33°C) or as guided by the National Weather Bureau. ■ Conduct training sessions to educate workers and create awareness about the signs of heat stress, preventive measures, and the importance of early intervention as well as the importance of drinking water to stay hydrated. 							

Table 7-10 – Impact of extreme weather events on personnel safety

Potential Impact: Extreme precipitation events, storm surges, and rising sea levels may cause localised flooding, restricting worker mobility and disrupting site operations. Persistent flooding and wave action may also weaken infrastructure over time, leading to higher maintenance needs and operational downtime at Berth 605 and the Port.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	4	3	33	Moderate	(-)
With Mitigation	2	1	3	4	2	20	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Send out timely communication to workers regarding unsafe work conditions due to extreme weather events to ensure their safety. Identify and incorporate emergency response policies and protocols into the Project. This should also include an evacuation plan to help move workers from site during unsafe work conditions. 							

Table 7-11 – Impact of increased rainfall intensity and extreme precipitation days

Potential Impact: Projections show minor increases in extreme precipitation days. However, an increase in rainfall intensity and frequency as well as extreme precipitation days may lead to flooding, causing damage to the rail siding and making the new shared road temporarily inaccessible. This would negatively impact the movement of personnel to, from, and around the location of Berth 605, restrict vehicle access to the Port of Richards Bay and the CHF where possible. This may lead to increased need to road repair and reconstruction, increased costs, inefficiencies at Berth 605 and Port operations and may also impact the transportation of dredged material to the authorised site	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	4	3	33	Moderate	(-)
With Mitigation	2	1	3	4	2	20	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Send out timely communication to workers regarding unsafe work conditions due to extreme weather events to ensure their safety. Identify and incorporate emergency response policies and protocols into the Project. This should also include 							

Potential Impact: Projections show minor increases in extreme precipitation days. However, an increase in rainfall intensity and frequency as well as extreme precipitation days may lead to flooding, causing damage to the rail siding and making the new shared road temporarily inaccessible. This would negatively impact the movement of personnel to, from, and around the location of Berth 605, restrict vehicle access to the Port of Richards Bay and the CHF where possible. This may lead to increased need to road repair and reconstruction, increased costs, inefficiencies at Berth 605 and Port operations and may also impact the transportation of dredged material to the authorised site	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	an evacuation plan to help move workers from site during unsafe work conditions.						

Table 7-12 – Impact of storm surges on the sewerage system and infrastructure at the Berth 605

Potential Impact: Extreme weather events, such as heavy rainfall, can overwhelm wastewater treatment plants or sewage systems, causing untreated sewage to flow into bodies of water. This can lead to contamination of water supplies such as groundwater surface water bodies affecting public health.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	4	3	33	Moderate	(-)
With Mitigation	2	1	3	4	2	20	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> The pipework must be designed to accommodate extreme weather events. If possible, consider having a weather station on site for real time monitoring of extreme climate events such as extreme precipitation. Regular preventive maintenance and cleaning of pipes to prevent blockage from any material sewage. Ensure regular maintenance of stormwater drainage systems on site. 							

Table 7-13 – Impact of precipitation events on the stormwater system

Potential Impact: Although projections show variability in rainfall and minor increases in extreme precipitation days increased rainfall intensity, extreme precipitation and rising sea levels may increase water leading to run off exceeding the capacity of stormwater drainage systems at around Berth 605 and the Port. This can result in surface flooding as elevated water levels reduce drainage efficiency, surcharging drainage pipes and impeding their function. Such conditions may disrupt operations, increase maintenance costs and pose environmental and safety risks due to localised waterlogging	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	4	3	33	Moderate	(-)
With Mitigation	2	1	3	4	2	20	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Identify and use existing Early Warning Systems (EWS) in the Project area. EWS are designed to provide communities with advanced notice of imminent flood events based on weather forecasts, recorded rainfall, or rising water levels upstream. They also help in implementing protocols for mitigating flood impacts. Construction and maintenance of diversion channels around the site to prevent mixing of 'clean' and 'dirty' stormwater runoff. Ensure regular maintenance, monitoring and clearance of stormwater drainage systems around Berth 605 and Port to collect, convey and discharge stormwater to reduce flooding and control water quality. Protect and re-establish wetlands to act as natural stormwater buffer and filtration systems. Flood Management: Implement flood management measures for your Project or development (e.g., installation of flood defences around Berth 605 and the Port). Design of stormwater management system should take into consideration the projected increases in the number of precipitation days and sea level rise. Where possible retrofit existing storm and sewer infrastructure to meet new stormwater management guidelines or quality standards for receiving waters. 							

Table 7-14 – Impact of increased number and magnitude of high intensity events on the Berth 605 dredging operations

Potential Impact: Impact of increased number and magnitude of high intensity events including storm surges on the Berth 605 dredging operations	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	2	5	40	Moderate	(-)
With Mitigation	1	1	1	2	5	25	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ Implement a dredging schedule and a contingency plan to address any challenges that can affect the current dredging techniques.■ Select the most appropriate method of dredging to manage impacts.■ Take into account the type and amount of dredging required.■ Ensure timely communication with contractor for any required dredging work.■ Where possible consider upgrading stormwater management systems to reduce silting caused by runoff during heavy precipitation.■ Strengthen port infrastructure to withstand increased sediment and flooding risks.							

Table 7-15 – GHG emissions of the project during operation

Potential Impact: Impact of electricity consumption of systems associated with the berth and diesel-powered yard equipment	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	2	5	40	Moderate	(-)
With Mitigation	1	1	1	2	5	25	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ The project should prioritise the use of energy-efficient cranes with regenerative systems and variable frequency drives where possible.■ All fixed lighting infrastructure should use LED technology integrated with motion sensors and smart controllers.■ Over the medium term, the Project should procure renewable energy, such as via TNPA's planned 20 MW solar PV installation as feasible and where possible.■ A phased transition strategy should be developed to replace diesel yard equipment with hybrid or electric alternatives, starting with reach stackers where feasible.							

Potential Impact: Impact of electricity consumption of systems associated with the berth and diesel-powered yard equipment	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
						<ul style="list-style-type: none"> ■ In the interim, vehicles should be monitored, for idling and fuel use. ■ South African-based suppliers are beginning to offer hybrid equipment, which improves feasibility over the Project lifecycle. ■ Administrative buildings should be designed to maximise natural ventilation and daylight use. ■ HVAC systems should be optimised using smart controllers, and the installation of rooftop solar PV should be evaluated during detailed design. ■ All pump systems installed should meet high energy-efficiency standards and be fitted with pressure control or variable-speed drives. ■ The feasibility of operating pumps during off-peak grid periods or using solar-powered booster pumps for isolated segments should be explored during detailed design. ■ The Project should prioritise gravity-fed design for new stormwater and sewer infrastructure to minimise electricity use. ■ Where pumps are necessary, energy-efficient motors and automated controls should be considered to reduce operational energy consumption. 	

The Climate Change Impact Assessment concluded that the proposed Berth 605 development will be exposed to a range of climate-related hazards over its operational lifespan, including increasing temperatures, sea level rise, extreme rainfall events, coastal flooding and storm-related impacts. However, the implementation of the recommended adaptation, monitoring and management measures is expected to reduce these risks to acceptable levels. No climate-related fatal flaws were identified and climate change is not considered to preclude the development of the proposed Berth 605 and associated infrastructure.

7.3 GEOTECHNICAL IMPACTS

A desktop study was conducted by Mukona (2025) to review available geological and geotechnical information pertaining to the site and determine any prevailing geohazards. Geohazards refer to geological events that cause damage to human life and the living environment when the geological body changes to a certain degree. Seismic activities, ground subsidence, sinkhole formation, slope failures and volcanic activities are typical examples of geohazards.

The investigation concluded the following:

- **Seismic activity** - Seismic activity can be defined by type, frequency and size of earthquakes that happen over a period of time in certain areas. Based on the seismic hazard map, the site does not fall in either Zone I (Regions of natural seismic activity) or Zone II (Regions of mining-induced and natural seismic activity).

- Ground subsidence - Subsidence occurs in areas with large underground cavities typically resulting from large scale shallow to very shallow mining and from dolomite/limestone dissolution. It may also appear where thick deposits of unconsolidated material exist. The available geological data and field observations indicate that no dolomite/ limestone underlies the site and that no undermining has occurred.
- Sinkhole formation - Like subsidence, sinkhole formation occurs in areas with large to extremely large underground cavities resulting from poorly designed shallow underground activities. Dissolution of dolomites or limestones over millions of years may lead to cavity formations which later manifest as sinkholes. The site is not underlain by dolomite and therefore a dolomite stability investigation is not required.
- Landslides and mudslides - Landslides are caused by disturbances in the natural stability of a slope and are mainly caused by heavy rains or droughts, earthquakes, and volcanic eruptions. Mudslides can develop by rapid water accumulation on the ground, which results in a surge of water-saturated rock, earth and debris. The probability of landslides and mudslides occurring within this area can be ruled out. This is primarily due to the low relief and relatively gentle gradient of the area.
- Liquefaction potential - The risk of liquefaction on site is mild due to the presence of waterlogged fine-grained sand and silt across the footprint of the site. Groundwater was encountered within all the test pits and on boreholes drilled onsite. Based on the regional 1:250 000 geological map of the area, no active faulting is present in this area.
- Rockfalls and rockslides - Rockfalls and rockslides are individual rocks that fall from a steep cliff. Based on the site investigation conducted, the probability of the occurrence of rockfalls and rockslides on the proposed site is remote due to the geology as it comprises deeply completely weathered rocks. No visible outcrops were noted on site.

The findings of the geotechnical investigation informed the engineering design process for the proposed Berth 605 development, including the design of the quay wall, dredging interfaces, road infrastructure, rail infrastructure and associated services. Geotechnical considerations were incorporated into project planning to minimise construction risks and ensure the long-term stability and resilience of the proposed infrastructure.

Based on the findings of the geotechnical investigation and the incorporation of the recommended engineering measures into the project design, no geotechnical fatal flaws were identified that would preclude the development of the proposed Berth 605 and associated infrastructure.

7.3.1 CONSTRUCTION PHASE

Geotechnical limitations were considered during the pre-feasibility and concept design stage for the project. The geotechnical investigation revealed the material that is likely to be dredged for the project as well as a range of geotechnical variations which will ensure that the final detailed design quay wall is stable at all locations along the quay wall.

Regarding the quay wall on the land side, rock is shallower than anticipated which is a high positive impact for the project as drilling to a shallower rock depth will decrease the cost of the activity of constructing the quay wall.

In addition, dredging is also considered a construction phase activity and a shallower rock in the basin translates to reduced volumes of sediment type material which inevitably means that there will be less sediment dispersion as there is more rock type materials to be disposed of.

Table 7-16 – Impact of shallow rock during the construction of the quay wall

Potential Impact: Positive economic impact of shallow rock during the construction of the quay wall	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	5	5	5	70	High	(+)
With Mitigation	3	1	5	5	5	70	High	(+)
Mitigation and Management Measures	■ N/A							

Table 7-17 – Impact of shallow rock associated with disposal of the dredged material

Potential Impact: Positive impact of disposing of more rock material than sediment which will result in reduced sediment dispersion at the offshore disposal site	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	5	5	5	75	High	(+)
With Mitigation	3	2	5	5	5	75	High	(+)
Mitigation and Management Measures	■ N/A							

7.3.2 OPERATIONAL PHASE

There are no operational phase impacts relating to geotechnical aspects for the project area. The current design of the Berth 605 and associated project components have been designed in a manner to eliminate the identified geotechnical constraints.

7.4 HYDROLOGY

7.4.1 CONSTRUCTION PHASE

The hydrological assessment undertaken by WSP (2025) was used to inform the stormwater bulk service design. Potentially significant hydrological impacts during the construction phase relate to the disturbance of soil during construction and excavation, the exposure of soils which will result in increased run off from cleared areas and surface water contamination and sedimentation.

Table 7-18 – Impact of inadequate stormwater management during construction

Potential Impact: Impact of inadequate stormwater management during construction	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	5	50	Moderate	(-)
With Mitigation	2	1	3	2	3	24	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Temporary stormwater systems should be installed to manage the stormwater during the pre-construction phase. Vegetation clearing must be limited to the workable project area only and must not extend into the surrounding natural vegetated areas. Highly erodible soils may require additional erosion control measures to be implemented. Up-slope drainage catchments may need to be diverted around the work site. Weather trends must be monitored by the Contractor to ensure that high intensity rainfall events are adequately planned for. Topsoil stockpiles kept on site will require an impervious cover to mitigate the impact of rainfall events. Stockpiles of sandy material located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. Drip trays should be placed under stationary vehicles / plant. Ensure proper control and of dangerous substances entering the site. Chemicals and other potential contaminants must be stored 50 m or more away from any water resources and watercourses. Construction chemicals, such as cement and hydrocarbons should be used in an environmentally safe manner with correct storage as per each chemical's specific storage descriptions. All waste must be removed and transported to appropriate waste facilities. A spill response plan must be developed and adhered to. 							

7.4.2 OPERATIONAL PHASE

Stormwater impacts associated with the operational phase of the project relate to the alteration of the natural stormwater flow processes, stormwater contamination (and runoff into the bay) and an inadequate stormwater system that does not adequately manage the stormwater associated with all project components.

The stormwater system has been designed to accommodate a 1 in 5-year storm. The CHF and Berth 605 project components will require a major flood to flow overland into the bay; therefore the design has mitigated the potential impact of an inadequate stormwater system.

Table 7-19 – Impact of inadequate stormwater management during operation

Potential Impact: Impact of inadequate stormwater management during operation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	5	5	60	Moderate	(-)
With Mitigation	2	1	3	5	2	22	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ Implementation of the designed stormwater management system to accommodate 1 in 5-year storms.■ Overland flow during a major storm event can be mitigated by designing and shaping the project area to prevent water ponding and to control flood damage to any infrastructure.■ Ensure proper control and storage of dangerous substances and potential contaminants entering and being stored at the site.■ Regular monitoring of the stormwater system.							

7.5 IMPACTS ON THE ESTUARINE ENVIRONMENT

The entire PoRB can be considered ecologically important habitat. Indeed, by virtue of the port being an estuarine embayment, of which it is one of only three in South Africa, gives it conservation (ecological) significance. Estuaries in South Africa are generally small, meaning large estuarine bays like the Port of Richards Bay assume an even greater ecological significance by virtue of the number and area of the habitats represented. The extensive mudflats in the Port of Richards Bay (and those in the adjacent Mhlathuze Estuary) are important by virtue of their extent, as there are few large, open mudflats along the KwaZulu-Natal coast.

The assessment recognised that the Port of Richards Bay is a highly modified estuarine embayment that nevertheless continues to provide important ecological functions and supports habitats of regional, national and, in some cases, international conservation significance. While historical port development has resulted in extensive habitat transformation, large areas of natural estuarine habitat remain within the Port and continue to support estuarine biodiversity, nursery habitat functions and ecological connectivity between estuarine and marine environments.

The CSIR, in the marine/estuarine study for the Berth 605 project identified four of the habitats and rated these in terms of their ecological importance in the PoRB and its immediate environment are represented in the 600 Berth Basin, namely Sandbanks, Mangrove Swamps, Harbour (Marine Embayment) and Deepwater Sediment. Parts of the small tidally influenced pool inland of the

Assembly Basin could possibly be regarded as representing Mudflat habitat in addition to Mangrove Swamp habitat.

The most ecologically sensitive and important habitat in the Berth 605 Project footprint is the small tidally influenced pool inland of the Assembly Basin. The pool is fringed by mangrove trees, including Black Mangroves, a protected tree in terms of the National Forestry Act. There is a high diversity and abundance of fish and pelagic and benthic invertebrates in the pool. However, specialist investigations confirmed that the proposed development footprint occurs within an area that has already been significantly modified through previous port development activities. The assessment therefore considered both the current ecological importance of the area and its historical disturbance context in evaluating impact significance and environmental acceptability.

A total of thirty-seven (37) environmental impacts associated with the marine/estuarine environment that might or will arise if the development of Berth 605 proceeds were identified, of which 13 potential were scoped out from detailed assessment because they should be relatively easy to control or because they are difficult to assess with the information available. These 13 potential impacts are tabulated below.

Table 7-20 – Impacts on the estuarine/marine environment which have been screened out

No	Impact	Motivation for screening out
1	Loss of non-hazardous solid waste from dredging, construction, and support vessels	The significance of this potential environmental impact was not assessed in detail since it is expected that dredging, construction, and support vessels will have procedures in place to manage non-hazardous solid waste in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL convention), the Marine Pollution (Prevention of Pollution from Ships) Act of 1986 and amendments, and any additional requirements the South African Maritime Safety Authority, TNPA, and/or other authority might prescribe to minimise the potential for this impact. The management of solid waste on vessels while in the Port of Richards Bay should furthermore be easy to implement since land-based disposal options are available and TNPA has waste reception facilities. The significance of this impact would have been rated as VERY LOW were it assessed in detail.
2	Loss of non-hazardous solid waste from construction sites on land	The significance of this environmental impact was not assessed in detail since it is expected that the construction contractor/s will have procedures in place to manage non-hazardous waste. The control and management of non-hazardous solid waste is also easy to implement since land-based disposal options are available. The significance of this impact would have been rated (very) LOW with mitigation.
3	Loss of hazardous substances into the port due to spills, leaks, and discharges from dredging, construction, and support vessels	The significance of this environmental impact was not assessed in detail since it is expected that dredging, construction, and support vessels will have procedures in place to manage hazardous waste and noxious substances in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL convention), the

No	Impact	Motivation for screening out
		Marine Pollution (Prevention of Pollution from Ships) Act of 1986 and amendments, and any additional requirements the South African Maritime Safety Authority, TNPA, and/or other authority might prescribe to minimise the potential for this impact. Furthermore, it is expected that dredging, construction, and support vessels and equipment on these vessels will be well maintained and operated by qualified and trained personnel, and there will be standard pollution prevention procedures in place. It is not anticipated that these plans and procedures will eliminate the potential for hazardous waste and noxious substance spills and leaks. In fact, hazardous substances are expected to be leaked into the port from the engines of small support vessels. Any small boat user is likely familiar with the small oil sheens that often develop on the water surface near outboard engines when they are started even if the engines are in good condition. However, it is anticipated that any spills or leaks that do occur in this way will be of such small volumes that their impact on water and sediment quality, and on biological resources in the port will be minimal. The management of hazardous substances is reasonably easy to implement. The significance of this impact would have been rated as (very) LOW with mitigation.
4	Entry of hazardous substances into the port due to spills and leaks at construction sites on land	The significance of this potential environmental impact was not assessed in detail since it is expected that the construction contractor/s will have procedures in place to manage hazardous waste according to the Hazardous Substances Act (Act No. 15 of 1973) and Occupational Health and Safety Act (No. 85 of 1993), including spill containment and cleanup procedures and related materials. Furthermore, it is expected that construction equipment will be well maintained and operated by qualified and trained personnel. As further justification, relatively little construction over and in water is anticipated since most of Berth 605 will be constructed in the dry. The plans and procedures implemented by the construction contractor/s will not eliminate the potential for hazardous substance spills or leaks. In fact, hazardous substances spills or leaks are likely since the regular handling of hazardous substances and frequent operation of construction equipment, machinery, and vehicles will statistically increase the chance of a spill or leak. However, the spills or leaks are expected to be of a small volume that can easily be contained and cleaned up. With mitigation measures in place, the significance of this impact would be rated as (very) LOW .
5	Loss of construction material and demolition debris into the port	This impact was not assessed in detail since the intent is to construct Berth 605 'in the dry'. It will thus be possible to control many of the losses of construction material into the port. The largest risk will occur during the demolition of concrete structures when Berth 605 is tied into Berth 606. It is inevitable that construction material will enter the port water environment. As an example, sand used as fill in the quay will inevitably be blown by wind into the port water environment.

No	Impact	Motivation for screening out
		However, the quantity of material and debris lost is anticipated to be small. The significance of this impact would have been rated as (very) LOW with mitigation.
6	Navigation hazard posed by dredging, construction, and support vessels	The significance of this environmental impact was not assessed in detail since it is expected that TNPA will stipulate procedures to which the dredging and construction contractor/s must adhere to avoid dredging, construction, and support vessels posing a navigation risk to other vessels and that the dredging and construction contractor/s will adhere to the procedures. Marine dredging and construction contractors invariably have experience operating in busy waterways and have in place procedures to avoid accidents and undue influences on other vessel traffic. It is expected that TNPA will appoint a marine dredging and construction contractor/s that has/have experience in the construction of infrastructure in ports. The significance of this impact would have been rated as (very) LOW with mitigation.
7	Marine megafauna strikes by dredging, construction, and support vessels	The significance of this environmental impact was not assessed in detail since it is expected that TNPA will stipulate the procedures the dredging contractor/s must follow to reduce the risk of dredging vessels striking marine megafauna while in transit to the dredged spoil disposal site and that the contractor/s will implement and follow these procedures. It would be beneficial if the dredging and dredging support vessel captains and crew maintain a record of where whales, dolphins, and other marine megafauna are observed during transit to and from the dredged spoil disposal site and their behaviour during dredged material disposal. The information will aid in assessing the potential risk of vessel strikes in dredging campaigns for Environmental Impact assessments for future planned projects. The significance of this impact would have been rated as LOW with mitigation.
8	Introduction of non-native aquatic biological resources	This impact was not assessed in detail since it is expected that dredging, construction, and support vessels that do not originate from South Africa and have not been actively working in South African territorial waters for at least several months, and vessels calling at the Port of Richards Bay in future when Berth 605 is operational, will abide with and implement regulations of the International Maritime Organisation Convention for the Control and Management of Ship's Ballast Water and Sediments, South Africa's (draft) Ballast Water Management Bill, and any additional protocols that TNPA and the South African Maritime Safety Authority might deem fit to identify to mitigate this impact. The significance of this impact would have been rated as (very) LOW with mitigation.
9	Increased vessel traffic	The disturbance of bottom sediment by vessel propeller wash also disturbs benthic biological resources. Increased vessel traffic will also generate increased noise.

No	Impact	Motivation for screening out
		This impact was not assessed in detail because the change in propeller wash related disturbance of sediment on pelagic and benthic biological resources is anticipated to be small compared to the existing situation.
10	Noise from dredging, construction, and support vessels	<p>The noise generated by the cutter suction dredger, barges, and other vessels in and near the Berth 605 Project footprint will thus be louder and more persistent than is currently the case. The cutter suction dredger and dredging support vessels will also operate nearer intertidal habitat than is currently the case. Underwater noise impacts from dredging operations are not anticipated to cause permanent auditory damage to biological resources in the area.</p> <p>CEDA (2011) indicate that pipeline cutter suction dredgers have a noise source level at 1 m of 172 dB-185 dB re 1µPa. Clarke et al. (2002) found that cutterhead sounds peaked at 100-110 dB and were inaudible at □500 m from the source. According to Richardson et al. (1995), noise levels diminish by about 60 dB between the source and a radius of 1 km. For marine mammals to be exposed to a received level of 140 dB at 1 km radius, the source level would have to be about 200 dB re 1 µPa/m. On the basis of (1) the predicted noise effect thresholds noted by Richardson et al. (1995), (2) the background noise that already exists in the marine environment (approximately 120 dB), and (3) the ability of marine mammals and fish to move away from the immediate noise source, noise generated by cutter suction dredger activities are not expected to affect mammals and fish outside the Berth 605 Basin to any significant degree.</p> <p>The significance of this impact would have been rated as LOW with mitigation.</p>
11	Underwater construction noise	<p>The significance of this environmental impact was not assessed in detail because one of the most environmentally significant sources of underwater noise that is usually associated with quay development in ports is percussive piling—the ‘hammering’ of long pieces of steel that provide structural stability to quay walls into sediment—will not significantly affect the underwater noise environment in the Port of Richards Bay since Berth 605 will be constructed ‘in the dry’ and piling will probably not be required. If piling is required, the noise will need to propagate through soil/land but will be substantially dampened when compared to piling underwater and is unlikely to be a significant source of disturbance to aquatic biological resources. There will of course be some underwater construction noise when Berth 605 is tied into Berth°606, but this is expected to be of a relatively short duration. The noise will nevertheless affect aquatic biological resources while it is ongoing. Other sources of underwater noise, such as dredging noise, is less significant than piling noise and will persist in the short-term and is not anticipated to have major consequences for aquatic biological</p>

No	Impact	Motivation for screening out
		resources. Potential underwater noise impacts on birds are dealt with in a separate specialist study considering the importance of the Port of Richards Bay to birds. The significance of this impact would have been rated as LOW but possibly moderate with mitigation.
12	Increased operational noise	The significance of this environmental impact was not assessed in detail because there is already a considerable amount of operational noise in the Port of Richards Bay and aquatic biological resources in the 600 Berth Basin are assumed to be habituated to the noise to the degree possible. Aquatic biological resources that have not been displaced or disturbed by the existing operational noise are not thus anticipated to be significantly affected by the increased noise when Berth 605 is operational. The significance of this impact would have been rated as LOW with mitigation.
13	Loss of recreation and tourism opportunities	The significance of this environmental impact was not assessed in detail because the Berth 605°Project footprint is far from angling areas in the Port of Richards Bay, which are restricted to an area east of an imaginary line extending between the eastern part of the 700 Berth Basin and the Chemical Berth near the Richards Bay Coal Terminal Basin. Bait organism collection areas are far from the 600 Berth Basin and are unlikely to be directly affected by dredging operations. More importantly, numerical modelling by WSP (2025) suggests that suspended sediment plumes are highly unlikely to extend much beyond the 600 Berth Basin—unsightly turbid plumes are unlikely to significantly detract from the visual experience in recreational areas in the port. The significance of this impact would have been rated as LOW with mitigation, but possibly VERY LOW .

Of the remaining twenty-four (24) impacts, one is anticipated to be of a **LOW NEGATIVE** and four (4) **LOW POSITIVE** and nine of a **VERY LOW** environmental significance, However, nine (9) are anticipated to be of a **MEDIUM** environmental significance and 1 of a **HIGH** environmental significance:

The medium significance impacts relate to physical disturbance, injury, and displacement of benthic biological resources caused by dredging, a deterioration in water quality related to increased suspended sediment concentrations and related turbidity, the deposition of sediment resuspended smothering and disturbance of benthic biological resources, a change in hydrodynamic conditions and an increased load of contaminants introduced into the port by surface runoff.

The single high significance impact relates to the permanent loss of the tidally influenced pool and related ecological value and productivity.

There are no identified environmental fatal flaws associated with the proposed development of Berth 605 in the context of estuarine and marine ecology. In most cases, the impacts will have negative consequences for the environment, but in three cases the consequence will be positive (beneficial). The medium and high negative consequences can be mitigated to an acceptable degree if the

proposed mitigation measures are implemented, and in three cases positive consequences can be enhanced.

The most important mitigation measure is the compensation of ecologically significant habitat in the small tidally influenced pool connected to the Assembly Basin. While the tidally influenced pool has developed important ecological characteristics over time and currently provides habitat for mangroves, fish and macrocrustaceans, specialist investigations confirmed that the feature is anthropogenic in origin and developed following historical port construction activities. The ecological importance of the pool was accordingly recognised in both the impact assessment and the development of compensation measures. Equivalent, or similar habitat could be created along the south-southwestern part of the lengthened 600 Berth Basin by excavating a pit into the surrounding land while excavations for the Berth 605 development are underway. Ideally, the habitat should cover a larger area than the existing tidally influenced pool. Provided the excavated area is of a depth that it does not drain dry at low tide and there is a permanent tidal connection to the 600 Berth Basin there is every reason to believe it would be similarly colonised by mangroves and other biological resources over time and would make as important an ecological contribution per unit area to the port as the existing tidally influenced pool.

Residual impacts associated with the loss of estuarine habitat have informed the development of the Biodiversity Compensation Plan. The revised compensation approach includes habitat creation and habitat compensation measures specifically intended to address the ecological functions currently provided by the affected estuarine habitats. The compensation measures were developed in consultation with relevant specialists and biodiversity authorities and form an integral component of the mitigation hierarchy applied to the project.

7.5.1 CONSTRUCTION PHASE

The impact of water-based construction activities on the marine ecology/estuarine environment is provided in the table below. Despite the historic modifications of the Berth 605 project area, the site is still considered ecologically important and sensitive.

The water-based construction activities will disturb the benthic habitat within the bay which will result in the modification of the benthic community structure on the site. It must be noted that the recovery of the intertidal fauna due to the disturbance of construction related activities will be rapid due to the ability of the fauna to adapt to such conditions which are ongoing at the PoRB. Fauna is constantly exposed to disturbance by propeller action, ship movement, wind and wave action, etc, therefore their recovery rate is rapid.

Table 7-21 – Loss in aquatic ecological function and productivity due to the physical disturbance, injury, and displacement of benthic biological resources by dredging

Potential Impact: The physical removal, disturbance, injury, and/or displacement of benthic biological resources are unavoidable consequences of dredging—there is no dredging technology that avoids such impacts. An invariable outcome of dredging is a significant decline in the species diversity, abundance, and biomass of benthic biological resources in the dredging footprint. The decline amounts to (temporary) habitat loss or displacement for other biological resources such as fish and larger motile invertebrates that depend on the biological resources in the dredging footprint for food or the physical area for breeding habitat, potentially directly affecting their abundance and survivorship and indirectly overall ecosystem functioning and productivity.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	3	5	45	Moderate	(-)
With Mitigation	2	1	3	3	5	45	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed. ■ Dredging should be completed within the scheduled timeframe to limit the period over which benthic ecology and related ecological function and productivity is impacted. ■ The dredging should be restricted to footprint as included in the design to limit the area over which benthic ecology is impacted. 							

Table 7-22 – Loss in aquatic ecological function and productivity due to a deterioration in water quality related to increased suspended sediment concentrations and related turbidity during dredging

Potential Impact: The resuspension of sediment and related increase in turbidity in the water column is an unavoidable consequence of dredging, excavation, and construction operations in aquatic systems. No dredging or in-water excavation and construction technology can eliminate sediment resuspension. An increase in the suspended sediment concentration above the baseline poses numerous potential impacts to biological resources. In general, the higher the suspended sediment concentration and the longer the exposure period, the greater the risk to biological resources.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	3	5	55	Moderate	(-)
With Mitigation	3	2	3	3	5	55	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ Dredging methods that resuspend the least quantity of fine-grained sediment should be used, as such a Cutter Suction Dredger (CSD) was recommended by the specialist. The full dredging method is detailed in the Dredging and Dredge Disposal Study (WSP, 2025) (Appendix G15). ■ Dredging near intertidal sediment habitat should ideally be performed at low tide to limit the dispersion of suspended sediment to intertidal areas where practical. ■ An environmental valve ('green valve') should be used in barges - these valves reduce air entrainment that otherwise limits dispersion of overflowed sediment-water mixtures. ■ Joints on pipes from the cutter suction dredger to barges must be properly sealed so that suspended sediment is not lost into the surrounding water column. ■ The dredging footprint should be restricted to the smallest area and depth possible as per the design (i.e. do not over dredge) to limit the quantity and period over which sediment is resuspended into the water column. ■ Barge loads must be monitored to prevent the overflow or leakage of sediment from barge compartments during non-dredging transit at the dredging site and during transit to the dredged spoil disposal site off Richards Bay. ■ Barges must not be overfilled. ■ A silt curtain should be installed across the narrow channel linking the 600 and 700/800 Berth Basins and Kabeljous Flats if a turbidity >25 NTU is measured regularly in surface and mid-water depths in water in and near the channel. This turbidity limit is approximately 4-5 times higher than the turbidity usually measured in the 600 Berth Basin (CSIR, unpublished data). 							

Potential Impact: The resuspension of sediment and related increase in turbidity in the water column is an unavoidable consequence of dredging, excavation, and construction operations in aquatic systems. No dredging or in-water excavation and construction technology can eliminate sediment resuspension. An increase in the suspended sediment concentration above the baseline poses numerous potential impacts to biological resources. In general, the higher the suspended sediment concentration and the longer the exposure period, the greater the risk to biological resources.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
	<ul style="list-style-type: none"> A water quality monitoring programme should be implemented to identify if the targets are exceeded. The water quality targets should be linked to a management response in the event they are breached. The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. 							

Table 7-23 – Loss in aquatic ecological function and productivity in subtidal habitats due to the deposition of sediment resuspended by dredging

Potential Impact: Most benthic biological resources live in the top 10-15 cm of sediment and rely on a connection (e.g. burrows, porewater diffusion) to the sediment-water interface for ventilation (respiration), feeding, and/or breeding. The excessive deposition of sediment on the bottom can lead to the burial, smothering, and crushing of benthic biological resources, including invertebrate infauna, poorly mobile, sessile, or sedentary epifauna, and the eggs of invertebrates and fish that develop on the bottom. In extreme cases, sediment deposition can lead to the complete loss of benthic ecology.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	3	5	55	Moderate	(-)
With Mitigation	3	2	3	3	5	55	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Dredging methods as indicated in the Dredge and Disposal Study (Appendix G15) must be implemented to resuspend the least quantity of sediment into the water column should be used, although it is acknowledged the 							

<p>Potential Impact:</p> <p>Most benthic biological resources live in the top 10-15 cm of sediment and rely on a connection (e.g. burrows, porewater diffusion) to the sediment-water interface for ventilation (respiration), feeding, and/or breeding. The excessive deposition of sediment on the bottom can lead to the burial, smothering, and crushing of benthic biological resources, including invertebrate infauna, poorly mobile, sessile, or sedentary epifauna, and the eggs of invertebrates and fish that develop on the bottom. In extreme cases, sediment deposition can lead to the complete loss of benthic ecology.</p>	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
						<p>dredging method will be dictated by the nature of the material that needs to be dredged or removed.</p> <ul style="list-style-type: none"> ■ The dredging footprint must be restricted to the smallest area and depth possible as per the design (i.e. do not over dredge) to minimise the quantity of sediment that is resuspended into the water column. ■ There should be no overflow or leakage from barge compartments during non-dredging transit at the dredging site and during transit to the dredged spoil disposal site off Richards Bay. ■ A silt curtain should be installed across the narrow channel between the 600 and 700/800 Berth Basins and the Kabeljous Flats if water quality surveys (see Impact 15) reveal unacceptably (and unexpectedly) high suspended sediment concentrations in the channel. ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. 	

Table 7-24 – Loss in aquatic ecological function and productivity in intertidal habitats due to the deposition of sediment resuspended by dredging

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
<p>Some of the fine-grained sediment that will be resuspended into the water column during dredging for the Berth 605 Project will inevitably settle in the intertidal in parts of the Port of Richards Bay. The most significant settlement is likely to occur in the intertidal in the 600 Berth Basin, but potentially also in the intertidal on parts of the Kabeljous Flats near the point where a small channel connects the 600 Berth Basin and flats and on parts of the Sandspit.</p> <p>The deposition of sediment in the intertidal can impact importantly on microphytobenthos. The excessive deposition of fine-grained sediment (mud) on sandy sediment can lead to the clogging of the spaces between sediment grains, displacing the biological resources that live between the sediment grains and retarding the exchange of oxygen with the overlying water, leading to the suffocation of these biological resources. Frequent repositioning to maintain a relative distance to the sediment-water interface or increased maintenance activities to prevent the infilling of burrows requires that biological resources shift their energy budget from other functions, such as growth or reproduction.</p>								
Without Mitigation	2	2	3	2	4	36	Moderate	(-)
With Mitigation	1	1	3	2	4	28	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ Dredging methods as indicated in the Dredging and Dredge Disposal Study (Appendix G15) must be implemented to resuspend the least quantity of sediment into the water column should be used, although it is acknowledged the dredging method will be dictated by the nature of the material that needs to be dredged or removed. ■ The dredging footprint must be restricted to the smallest area and depth possible as per the design (i.e. do not over dredge) to minimise the quantity of sediment that is resuspended into the water column. ■ There should be no overflow or leakage from barge compartments during non-dredging transit at the dredging site and during transit to the dredged spoil disposal site off Richards Bay. ■ A silt curtain should be installed across the narrow channel between the 600 and 700/800 Berth Basins and the Kabeljous Flats if water quality surveys reveal 							

<p>Potential Impact:</p> <p>Some of the fine-grained sediment that will be resuspended into the water column during dredging for the Berth 605 Project will inevitably settle in the intertidal in parts of the Port of Richards Bay. The most significant settlement is likely to occur in the intertidal in the 600 Berth Basin, but potentially also in the intertidal on parts of the Kabeljous Flats near the point where a small channel connects the 600 Berth Basin and flats and on parts of the Sandspit.</p> <p>The deposition of sediment in the intertidal can impact importantly on microphytobenthos. The excessive deposition of fine-grained sediment (mud) on sandy sediment can lead to the clogging of the spaces between sediment grains, displacing the biological resources that live between the sediment grains and retarding the exchange of oxygen with the overlying water, leading to the suffocation of these biological resources. Frequent repositioning to maintain a relative distance to the sediment-water interface or increased maintenance activities to prevent the infilling of burrows requires that biological resources shift their energy budget from other functions, such as growth or reproduction.</p>	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	<p>unacceptably (and unexpectedly) high suspended sediment concentrations in the channel.</p> <ul style="list-style-type: none"> ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. 						

Table 7-25 – Remobilisation of oxygen depleting substances from sediment/soil during dredging

Potential Impact: The remobilisation of inorganic and organic oxygen demanding substances from sediment into the water column is an unavoidable consequence of dredging. Inorganic oxygen demand is caused by abiotic (non-biological) reactions. A depression in the dissolved oxygen concentration directly impacts on water quality and may indirectly impact on biological resources that rely on an adequate supply of oxygen for their survival depending on the magnitude and duration of the dissolved oxygen depression, the absolute dissolved oxygen concentration in the water column before and during dredging, and the dissolved oxygen requirements and tolerances of individual biological resources.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	1	2	5	30	Low	(-)
With Mitigation	2	1	1	2	5	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Topsoil for reuse to be stored in accordance with the design and construction methods i.e. stored at the designated sites within the project footprint. If suspended sediment concentrations are regularly elevated at the point where the Assembly Basin joins the 600 Berth Basin during soil stockpiling in the Assembly Basin, then a silt curtain should be strung to separate these basins and restrict suspended sediment concentrations to the Assembly Basin to the greatest extent possible. Complete dredging according to the scheduled timeframe to limit the time that biological resources might be exposed to depressed dissolved oxygen concentrations. The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. 							

Table 7-26 – Nutrient remobilisation from sediment/soil during dredging

Potential Impact: Dredging remobilises nutrients dissolved in water between sediment grains (porewater), while particulate organic matter that is exposed by dredging is remineralised, adding nutrients into the water column. An increase in nutrient concentrations above the baseline directly impacts on water quality and may indirectly impact on biological resources. A small or short-term increase above the baseline can positively impact on primary productivity by increasing nutrient availability to micro- and macroalgae. A marked or prolonged increase in nutrient concentrations above the baseline, in contrast, can stimulate the excessive growth of micro- and macroalgae, leading to eutrophication that in turn can lead to a host of detrimental ecological effects that include depleting the dissolved oxygen concentration in the water column and sediment.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	1	1	3	15	Very Low	(-)
With Mitigation	2	1	1	1	3	15	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is necessary considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below.</p> <ul style="list-style-type: none"> ■ Complete dredging according to the scheduled timeframe to limit the time that biological resources might be exposed to depressed dissolved oxygen concentrations. ■ Restrict dredging to the smallest area and depth possible (i.e. do not over dredge) to minimise the remobilisation of nutrient concentrations from sediment. ■ The surface vegetation must be removed and disposed (if not being stored for rehabilitation and compensation) and should not be deposited in the port if excavated soil is temporarily stockpiled in the Assembly Basin. 							

Table 7-27 – Remobilisation of noxious substances from sediment/soil during dredging

Potential Impact: Dredging changes the physicochemical properties of sediment. The oxygen that permeates newly dredged sediment destabilises many chemical complexes through the process of oxidation, resulting in the dissociation and transfer of the chemicals into the water column.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	1	2	3	15	Very Low	(-)
With Mitigation	1	1	1	2	3	15	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is necessary considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below.</p> <ul style="list-style-type: none"> ■ TNPA must secure a permit from the Department of Forestry, Fisheries and the Environment for the disposal of dredged material at an authorised dredged spoil disposal site off Richards Bay. The sediment testing for the permit must include toxicity testing. 							

Table 7-28 – Bioaccumulation and biomagnification of noxious chemicals remobilised from sediment by biological resources

Potential Impact: Noxious chemicals that are remobilised into the water column during the dredging of contaminated sediment are potentially available for uptake (bioaccumulation) by biological resources.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	1	2	2	12	Very Low	(-)
With Mitigation	1	2	1	2	2	12	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is necessary considering the VERY LOW significance for this impact. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below.</p> <ul style="list-style-type: none"> ■ TNPA must secure a permit from the DFFE for the disposal of dredged material at an authorised dredged spoil disposal site off Richards Bay. The sediment testing for the permit must include toxicity testing. 							

Table 7-29 – Ecological impacts due to a deterioration in water quality related to increased suspended sediment concentrations during dredged material disposal

Potential Impact: The sediment that is dredged and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. An increase in the suspended sediment concentration and related turbidity in the water column due to dredged sediment disposal can have the same environmental consequences as those that occur when sediment is resuspended at the dredging site, but the impacts are usually less significant because of the larger dilution and dispersion potential at open water dredged spoil disposal sites.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	3	5	60	Moderate	(-)
With Mitigation	4	2	3	3	5	60	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ The mitigation measures are aimed at limiting the amount of sediment that is resuspended into the water column and propagated by currents from the dredged spoil disposal site, at limiting losses of sediment from dredgers and barges during transit to the disposal site, and at limiting the amount of time that pelagic and benthic biological resources are exposed to elevated suspended sediment concentrations. ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. ■ Dredging should be completed according to the scheduled timeframe to reduce the period over which biological resources at and near the dredged spoil disposal site are exposed to suspended sediment concentrations and related turbidity above the baseline. ■ The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over dredge) to minimise the amount of sediment that needs to be disposed at the dredged spoil disposal site and hence the period over which biological resources at and near the dredged spoil disposal site are exposed to suspended sediment concentrations and related turbidity above the baseline. ■ There should be no overflow or leakage of sediment from barge compartments during non-dredging transit at the dredging site and during transit to the dredged spoil disposal site. ■ Barges should not be overfilled such that dredged material is washed overboard. 							

	<ul style="list-style-type: none"> ■ The dredged sediment should be disposed on designated cells on the disposal site, in a rotational manner, to avoid the persistent exposure of biological resources at and near the dredged spoil disposal site to suspended sediment concentrations and related turbidity above the baseline. ■ Dredged sediment should not be disposed if dolphins or whales are observed within approximately 200-300 m of the point of disposal.
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Table 7-30 – Remobilisation of oxygen depleting substances from sediment during dredged material disposal

Potential Impact: The sediment that is dredged and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. Inorganic and organic oxygen depleting substances will be remobilised into the water column during dredged sediment disposal, with the same potential environmental consequences as those that might occur when sediment is resuspended by dredging. Inorganic and organic oxygen depleting substances will be remobilised from sediment during dredged material disposal and these substances will depress the dissolved oxygen concentration in the water column.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	1	2	1	5	Very Low	(-)
With Mitigation	1	1	1	2	1	5	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is required considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below.</p> <ul style="list-style-type: none"> ■ Dredging should be completed according to the scheduled timeframe to reduce the period over which biological resources at and near the dredged spoil disposal site are exposed to dissolved oxygen concentrations sediment concentrations depressed below the baseline. ■ The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over dredge) to minimise the amount of sediment that needs to be disposed at the dredged spoil disposal site and hence the period over which biological resources at and near the dredged spoil disposal site are exposed to dissolved oxygen concentrations sediment concentrations depressed below the baseline. 							

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
The sediment that is dredged and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. Inorganic and organic oxygen depleting substances will be remobilised into the water column during dredged sediment disposal, with the same potential environmental consequences as those that might occur when sediment is resuspended by dredging. Inorganic and organic oxygen depleting substances will be remobilised from sediment during dredged material disposal and these substances will depress the dissolved oxygen concentration in the water column.							
						<ul style="list-style-type: none"> ■ Barges should not be overfilled such that dredged material is washed overboard. ■ The dredged sediment should be disposed on designated cells on the disposal site, in a rotational manner, to avoid the persistent exposure of biological resources at and near the dredged spoil disposal site to dissolved oxygen concentrations sediment concentrations depressed below the baseline. 	

Table 7-31 – Remobilisation of nutrients from sediment during dredged material disposal

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
The sediment that is dredged, and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. Nutrients in porewater in the sediment will be remobilised into the water column during open water disposal and could have the same environmental consequences as those that might occur when nutrients are remobilised from resuspended sediment during dredging (see Impact 19). Note that this assessment assumes topsoil and vegetation (a source of nutrients on decomposition) will be removed from the site prior to dredging.							
Without Mitigation	1	1	1	2	1	5	Very Low (-)
With Mitigation	1	1	1	2	1	5	Very Low (-)
Mitigation and Management Measures	No mitigation is required considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below.						

	<ul style="list-style-type: none"> ■ Dredging should be completed according to the scheduled timeframe to reduce the period over which nutrient concentrations might be released from sediment into the water column. ■ The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over dredge) to minimise the amount of sediment that needs to be disposed at the dredged spoil disposal site. ■ Topsoil will need to be stockpiled and used in areas that will be rehabilitated and vegetation will either be shredded and sprinkled on the rehabilitated areas or disposed of at the registered landfill site.
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Table 7-32 – Remobilisation of noxious substances from sediment during dredged material disposal

Potential Impact: The sediment that is dredged, and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. Noxious chemicals present in the sediment porewater or attached to sediment resuspended during dredged sediment disposal may be remobilised into the water column and may have the same environmental consequences as those that might occur when noxious chemicals are remobilised from resuspended sediment during dredging	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	3	2	2	14	Very Low	(-)
With Mitigation	1	1	3	2	2	14	Very Low	(-)
Mitigation and Management Measures	No mitigation is required considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below. <ul style="list-style-type: none"> ■ Ensure that dredged sediment is disposed evenly over the dredged sediment disposal site to disperse and dilute noxious chemical concentrations. 							

Table 7-33 – Deterioration in sediment quality on the dredged spoil disposal site due to the disposal of contaminated dredged material

Potential Impact: The sediment that is dredged, and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing registered offshore disposal site off Richards Bay. The transfer of noxious chemicals in contaminated dredged material to open water dredged spoil disposal sites is an unavoidable consequence if open water disposal is approved. Benthic biological resources that survive or avoid the physical effects of dredged material disposal (e.g. burial, smothering) and those that invade or colonise the deposited sediment may be exposed to noxious chemicals in the sediment.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	1	2	3	15	Very Low	(-)
With Mitigation	1	1	1	2	3	15	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is required considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation even in these circumstances. Recommended mitigation measures are thus outlined below. It is not possible to mitigate this impact once dredged material has been disposed, so mitigation measures are aimed at minimising the potential impact.</p> <ul style="list-style-type: none"> ■ TNPA must secure a permit from the Department of Forestry, Fisheries and the Environment for the offshore disposal of sediment before capital dredging proceeds for infrastructure developments. ■ Dredged sediment must be disposed in designated cells on the dredged spoil disposal site following a pre-approved sequence that avoids disposal in adjacent cells for successive disposal events and ensures the dredged sediment is disposed as evenly as possible across the site, avoiding the disposal of the potentially most contaminated sediment in a restricted part of the dredged spoil disposal site. ■ Dredging vessel and barge tracks must be examined to ensure dredged material is disposed as evenly as possible across the dredged spoil disposal site. 							

Table 7-34 – Smothering and disturbance of benthic biological resources by disposed dredged material

Potential Impact: An unavoidable consequence of dredged sediment disposal at offshore dredged spoil disposal sites is thus the burial, smothering, and crushing of benthic biological communities, including benthic invertebrate infauna and poorly mobile epifauna, bottom-dwelling fish, and the eggs of invertebrates and fish that are deposited and develop until hatching on the seabed.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	3	5	55	Moderate	(-)
With Mitigation	3	2	3	3	5	55	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ Dredged material must be disposed in designated cells on the dredged spoil disposal site following a pre-approved sequence that avoids disposal in adjacent cells for successive disposal events, to ensure the sediment is disposed as evenly as possible across the site. This may provide an opportunity for benthic biological resources that are able to migrate through deposited sediment. ■ Dredging vessel and barge tracks must be examined to ensure dredged sediment is disposed as evenly as possible across the dredged spoil disposal site. ■ A record of the volume of sediment during each disposal event must be retained. ■ The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over dredge) to minimise the amount of sediment that needs to be disposed at the dredged spoil disposal site. ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts. 							

Table 7-35 – Change in hydrodynamic conditions due to accumulation of dredged material at dredged spoil disposal site

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
<p>The disposal of dredged material for the Berth 306 Project resulted in the formation of a large mound of material in part of the dredged spoil disposal site, to a degree it was necessary for the South African Maritime Safety Authority to issue a maritime notice on the navigation hazard posed by the mound. This reflects 'short dumping', that is, a poor dredged material disposal strategy. Changes to the bathymetry of the seabed can refract and amplify waves, currents, and sediment transport patterns to a degree this causes or enhances shoreline erosion. The erosion of the shoreline to the north of the entrance channel to the Port of Richards Bay is currently a major challenge, to a degree the main bathing beach has essentially disappeared over time and port and municipal infrastructure is being threatened.</p> <p>An increase in the rate of shoreline erosion because of the Berth 605 Project will thus be problematic and will diminish the available habitat for sandy beach biological resources, including birds, that use this habitat.</p>								
Without Mitigation	2	3	3	4	4	48	Moderate	(-)
With Mitigation	2	3	3	4	4	48	Moderate	(-)
Mitigation and Management Measures	<p>It is recommended that material dredged for the Berth 605 development be disposed on the dredged spoil disposal site in a manner that takes into account the existing bathymetry. It is assumed that this recommendation will be followed, which is thus considered embedded mitigation. Other mitigation measures for this impact are outlined below.</p> <ul style="list-style-type: none"> ■ The dredging contractor/s must develop a project-specific Dredging and Environmental Management Plan that outlines how dredging will proceed and details measures that will be implemented to minimise environmental impacts—in this case to limit the degree of shoreline erosion. ■ The tracks of dredging vessels and barges must be audited to ensure dredged sediment is disposed according to pre-approved sequence and position dictated by WSP (2025) modelling. 							

Table 7-36 – Bioaccumulation and biomagnification of noxious chemicals in disposed dredged material by biological resources

Potential Impact: The sediment that is dredged, and soil and rock that is excavated for the development of Berth 605 will be disposed at the existing, registered offshore disposal site off Richards Bay. Noxious chemicals in the sediment may be remobilised into the water column during disposal and will accumulate on the seabed along with disposed sediment, from where they may be remobilised into the water column over time as the sediment is gradually eroded by currents. The noxious chemicals may be bioaccumulated by biological resources and enter the food web in the nearshore marine environment off Richards Bay.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	1	4	1	7	Very Low	(-)
With Mitigation	1	1	1	4	1	7	Very Low	(-)
Mitigation and Management Measures	<p>No mitigation is required considering the VERY LOW significance for this impact without mitigation. However, it is good environmental practice to implement mitigation to further reduce the potential for and implications of environmental impacts. Recommended mitigation measures for this impact are thus outlined below.</p> <ul style="list-style-type: none"> ■ TNPA must secure a permit from the Department of Forestry, Fisheries and the Environment for the disposal of dredged material at an authorised dredged spoil disposal site off Richards Bay. The sediment testing for the permit must include toxicity testing. 							

7.5.2 OPERATIONAL PHASE

The operational impacts on the marine and estuarine environment include the loss of the tidally influenced pool and its related ecological value and productivity, the ecological effects of change in hydrodynamic functions and the ecological effects of the increased need for maintenance dredging and dredge disposal. The positive impacts include the gain in intertidal and subtidal sediment habitat, gain in hard substrate habitat and gain in open water habitat.

Table 7-37 – Loss of tidally influenced pool and related ecological value and productivity (without creating a similar environment)

Potential Impact: The small tidally influenced pool inland of the Assembly Basin provides unique, ecologically valuable and productive habitat in the Berth 605 development footprint. The pool will be dredged if the Berth 605 development proceeds. The loss of the pool will result in the loss of a modest sized stand of mangroves that fringe the pool and the sediment and water habitat that supports the high abundance and biodiversity of benthic and pelagic invertebrates and fish.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	5	5	5	75	High	(-)
With Mitigation	3	2	5	5	5	75	High	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> An effort should be made to relocate easily collected biological resources from the small tidally influenced pool to the extent possible. These biological resources would include large gastropods. Fish should also be forced from the pool to the extent possible before it is dredged. However, it will be essentially impossible to collect most invertebrate biological resources, such as borrowing crabs and prawns, and swimming prawns. TNPA must secure a permit from the DFFE for the removal of mangroves fringing the small tidally influenced pool (and Assembly Basin). Although it is theoretically feasible to transplant adult mangroves, this will involve habitat disturbance at the transplant site with no certainty on success and is not recommended—the effort and costs would be better invested in creating similar habitat to that which currently exists in the small tidally influenced pool. 							

Table 7-38 – Loss of tidally influenced pool and related ecological value and productivity (with creating a similar environment south of the existing pool)

Potential Impact: The small tidally influenced pool inland of the Assembly Basin provides unique, ecologically valuable and productive habitat in the Berth 605 development footprint. The pool will be dredged if the Berth 605 development proceeds. The loss of the pool will result in the loss of a modest sized stand of mangroves that fringe the pool and the sediment and water habitat that supports the high abundance and biodiversity of benthic and pelagic invertebrates and fish.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	5	2	1	10	Very Low	(-)
With Mitigation	1	2	5	2	1	10	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Similar habitat to that which currently exists in the small tidally influenced pool will be created in an area to the south southwest of the existing pool by excavating virgin land and ensuring this has a permanent tidal connection to the 600 Berth Basin through a channel. An effort should be made to relocate easily collected biological resources from the small tidally influenced pool to the extent possible. These biological resources would include large gastropods. Fish should also be forced from the pool to the extent possible before it is dredged. However, it will be essentially impossible to collect most invertebrate biological resources, such as borrowing crabs and prawns, and swimming prawns. TNPA must secure a permit from the DFFE for the removal of mangroves fringing the small tidally influenced pool (and Assembly Basin). Although it is theoretically feasible to transplant adult mangroves, this will involve habitat disturbance at the transplant site with no certainty on success and is not recommended—the effort and costs would be better invested in creating similar habitat to that which currently exists in the small tidally influenced pool. 							

Table 7-39 – Ecological effects of a change in hydrodynamic functioning in the port

Potential Impact: The development of Berth 605 requires the lengthening of the 600 Berth Basin, by excavating into the land to the west of the basin. The larger area water volume will alter hydrodynamic conditions in the basin. A change in hydrodynamic conditions can affect water and sediment quality by altering the residence time of water, that is, how long a water parcel, starting from a specified location, remains in the waterbody before exiting. Many ecological processes are also influenced by the residence time of water. Poor circulation combined with excessive nutrient loading can promote the development of microalgal blooms, with attendant adverse ecological impacts.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	5	4	1	12	Very Low	(-)
With Mitigation	2	1	5	4	1	12	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ Mitigation involves ensuring there are no impediments to water movement in the 600 Berth Basin. ■ The dredged area must correspond to the dredging plans. ■ The dredged footprint must avoid leaving indentations in the slopes leading to intertidal and shallow subtidal sandbanks and on the bottom of channels to avoid effects on currents that lead to altered erosion or deposition. ■ There must be no major indentations on the bottom that will alter current flows and affect erosion and deposition patterns, or trap water such that low dissolved oxygen concentrations develop. 							

Table 7-40 – Ecological effects of increased need for maintenance dredging and dredged sediment disposal

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
The development of Berth 605 requires the lengthening of the 600 Berth Basin, by excavating into land to the west of the basin. As is the case in other parts of the Port of Richards Bay, it is inevitable that sediment will deposit and accumulate on the bottom in the lengthened basin over time and will require periodic maintenance dredging to allow the safe movement of vessels. The dredged sediment will need to be disposed at the registered offshore disposal site off Richards Bay. The environmental consequences of maintenance dredging and dredged sediment disposal will be the same as those that currently exist for maintenance dredging in the 600 Berth Basin but will obviously be more intense since the dredging period will be longer and a larger volume of dredged sediment will need to be disposed at the registered offshore disposal site off Richards Bay.								
Without Mitigation	2	1	1	2	5	30	Low	(-)
With Mitigation	2	1	1	2	5	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> A permit from the Department of Forestry, Fisheries and the Environment for the offshore disposal of dredged material must be secured at required intervals. The dredging footprint must be restricted to the design (i.e. do not over dredge) to minimise the period over which environmental impacts may manifest. An environmental valve ('green valve') must be used in trailer suction hopper dredgers. Monitoring for overflow or leakage from hopper compartments during non-dredging transit between the 600 Berth Basin and dredged spoil disposal site off Richards Bay must be undertaken. 							

Table 7-41 – Gain in intertidal and subtidal sediment habitat

Potential Impact: The development of Berth 605 requires the lengthening of the 600 Berth Basin, by excavating into land to the west of the basin. The lengthened basin will result in a gain in intertidal and subtidal sediment habitat in the Port of Richards Bay.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	0	4	4	28	Low	(+)
With Mitigation	1	2	0	4	4	28	Low	(+)
Enhancement Measures	<ul style="list-style-type: none"> The ecological value of the intertidal habitat in the expanded 600 Berth Basin to macrocrustaceans and fish can be enhanced by ensuring it has a shallow slope, and by creating habitat complexity by excavating small, shallow, but permanently inundated channels extending from the water's edge toward the land. 							

Table 7-42 – Gain in hard substrate habitat

Potential Impact: The construction of Berth 605 will result in a gain in hard substrate (quay wall, rip rap) habitat in the Port of Richards Bay. The new habitat will be exploited by aquatic biological resources that depend on a hard substrate, such as barnacles, oysters, and sponges. The biological resources that colonise existing hard substrates in the port are usually found on rocky substrates in the marine environment. They are usually not found in estuaries for various reasons, including the typical absence of hard substrates and their inability to tolerate the variable salinity regimes that usually characterise estuaries (many marine biological resources are stenohaline). They can exploit hard substrate habitat in the Port of Richards Bay because of the stable water column salinity that approximates the salinity of seawater. They are not thus high on the agenda from a conservation perspective in the port. However, the biological resources that exploit hard substrate habitat nevertheless contribute to the ecological productivity of the port.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	0	4	4	28	Low	(+)
With Mitigation	1	2	0	4	4	28	Low	(+)

Enhancement Measures	<ul style="list-style-type: none"> Various engineering interventions can be used to improve the ecological/habitat value of artificial hard substrates in the ports. These include roughening the surface of quay walls and providing artificial habitat that simulates rock pool environments.
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Table 7-43 – Gain in open water habitat

Potential Impact: The development of Berth 605 will require the lengthening of the 600 Berth Basin by excavating land to the west of the existing 600 Berth Basin. The lengthened basin will result in a gain in open water habitat of approximately 65 000 m ² that will be exploited by pelagic biological resources, such as phytoplankton, zooplankton, and fish. The larger population sizes of these biological resources will contribute to the ecological functioning and increase the ecological productivity in the Port of Richards Bay.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	0	4	4	28	Low	(+)
With Mitigation	1	2	0	4	4	28	Low	(+)
Enhancement Measures	<ul style="list-style-type: none"> No mitigation required 							

Table 7-44 – Increased load of contaminants introduced into the port by surface runoff

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Surface (stormwater) runoff from hardstand and other impervious surfaces constructed for Berth 605 and the CHF will be directed into the PoRB, providing a pathway into the port for contaminants (in the broadest sense) arising from general port operations that deposit on hardstand and other impervious surfaces. The contaminants may arise from spillages and leaks from vehicles, trucks, and cranes and rusting and decaying infrastructure amongst other sources. Potential pollutants include hydrocarbons, metals, and particulate material. If coal exports continue at neighbouring berths in the 600 Berth Basin, then it is inevitable windblown coal dust will deposit on hardstand and other impervious surfaces for Berth 605 and the Container Handling Facility and be transported into the port by surface runoff. Windblown coal dust is presently effectively trapped by vegetation and soil in the land part of the Berth 605 Project footprint.								
Without Mitigation	2	1	1	4	4	32	Moderate	(-)
With Mitigation	2	1	1	4	4	32	Moderate	(-)
Mitigation Measures	<ul style="list-style-type: none">■ Include engineering designs in quay to trap suspended particulate matter and hazardous substances in surface runoff (or at least the first flush event) so this matter does not enter the ports aquatic environment.■ Ensure quay and other impervious surfaces are regularly cleaned to limit the mobilisation of accumulated particulate matter and contaminants into the port by surface runoff. The material should be discarded at a registered landfill site.■ Hydrocarbons, hydraulic fluids, and so on that may be leaked from quayside equipment and machinery should be cleaned up timeously. Standard Operating Procedures for spill cleanup should be defined, and spill cleanup kits should be available at the quayside and CHF.							

Table 7-45 – Introduction of artificial light to port aquatic environment

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Artificial light at night is known to have several (largely negative) consequences for aquatic biological resources (including birds), although quantitative studies on invertebrates and fish are limited (but the body of information is growing rapidly). The impacts of artificial light principally involve a disruption to the natural circadian rhythm (light-dark body clock) of biological resources and their disorientation by or attraction to artificial light.								
Without Mitigation	2	1	1	4	4	32	Moderate	(-)
With Mitigation	1	1	1	4	4	28	Low	(-)
Mitigation Measures	Mitigation measures for some artificial light sources on the quayside are relatively easy, but for work safety reasons may be difficult for other light sources. If practical, mitigation measures may include: <ul style="list-style-type: none">■ Use directional lighting that faces away from the port aquatic environment.■ Use light shielding to direct lighting downward to the quay surface.■ Limit lighting that is not essential for safety purposes at night to times when it is required (e.g. when a vessel is being loaded/offloaded).■ Use blackout blinds on office windows.■ The crew of dredging and/or dredging support vessels must keep a lookout for and document the presence of megafauna that might be attracted to the vessels when artificial lights are turned on during dredged material disposal at the registered offshore disposal site off Richards Bay.							

7.6 DREDGING AND DREDGE DISPOSAL

Dredging represents one of the principal construction activities associated with the proposed development and was therefore assessed in detail through specialist investigations, including sediment quality assessments, dredge material disposal modelling, marine ecology studies and hydrodynamic investigations. The assessment considered both direct impacts associated with dredging activities within the Port of Richards Bay and indirect impacts associated with the transport and disposal of dredged material at the authorised offshore disposal site. Sediment and soil quality investigations confirmed the presence of contaminant concentrations associated with long-term port activities within parts of the development footprint. However, sediment toxicity testing demonstrated that the identified contaminants are not readily bioavailable and are not expected to result in significant toxic effects during dredging, transport or disposal operations. Specialist investigations accordingly concluded that the material is suitable for disposal at the authorised offshore disposal site, subject to the applicable regulatory approvals. Environmental monitoring during dredging and disposal activities will focus on key indicators including suspended sediment concentrations, turbidity, sediment

deposition, water quality and relevant biological receptors. Monitoring data will be used to verify impact predictions and facilitate adaptive management should unforeseen impacts arise.

A Dredging and Dredge Material Disposal Modelling Study was undertaken by WSP (2025). The primary aim of this study was to inform the impacts on the estuarine/marine environment as discussed in Section 7.5 above.

Apart from the impacts identified in Section 7.5 above, the Dredging and Dredge Material Disposal Modelling Study also identified two additional impacts associated with dredging and dredge disposal:

1. Visual impacts of dredging plumes in surface water are negligible therefore not further assessed in this EIR.
2. Climate change may affect some of the environmental baseline conditions and also the coastal processes relevant to this study which has been assessed as part of the Climate Change Impact Assessment.

7.6.1 VISUAL

The visual impacts of dredging plumes in the surface waters within the port are predicted to be negligible with visual plumes only very rarely observable beyond the 600 Series Basin. However, the increased turbidity at depth is likely to increase the surface plumes from shipping and berthing activities within the 600 Series Basin and its immediate surrounds.

Elevations in turbidity exceeds the threshold assumed for aesthetic (visual) impacts for large distances SW and more so NE of the disposal site resulting from the re-suspension of sediments and from the disposal site and the mixing of such sediment throughout the water column. The elevation of turbidity and TSS concentrations in the surface layers are associated with storm conditions when there is a general elevation of turbidity and TSS concentrations in the water column that are likely largely to mask the presence of such dredging-related plumes.

Based on the negligible visual impacts, it was not further assessed in this EIR.

7.6.2 CLIMATE CHANGE

Climate change may affect some of the environmental baseline conditions and also the coastal processes of relevant to dredging and dredge disposal. However, the anticipated changes in key processes such as sea level and storminess will be extremely limited and largely not easily discernible from natural variability over the short to medium term when potential dredging impacts associated with the Berth 605 dredging activities are likely to be observed.

The issues around long-term climate change effects on wave climate and possible shoreline change are addressed in a companion Wave Climate and Shoreline Change specialist study (WSP, 2025) and discussed in Section 7.7 below.

7.7 WAVE CLIMATE AND SHORELINE CHANGE

The Wave Climate and Shoreline Change Study was undertaken by WSP (2025). This specialist study assessed the potential impacts of dredged material disposal at the existing Richards Bay offshore disposal site, focusing primarily on expected changes to the inshore wave climate, resulting alterations in sediment transport, and potential shoreline changes.

The Wave Climate and Shoreline Change Assessment considered the potential influence of dredged material disposal at the authorised offshore disposal site on local wave conditions, longshore sediment transport and shoreline behaviour. The assessment further considered the potential implications of these changes for coastal infrastructure, shoreline stability and long-term coastal management within the Richards Bay area.

The findings of the Wave Climate and Shoreline Change Assessment should be read together with the Climate Change Impact Assessment, as future shoreline behaviour will be influenced by both local sediment transport processes and longer-term climate-related factors such as sea-level rise, storm surge events and changing wave conditions.

7.7.1 CHANGES IN EXTREME WAVE CONDITIONS

To assess changes in the wave climate, 87 representative wave conditions, covering wave height, period, direction, and frequency, were synthesized from the offshore wave time series. Extreme wave conditions were also selected to evaluate how bathymetric changes from dredge disposal might influence nearshore extremes in wave conditions. To ensure directional coverage, the highest wave conditions per 22.5° sector were chosen, including both long and short-wave periods where relevant.

Using this representative extreme wave climate, two scenarios were simulated: the existing bathymetry and the post-disposal bathymetry. For the latter, the bulked dredge volume of ~4.3 million m³ was spread across the disposal site resulting in an even -13.5 m CD across the site with a mound in the northern area of the disposal site where the dredge disposal has been concentrated in recent times. This results in elevation of the seabed (i.e., decrease in water depth) by up to 7 m in the deeper waters of the disposal site.

Wave data at 10 m depth opposite the breakwater showed that, under all extreme scenarios, wave height increases were no more than 5 cm. Even under more severe conditions, increases are unlikely to exceed 10 cm, suggesting minimal impact on breakwater stability.

Based on the above, changes in extreme wave conditions are expected to be negligible and therefore not assessed further in this EIR.

7.7.2 SHORELINE CHANGE

The assessment evaluated how dredge spoil disposal might alter northerly longshore sediment transport along the coastline from the far-southern beach to the northern beach. The impact of dredge spoil disposal on longshore sediment transport varies along the coastline, with most changes expected to be negligible therefore not further assessed in this EIR.

The central areas of the southern beach (Mhlathuze estuary mouth to the south breakwater) could experience detrimental erosion since the beach is currently narrow. However, this risk is mitigated to some extent by the rapid natural redistribution of dredged material, making the model results conservative for the Berth 605 project alone.

The assessment adopted a deliberately conservative approach by assuming that the full volume of dredged material remains on the offshore disposal site for an extended period. Historical monitoring has demonstrated that a substantial proportion of dredged material is naturally redistributed from the disposal site over time, meaning that the predicted shoreline responses represent a conservative assessment of potential long-term impacts.

Table 7-46 – Impacts of dredge spoil disposal on the central areas of the Southern Beach (Mhlathuze estuary mouth to the south breakwater)

Potential Impact: Erosion as a result of dredge spoil disposal	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	5	4	56	Moderate	(-)
With Mitigation	2	2	3	3	3	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Conduct annual satellite-based shoreline monitoring, particularly along the southern beach. If beach width reduces to 20–30 m, consider targeted beach nourishment. Reassess cumulative impacts if multiple dredging projects are planned in close succession. 							

The specialist assessment concluded that disposal of dredged material associated with the proposed Berth 605 development may result in minor localised changes to wave climate, sediment transport and shoreline behaviour. However, the predicted effects are generally small in magnitude, remain manageable through monitoring and adaptive management measures, and are unlikely to result in significant impacts on breakwater stability, coastal infrastructure or shoreline functioning. No fatal flaws were identified from a wave climate or shoreline change perspective.

7.8 WETLANDS AND RIVERS

7.8.1 CONSTRUCTION AND OPERATIONAL PHASES

Freshwater wetland systems identified during the specialist investigations occur within the broader study area (west of Urania Road). They are located outside of the direct Berth 605 development footprint and will not be directly impacted by the proposed project..

According to the layout of the proposed Berth 605 project area, there are no direct impacts on the wetlands delineated as a result of the proposed activities for both the construction as well as the operational phase of the project. In addition, there are no rivers located within 1km of the project area.

Considering the location of the wetlands, which are upgradient of the proposed activities (although within 500 m of the wetlands) and the existing infrastructure within the study area which limits the potential migration of impacts, the overall risk significance to the delineated wetlands is considered negligible.

Impacts on the surrounding wetlands will only exist if the construction activities are extended into the surrounding receiving environment, this is considered the worst-case scenario as the wetlands are located outside the immediate footprint of the project area.

The freshwater assessment confirmed that freshwater wetland losses do not contribute to the biodiversity compensation requirements associated with the project. Biodiversity compensation

calculations were therefore focused on estuarine, mangrove, shoreline and terrestrial habitat losses directly attributable to the proposed development.

Table 7-47 – Impacts on wetlands outside of the Berth 605 project footprint

Potential Impact: Removal of vegetation in wetland environments. Potential contamination of wetlands. Excavations within the wetland environment.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	5	3	39	Moderate	(-)
With Mitigation	1	2	3	5	1	11	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> The identified wetlands are situated outside of the Berth 605 project area. If the project area is adequately demarcated, there will be no impact to the delineated wetlands. The contractor must be made aware of the wetland areas which must be considered as no go areas. An Environmental Control Officer (ECO) must be appointed to monitor construction related activities. 							

7.9 TERRESTRIAL BIODIVERSITY

7.9.1 PROJECT CONTEXT AND BIODIVERSITY SENSITIVITY

The Berth 605 development footprint lies predominantly within an area identified as a CBA 1 Irreplaceable as defined by the KwaZulu-Natal Biodiversity Sector Plan (2016). The site also falls within a Key Biodiversity Area (Richards Bay Coast) of international significance and overlaps with Priority Areas for Protected Area Expansion. Importantly, these categorisations cover much of the PoRB area and adjacent estuary. The affected landscape supports Endangered and Near Threatened ecosystems, including:

- Mangrove Forests (Endangered)⁴,
- Maputaland Coastal Grassland (Endangered),
- Coastal Forest (Near Threatened),
- Estuarine and intertidal habitats of high ecological value.

Field surveys and specialist assessments confirmed the presence of numerous SCC, including protected tree species, threatened flora, mammals, reptiles, amphibians, birds, and invertebrates. Of particular importance is a tidally influenced pool within the project footprint that has developed into a highly productive estuarine habitat supporting nursery functions for fish and crustaceans. This tidally

⁴ Although mangroves are acknowledged to become invasive within the Port of Richards Bay.

influenced pool is on the site of previous disturbance but has re-established over a period of approximately 20 years.

Although the project footprint occurs within a CBA 1: Irreplaceable area, a Key Biodiversity Area and a Priority Area for Protected Area Expansion, specialist investigations confirmed that substantial portions of the development footprint have been previously disturbed through historical port development activities. The biodiversity assessment therefore considered both the strategic conservation importance of the affected habitats and their historical disturbance context when evaluating impact significance and environmental acceptability.

Historical imagery and specialist investigations confirm that the Berth 605 footprint has been subjected to previous dredging, excavation, stockpiling, land reclamation and construction activities associated with earlier phases of development within the Port of Richards Bay (see Section 2.2). The current vegetation communities, mangrove habitats and tidally influenced systems occurring within the footprint therefore represent ecological succession and habitat re-establishment within a historically disturbed environment rather than the persistence of undisturbed reference ecosystems.

Following consultation with relevant authorities and stakeholders, the Biodiversity Compensation Plan was revised to achieve an overall compensation ratio of approximately 1:1. The compensation area comprises approximately 11 ha and includes terrestrial, mangrove, shoreline and estuarine habitat compensation measures together with habitat creation initiatives aimed at replicating ecological functions lost as a result of the proposed development.

The proposed compensation area will be secured through appropriate legal protection mechanisms, including the registration of a conservation servitude and associated management commitments. Long-term monitoring, habitat management and adaptive management measures will be implemented to ensure the ecological objectives of the Biodiversity Compensation Plan are achieved over time.

7.9.2 APPLICATION OF THE MITIGATION HIERARCHY

The mitigation hierarchy entailing avoidance, minimisation, rehabilitation, and ultimately compensation for residual biodiversity impacts was applied. While project design has sought to avoid the most sensitive “no-go” areas where feasible and to minimise disturbance through construction controls and rehabilitation measures, residual impacts to biodiversity remain unavoidable due to the nature and location of the development which is an extension to the existing Berth 600 series. Residual impacts include:

- Permanent loss of high-value terrestrial habitats,
- Loss of intertidal habitats which include the tidal pool,
- Fragmentation and loss of habitat for fauna SCC,
- Direct and indirect impacts on estuarine and marine ecological functioning.

Notwithstanding the implementation of avoidance, minimisation and rehabilitation measures, residual impacts associated with habitat loss remain unavoidable due to the nature of the proposed berth and basin development. Biodiversity compensation therefore represents the final step in the application of the mitigation hierarchy and forms an integral component of the environmental acceptability of the proposed development.

7.9.3 RESIDUAL IMPACTS AND COMPENSATION REQUIREMENTS

The habitat loss requiring compensation of coastal forest (5.17 ha) and coastal grassland (3.78 ha) is 8.95 ha, in addition to which 2.06 ha of tidal pool and mangrove habitat will be lost.

For estuarine impacts, particularly the loss of the tidally influenced pool, the report strongly recommends on-site habitat creation through the excavation and tidal connection of new shallow estuarine areas, designed to replicate the ecological structure and function of the lost habitat.

7.9.4 CANDIDATE COMPENSATION SITE AND FEASIBILITY

The compensation approach entails the integration of new habitat creation into the Berth 605 final design. Consequently, the compensation area lies immediately to the south south-west of the proposed Berth 605 development. This site aligns strategically with conservation planning objectives. The site contains terrestrial habitat of similar type and recovery stage as it has also been previously disturbed during the construction of the Berth 600 and Berth 300 series approximately 20 years ago. The compensation proposal includes engineered intervention to recreate tidal pool habitat of similar size, the recreation of the shoreline and associated mudflat habitat creation and incorporation of grassland and forested habitat areas south of the proposed Berth 605.

7.9.5 COMPENSATION IMPLEMENTATION AND MANAGEMENT

An approach is recommended which seeks to re-engineer key estuarine habitat will be lost, supported by long-term management, rehabilitation of modified areas and alien invasive plant control. The proposed compensation plan includes a commitment to long-term ecological monitoring. The compensation site will be included within the Port Development Framework Plan as a no-go development area to ensure that it is secured from development.

7.9.6 CONSTRUCTION PHASE

Table 7-48 – Direct loss and disturbance of natural habitat and associated flora SCC

Potential Impact: Loss and fragmentation of natural habitat as a result of vegetation clearing and earthworks	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	3	4	5	5	85	Very High	(-)
With Mitigation	5	3	4	4	4	80	High	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> The surrounding area must be surveyed prior to construction/laydown area establishment to determine the presence of nesting birds and sensitive fauna and these must be cordoned off. A qualified, competent ECO should be on site during construction to safely remove all slow-moving (chameleons and tortoises) and burrowing (moles, lizards and snakes) species from the path of the excavator and relocated to a conservation area. 							

Potential Impact: Loss and fragmentation of natural habitat as a result of vegetation clearing and earthworks	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
						<ul style="list-style-type: none"> The ECO must make the workforce aware that the sandspit and Kabeljous Flat are no go areas i.e. these areas may not be utilised in any way to support or facilitate construction/mooring activities, storing of materials, etc. No animals (birds, reptiles, and mammals) are to be disturbed unnecessarily, and no animals are allowed to be shot, trapped or caught/hunted for any reason. 	

Table 7-49 – Establishment and spread of AIP

Potential Impact: Establishment and spread of AIP	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	3	3	5	5	80	High	(-)
With Mitigation	3	2	2	4	3	33	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ The existing AIP species management programme must be expanded, to include the active control of alien invasive species that may establish/spread as a result of proposed project activities.■ Alien and invasive species management to be prioritised for the following alien and invasive species control areas within the study area:<ul style="list-style-type: none">• Areas where vegetation cover is disturbed.• Areas where soils imported from external sources are applied.• All rehabilitated areas.• Areas within the development area that are already invaded by alien species.							

Table 7-50 – Injury and mortality of reptile and mammal SCC

Potential Impact: Injury and mortality of reptile and mammal SCC	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	3	4	5	5	85	Very High	(-)
With Mitigation	4	4	4	5	4	68	High	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Employees and contractors should be made aware of the presence of and rules regarding fauna through suitable induction training and on-site signage. Movement across the project area should be facilitated by providing suitably sized gaps in fencing and/or culverts/passageways under roads for fauna. The surrounding area must be surveyed prior to construction/laydown area establishment to determine the presence of nesting birds and sensitive fauna and these must be cordoned off. A qualified, competent ECO should be on site during construction to safely remove all slow-moving (chameleons and tortoises) and burrowing (moles, lizards and snakes) species from the path of the excavator and relocated to a conservation area. Search and rescue survey for all fauna SCC should also be conducted within the marked footprints prior to the commencement of construction to determine the number of potentially impacted animal SCC. A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons. The ECO/EO must ensure that the contractor is aware that the sandspit and Kabeljous Flat are no go areas. 							

Table 7-51 – Loss of floral SCC

Potential Impact: Loss of floral SCC as a result of vegetation clearing and earthworks	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	4	5	5	4	76	High	(-)
With Mitigation	3	2	2	4	3	33	Moderate	(-)

Potential Impact: Loss of floral SCC as a result of vegetation clearing and earthworks	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Mitigation and Management Measures	<ul style="list-style-type: none"> To prevent loss of flora of conservation concern beyond the direct disturbance footprint, prior to any vegetation clearing, the development footprints should be clearly marked out. Vegetation clearing should be restricted to the proposed project footprints only, with no clearing or disturbance permitted outside of these areas. A search and rescue survey for all flora SCC should be conducted within the marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. This will form part of a protected plant walkdown undertaken by a specialist ECO. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC to adjacent areas of natural habitat. It is recommended that no large plant specimens should be translocated prior to developing the project area, unless previously proven success is confirmed. As an alternative mitigation measure, the budget that would have been allocated to translocation of large plant specimens. 						

7.9.7 OPERATIONAL PHASE

The impacts associated with the operational phase of the project include the injury and mortality of faunal SCC as a result of the movement of machinery and vehicles and Increased sensory disturbance from dust or noise generation.

Table 7-52 – Injury and mortality of fauna SCC due to traffic

Potential Impact: Injury and mortality of fauna SCC due to traffic	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Without Mitigation	5	5	2	4	5	68 High	(-)
With Mitigation	3	4	2	3	5	42 Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> An incidence register should be maintained throughout all phases of the Project detailing any wildlife mortalities/injuries caused by on-site activities. The register should be used to identify additional biodiversity management requirements. 						

Potential Impact: Injury and mortality of fauna SCC due to traffic	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	<ul style="list-style-type: none"> No animals may be hurt or killed during any phase of the development. It will form part of the ECO duties to record and relocate any species at risk to adjacent areas of natural habitat within the Project area once development commences. Rehabilitation of all disturbed areas, specifically the lay down areas, to be completed with the goal of rehabilitation to return disturbed areas to an acceptable state. Speed limits at the port must be adhered to at the new Berth 605 site. 						

7.10 AVIFAUNA

7.10.1 CONSTRUCTION AND OPERATIONAL PHASES

The avifaunal assessment identified the Port of Richards Bay as an area of regional avifaunal importance supporting a high diversity of resident and migratory bird species. The broader harbour environment forms part of a landscape that includes the Richards Bay Game Reserve Important Bird and Biodiversity Area and supports numerous waterbird species, including species of conservation concern.

Specialist investigations confirmed that the Berth 605 footprint is located within a historically transformed section of the Port of Richards Bay and consists primarily of secondary woodland, grassland and modified estuarine habitats that developed following previous port construction activities. The avifaunal assessment therefore focused primarily on the ecological functions currently supported by these habitats rather than their historical origin.

The avifaunal assessment concluded that the principal impacts associated with the proposed development relate to habitat transformation rather than direct mortality of birds. In particular, the mangrove habitat, tidally influenced pool and semi-natural shoreline within the project footprint provide habitat utilised by a range of waterbird species and therefore represent the most important avifaunal receptors affected by the proposed development.

The Biodiversity Compensation Plan developed during the Environmental Impact Assessment process incorporates habitat creation, habitat restoration and habitat management measures intended to compensate for the loss of avifaunal habitat associated with the development footprint.

7.10.1.1 Impacts on terrestrial avifaunal habitats

The terrestrial avifauna habitats in the Berth 605 project footprint and immediately surrounding areas all comprise anthropogenically transformed areas. Some of these areas currently support infrastructure such as roads and buildings, but the majority comprises secondary grassland and woodland that has established on ground previously cleared and otherwise transformed, e.g. old dump sites, during the initial creation of the Port of Richards Bay.

These sites currently support a terrestrial avifauna typical of such transformed and secondary habitats. These are typically common and widespread species, with no Red Data species (equivalent to Species of Conservation Concern) reliant on these habitats. The Berth 605 development is therefore not of significant avifaunal concern relevant to terrestrial bird species.

7.10.1.2 Impacts on aquatic avifaunal habitats

Mangroves patch and intertidal mudflat

The small, artificially created mangrove patch surrounding a small intertidal mudflat in the Berth 605 project area (**Figure 7-1**) comprises potential habitat for the Mangrove Kingfisher, a Red Data species. This species was not encountered in the Berth 605 project area during the fieldwork for this assessment, but it is a winter visitor to the area and the fieldwork for this assessment was restricted to the summer period when the species is absent.

When this artificially created intertidal mudflat area was initially established it supported foraging shorebirds including the Curlew Sandpiper (pers. obs), another Red Data species. This mudflat though is now too closely encircled by the mangrove trees that have grown up around the mudflat to comprise suitable shorebird habitat.

The mangrove patch and associated intertidal mudflat would be entirely transformed by the Berth 605 development, initially being used as a temporary stockpile area and subsequently dredged to deep open water allowing access by ocean-going container ships.⁵

⁵ Mangroves have become invasive at the PoRB and will not be replaced but will be allowed to grow out naturally



Figure 7-1 - The Berth 605 project footprint showing: 1 - the artificially-created mangrove patch encircling an intertidal mudflat, and 2 – the extent of semi-natural shoreline.

7.10.1.3 Shorelines

The semi-natural shorelines in the Berth 605 project area (**Figure 7-1**) will be transformed by the dredging process and largely replaced by artificial concrete quaysides and rock revetment, although some semi-natural shoreline may apparently be retained/created along the southern fringe of the Berth 605 development area. The total length of semi-natural shoreline to be transformed is about 960 m.

Several species of shorebird were recorded using the existing semi-natural shorelines in the Berth 605 project area during the fieldwork for this assessment, i.e. White-fronted Plover, Common Sandpiper, Eurasian Whimbrel and Water Thick-knee. It can be expected that a wider range of shorebirds (and other waterbirds) use this stretch of shoreline at least occasionally. Some of these are Red Data species, e.g. among the shorebirds Grey Plover, Eurasian Curlew, Bar-tailed Godwit, Ruddy Turnstone, Red Knot and Curlew Sandpiper, two of which were recorded in the adjacent Sandspit Island area during the fieldwork for this assessment.

Table 7-53 – Transformation of the terrestrial avifaunal habitat

Potential Impact: Transformation of the terrestrial avifaunal habitat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	1	3	5	3	39	Moderate	(-)
With Mitigation	4	1	3	5	3	39	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Given that the Berth 605 development is not considered of significant avifaunal concern relevant to terrestrial bird species, no mitigation measures are considered necessary in this regard. 							

Table 7-54 – Transformation of mangrove patch and associated intertidal mudflat (tidal pool) (post offset)

Potential Impact: Transformation of mangrove patch and associated intertidal mudflat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	1	3	5	5	70	High	(-)
With Mitigation	2	1	3	5	3	33	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Considering the mitigation hierarchy the impact on the mangrove and intertidal mudflat cannot be avoided, minimized or rehabilitated as the project requires that the entire mudflat and mangrove area be removed to achieve the depth for the berth, then the only appropriate measure in these circumstances would appear to be compensation, especially given that this area formally lies within an irreplaceable Critical Biodiversity Area and within an estuarine functional zone. The Biodiversity Compensation Plan, when implemented will result in the south-southwest area of the project being modified to compensate for the loss of terrestrial biodiversity and the marine environment including the mudflat. 							

Table 7-55 – Transformation of the semi natural shoreline (post compensation)

Potential Impact: Transformation of the semi natural shoreline	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	1	3	5	5	65	High	(-)
With Mitigation	2	1	3	5	3	33	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> A very similar position as to that discussed above relevant to the mangrove patch pertains to the 960 m stretch of semi-natural shoreline present in the Berth 605 project area. It seems unavoidable that this shoreline will be transformed by the development through dredging and the construction of concrete quaysides and rock revetment. As such, the loss of this critical habitat also calls for compensation. The simplest method of compensation for the lost shoreline is to modify the southern edge of the development area during the construction phase to create the necessary length of semi-natural shoreline, similar to the suggestion above related to compensating for the loss of terrestrial biodiversity and the marine environment include the mudflat. 							

Table 7-56 – Disturbance to the sandspit island

Potential Impact: Disturbance to the sandspit island	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	4	1	10	Very Low	(-)
With Mitigation	1	2	3	4	1	10	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Due to the Berth 605 project area being considered distant enough from the Sand-spit Island not to significantly impact the island or disturb its associated waterbirds, no mitigation measures are considered necessary. 							

Table 7-57 – Disturbance to the Kabeljou Flats

Potential Impact: Disturbance to the Kabeljou Flats	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	4	1	10	Very Low	(-)
With Mitigation	1	2	3	4	1	10	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Similar to the position with the Sand-spit Island, the Berth 605 development is considered sufficiently distant, and shielded, from the Kabeljou Flats intertidal mudflat so as not to significantly impact this habitat or disturb its associated waterbirds, and as such no mitigation measures are considered necessary. 							

7.11 ARCHAEOLOGY AND CULTURAL HERITAGE

From a terrestrial heritage perspective, there were no resources of archaeological or cultural significance identified at or surrounding the project site. For marine heritage, due to the frequent maintenance dredging activities at the PoRB, underwater heritage resources are unlikely to be discovered in the project area. In addition, the specialist confirmed that there are no known marine heritage resources within the project footprint.

Regarding palaeontology, the area is of moderate sensitivity and unlikely to contain any fossils due to the significant anthropogenic impacts exerted onto the site.

7.11.1 CONSTRUCTION PHASE AND OPERATIONAL PHASES

Table 7-58 – Potential impact on terrestrial and marine heritage resources

Potential Impact: Potential impact on terrestrial heritage and marine resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Without Mitigation	0	0	0	0	0	NO IMPACT	(-)
With Mitigation	0	0	0	0	0	NO IMPACT	(-)
Mitigation and Management Measures	<div>■ No heritage resources were identified in the project area, however the Chance Find Protocol must be implemented if any resource is discovered during construction activities.</div>						

Table 7-59 – Potential impact on terrestrial palaeontological resources

Potential Impact: Potential impact on terrestrial palaeontological resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	5	1	11	Very Low	(-)
With Mitigation	1	2	3	5	1	11	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. Since there is an extremely small chance that fossils from the KwaMbonambi Formation may be disturbed, a Fossil Chance Find Protocol must be implemented. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low. 							

7.12 VISUAL

Since the proposed development is situated within the PoRB, the landscape character is considered industrial with numerous anthropogenic activities actively taking place, therefore the sense of place of the area is that which is associated with an industrialised area as well as that associated with a harbour (continuous movement of vehicles and people).

Visual impacts are only experienced when there are receptors present to experience the impact and with the sparse receptors present within the receiving environment and given the location of the proposed facility within the harbour precinct (approximately 6 km from the seashore) and where public access is limited, there are not likely many visual impacts experienced. Although the cumulative impact may be affected as the bulk appearance of port infrastructure will increase. The outcome of the field assessment indicated that the subtropical vegetation of the receiving environment assists in screening the view toward the proposed development.

Given the above conclusion, the potential visual impact of the proposed infrastructure is likely to be minimal to negligible and will not be significantly visually intrusive on the receiving environment from where numerous observers could be impacted.

7.12.1 CONSTRUCTION PHASE AND OPERATIONAL PHASES

Table 7-60 – Potential visual impacts

Potential Impact: Potential visual impacts	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	5	1	11	Very Low	(-)
With Mitigation	1	2	3	5	1	11	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> It is recommended, that as far as possible and as per the design development footprint the existing vegetation, with particular reference to tall trees and larger shrubs, in the vicinity of the proposed development should be retained, to ensure that the screening ability provided by the vegetation is not jeopardised. Should it be deemed possible and in line with the health and safety protocol of 24hour operations, it is recommended that security lighting required at night, use minimum lumen or wattage in light fixtures. Furthermore, making use of motion detectors on security lighting, where possible, ensures that the site will remain in relative darkness, until lighting is required for security purposes. Up-lighting of structures and bright flood lights must be avoided where possible, with lighting installed at downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass. As far as practically possible, no naked / unshielded light sources are to be directly visible from a distance. Only reflected light should be visible from outside the proposed development area. 							

7.13 NOISE

Baseline monitoring indicated current day-time noise levels were below the respective SANS guideline rating level at all of the monitoring locations. At night, average noise levels at two of the five monitoring locations (Pt 02 (onsite south) and Pt 05 (Arboretum residential)) exceeded the respective guideline rating level. From the daytime and night-time monitoring campaigns it is evident that the current noise climate surrounding the Project site is predominantly anthropogenic in nature (traffic and port-related), with influences from natural sources like birds and insects.

During the operational phase of the project, day-time noise levels at the onsite monitoring locations (including Rec 01 (Richards Bay Seafarers Club)) are anticipated to increase by between 0.6 and 11.8 dB(A). Cumulative noise levels at all these locations remain below the industrial guideline rating level (70 dB(A)). Night-time noise levels at the onsite monitoring locations (including Rec 01 (Richards Bay Seafarers Club)) are anticipated to increase by between 0.8 and 12.6 dB(A) with the operation of the Project. The larger increase at night-time is attributed to the lower baseline noise levels at this time.

Cumulative night-time noise levels at all these locations are predicted to exceed the industrial guideline rating level (60 dB(A)). It must be noted that these locations are all onsite, within the site boundary and not on the fence line, where compliance applies. Furthermore, there are no sensitive receptors within the immediate vicinity of the site.

As a receptor location with regular occupants, the Richards Bay Seafarers Club (Rec 01) will experience the largest increase in noise levels (+11.8 dB(A) during the day and +10.5 dB(A) at night). Such a change is above the 7 dB(A) threshold for annoyance as per the Noise Control Regulations, resulting in medium to strong community response, with complaints anticipated. It is noted, however, that although the Richards Bay Seafarers Club is not considered an industrial activity itself, it is located in an area zoned for industrial activities, so the occupants would essentially be accustomed to industrial type ambient noise levels. As such, this location is not classified as a “sensitive receptor”.

Predicted day and night-time noise levels at the only sensitive receptor (Rec 05 – Arboretum) are well below the respective urban guideline rating levels. With the operation of the Project, noise levels are predicted to increase by between 0.2 and 0.9 dB(A), resulting in “little” community/group response. It is noted that such increases are well below the 7 dB(A) threshold for annoyance as per the Noise Control Regulations. Such increases are also well below the IFC’s more stringent threshold for annoyance of 3 dB(A). As such, these increases are likely to go unnoticed.

Based on both the day and night-time results presented here, acoustic impacts on sensitive receptors due to the operation of the proposed project are not predicted and noise-related complaints from receptors are not anticipated. As such, it is recommended that the project be authorised with no special acoustic-related conditions applicable.

7.13.1 CONSTRUCTION PHASE

Table 7-61 – Potential impact on sensitive receptors during construction

Potential Impact: Potential impact on sensitive receptors during construction	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	1	1	2	16	Low	(-)
With Mitigation	2	2	1	1	1	6	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">Ensuring equipment with the lowest sound power level specifications are selected for the project where feasible.Installing suitable mufflers on heavy vehicle engine exhausts.Installing acoustic enclosures for equipment causing radiating noise.Locating noise sources in less sensitive areas to take advantage of distance and shielding where feasible.Developing a mechanism to record and respond to complaints.							

7.13.2 OPERATIONAL PHASE

Table 7-62 – Potential impact on sensitive receptors during operation

Potential Impact: Potential impact on sensitive receptors during operation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	1	4	2	18	Low	(-)
With Mitigation	2	1	1	4	1	8	Very Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Developing a mechanism to record and respond to complaints. Ensuring equipment with the lowest sound power level specifications are selected for the project where feasible. Installing suitable mufflers on engine exhausts. Installing acoustic enclosures for equipment causing radiating noise. 							

7.14 WASTE AND CHEMICAL POLLUTION

Solid waste will be generated during the construction phase of the project. Waste produced will include rubble, metal materials, plastic waste, general litter and excavated and dredged material that will require disposal. Excavated and dredged material is assessed under Section 7.15.

If not properly managed and contained, these materials may find their way into the port, sensitive littoral habitats or ultimately into the open marine environment. Floating or submerged solid waste (especially plastics) in the marine environment can be transported over vast distances through the ocean currents and therefore, the area of impact could potentially be extensive. Debris in the port and ocean may have a lethal/sublethal impact on marine fauna, with potentially severe consequences for rare and endangered species such as turtles and dolphins.

Poor management of the laydown area, the stringing yard and its operations (e.g., waste management facilities) and construction areas (e.g. towers) may also lead to contamination of the immediate surrounding environment. Waste management, in terms of the handling, storage and disposal of general, construction and hazardous waste, must continue for the duration of the construction phase. The possibility of impacts occurring is high if waste is not properly managed and the intensity of these impacts may be severe and expensive or time consuming to mitigate.

There is also a potential for accidental spills of hydrocarbons and oils from construction vehicles, machinery and barges as well as spills from other hazardous substances such as concrete. These may enter the bay as contaminated run off or direct spills into the bay as a result of poor handling and improper spill management.

7.14.1 CONSTRUCTION PHASE

Table 7-63 – Potential impacts of improper waste management during construction

Potential Impact: Potential impacts of improper solid and chemical waste management during construction	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	5	5	4	64	High	(-)
With Mitigation	2	1	3	2	2	16	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> Management of all site activities and site camp/laydown area must be undertaken in accordance with a site specific EMPr. Strict adherence to TNPA pollution, emergency, and health and safety protocols as well as other applicable maritime legislation and policies. Construction workers and operational staff to adopt best practice waste minimisation procedures. Implement the correct handling and disposal procedures for general and hazardous waste. Reduce the amount of waste generated from the construction phase by means of efficient operations and recycling of general waste. Good housekeeping to be done daily of the intertidal area and surrounding port waters. No mixing of concrete in the intertidal zone. No dumping of construction materials or excess concrete in the intertidal and subtidal zones. Wind screening (e.g., fine mesh shade cloth fencing, or solid fencing) must be installed to prevent excessive wind-blown sand and light-weight solid waste (e.g., litter) entering the estuary. Conduct an environmental awareness programme amongst contracted construction personnel about sensitive estuarine/marine habitats and good housekeeping. Existing ablution facilities will be used by the contractor, therefore no additional ablution facilities will be erected for this project. The laydown area must be adequately protected against adverse weather conditions, particularly the chemical storage areas, to prevent erosion and run-off of contaminants into the port. Correct handling, storage and disposal procedures must be followed (e.g., bunded storage areas to contain 110% of volume). A spill management plan must be compiled and implemented. In the event of a spill, a penalty must be issued and the 'Polluter Pays' principle must be applied for clean-up operations and rehabilitation, if necessary. 							

7.14.2 OPERATIONAL PHASE

During the operational period, there is the potential for leaks or accidental spills of oils and grease from the vessels and other supporting equipment /plant and other harmful substances and chemicals used during operations and overall maintenance. This may enter the water of the port directly as a result of incorrect handling and improper spill management. Any spills and leaks of hazardous substances will have a negative effect on the immediate estuarine/marine water quality and potentially the most ecologically significant habitats of the bay including the open ocean under severe circumstances. Accidental spills, regardless of volume or concentration, could lead to significant environmental damage.

Table 7-64 – Potential impacts of spills during operation

Potential Impact: Potential impacts of spills during operation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	5	2	5	65	High	(-)
With Mitigation	2	1	3	2	2	16	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">▪ Strict adherence to TNPA pollution, emergency and health and safety protocols as well as other applicable maritime legislation and policies.▪ Emergency response teams must be trained in handling spills effectively and timeously.▪ A requirement to report environmental accidents and emergencies immediately as per the Transnet SOP.▪ For major incidents, an investigation as per the Transnet SOP must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future.							

7.15 SOCIO ECONOMIC

The PoRB is an important economic centre for the region and the country, serving as a shipping port for coal, aluminium and minerals. The growth and increase in activities at the port could positively and negatively impact the surrounding businesses and communities and social change processes.

There would be an increased demand for goods and services related to the construction phase. This will stimulate growth within the local and regional construction and service sectors. It is anticipated that a significant portion of the wages earned by construction workers will likely be spent near the project area. This expenditure will increase the revenue flows in the surrounding communities, thus acting as a catalyst for growth in the formal and secondary economy. Additionally, workers sourced from the surrounding communities are foreseen to spend an even larger proportion of their wages within the local communities, further adding to the flow of revenue.

As a positive impact, rated as Moderate before mitigation, the impact's significance rating is improved but remains Moderate after mitigation. Apart from the obvious positive economic impact once the project is operational, other impacts identified include impact on local businesses and economics, increased traffic at and around the project area and the potential to increase crime within and around the port.

7.15.1 CONSTRUCTION PHASE

Table 7-65 – Influx of job seekers during construction

Potential Impact: Influx of job seekers during construction which could result in increased crime in the area as well as unrest between the local workforce and new job seekers from outside the area	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	4	4	4	56	Moderate	(-)
With Mitigation	2	2	3	3	3	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> A preference should be given to the employment of local labour where feasible. The number and types of jobs need to be communicated clearly. There should be no employment at the project gate. The ULM should be engaged to prepare for the potential influx of job seekers. A complaints register should be implemented to deal with potential issues between project-induced newcomers and local people. The South African Police Services will need to be engaged if there are instances of crime related to project personnel who have come to work on the project. 							

Table 7-66 – Temporary disruption of business activities at the PoRB

Potential Impact: Temporary disruption of business activities at the PoRB	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	1	3	5	45	Moderate	(-)
With Mitigation	1	2	1	3	3	21	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> PPP: I&APs should be regularly informed through meetings and updates. This keeps everyone aware of progress and expected impacts. Concerns can be raised and addressed early. 							

Potential Impact: Temporary disruption of business activities at the PoRB	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	<ul style="list-style-type: none"> Extended Operational Hours: Offer extended hours of operation during less active periods to handle backlogged activities and mitigate delays caused by construction. 						

Table 7-67 – Temporary stimulation of the regional and local economy

Potential Impact: Temporary stimulation of the regional and local economy	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	4	5	3	4	64	High	(-)
With Mitigation	5	4	5	3	5	85	Very High	(-)
Enhancements	<div> <div></div> <ul style="list-style-type: none"> ■ Prioritising Local Procurement: Actively engaging with local suppliers for construction materials, equipment and services to ensure that a portion of the expenditure remains within the City of uMhlathuze and King Cetshwayo. This helps to bolster the capacity of regional businesses. ■ Supporting Local Workforce Development: Providing skills development and training programs for local workers to equip them for opportunities created during the construction phase. This ensures that more individuals from the local communities' benefit from the project, while also enhancing long-term employability. ■ Encouraging Small and Medium Enterprises (SMEs): Establishing partnerships with local SMEs to integrate them into the project supply chain. This can include mentoring and providing support to help these businesses meet the project's quality and capacity requirements. </div>							

Table 7-68 – Temporary creation of employment

Potential Impact: Temporary creation of employment	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	5	3	4	56	Moderate	(-)
With Mitigation	4	3	5	3	5	75	High	(-)
Enhancements	<ul style="list-style-type: none"> Local Hiring Policies: Establish and enforce policies that prioritise hiring from the local community, ensuring that residents directly benefit from the employment opportunities. Skills Development Programs: Introduce training initiatives to upskill the local workforce, particularly in construction-related trades. This enhances employability beyond the construction phase and contributes to long-term economic development Incentives for Contractors: Require contractors to allocate a percentage of their workforce to the local workforce as part of their contractual obligations, incentivising them to integrate local labour into their operations. Support for Indirect Employment: Facilitate the growth of ancillary businesses, such as catering, transportation and equipment supply, by providing information and access to contracts related to the project. Capacity Building for SMEs: Offer workshops and support programs for small and medium enterprises (SMEs) to help them meet project demands, enabling them to provide goods and services and participate in the economic opportunities generated. 							

Table 7-69 – Temporary increase in household income

Potential Impact: Temporary increase in household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	5	3	4	56	Moderate	(-)
With Mitigation	4	3	5	3	4	60	Moderate	(-)
Enhancements	<ul style="list-style-type: none"> Local Recruitment Policies: Prioritise hiring from the surrounding communities within the King Cetshwayo Municipality where feasible to ensure that economic 							

Potential Impact: Temporary increase in household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
						benefits remain localised, directly uplifting the households most in need. <ul style="list-style-type: none"> Skills Training Initiatives: Provide construction training programs for local workers to increase their employability, enabling them to secure higher-paying positions within the project and beyond. Fair Compensation Standards: Ensure that wages meet or exceed industry standards to maximise the financial benefits for workers and their households. Support for Small, Micro and Medium Enterprises (SMMEs): Engage local suppliers and subcontractors to create indirect employment opportunities, thereby increasing household incomes in ancillary sectors. 	

Table 7-70 – Temporary increase in production

Potential Impact: Temporary increase in production	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
Without Mitigation	3	3	5	3	3	42 Moderate	(-)
With Mitigation	4	3	5	3	4	60 Moderate	(-)
Enhancements						<ul style="list-style-type: none"> Prioritise Local Procurement: Source construction materials, machinery and equipment from local suppliers where feasible to boost production within the King Cetshwayo Municipality and KwaZulu-Natal, thereby maximising regional economic benefits. Support SMMEs: Engage local SMMEs in the supply chain by providing technical assistance, contract opportunities and capacity-building initiatives to enable their participation in the project. 	

7.15.2 OPERATIONAL PHASE

Table 7-71 – Employment and business opportunities

Potential Impact: Employment and business opportunities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	3	5	5	3	45	Moderate	(+)
With Mitigation	3	3	5	5	3	48	Moderate	(+)
Enhancement Measures	<ul style="list-style-type: none"> It is suggested that non-locals should only be hired when specialist skills, which are unavailable locally, are required. The following aspects in this regard should receive priority: <ul style="list-style-type: none"> Residents and communities should be employed wherever possible. Local companies should be used whenever possible, especially for unskilled and semi-skilled work. Local workers should be used and mentored as far as possible. Rigorous and transparent recruitment processes should be followed, and regular audits should be undertaken to establish whether workers are locals. 							

Table 7-72 – Regional economic development

Potential Impact: Regional economic development	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	5	5	4	68	High	(+)
With Mitigation							N/A	
Enhancement Measures	<ul style="list-style-type: none"> N/A 							

Table 7-73 – Improved trade competitiveness

Potential Impact: Improved trade competitiveness	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	4	5	5	4	72	High	(+)

Potential Impact: Improved trade competitiveness	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
With Mitigation							N/A	
Enhancement Measures	■ N/A							

Table 7-74 – Government Revenue Increase

Potential Impact: Government Revenue Increase	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	5	4	3	45	Moderate	(+)
With Mitigation							N/A	
Enhancement Measures	■ N/A							

7.16 TRAFFIC

The additional traffic on the roads at and surrounding the PoRB during construction will be short term in duration and will be associated with additional trucks on the roads to deliver construction materials. This could result in additional congestion at the access points at the PoRB. Secondary impacts related to additional traffic, is noise and dust.

Neither the new Berth 605 nor the new access road will be associated with any additional traffic during operation, traffic will however be generated by the new CHF once operational, therefore a TIA is required to address the impacts associated with traffic related to the new CHF. The TIA has therefore been deferred to the EIA Process for the CHF.

7.16.1 CONSTRUCTION PHASE

Table 7-75 – Increased traffic at and surrounding the project area

Potential Impact: Increased traffic at and surrounding the project area	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	2	3	24	Low	(-)

Potential Impact: Increased traffic at and surrounding the project area	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
With Mitigation	2	1	3	2	2	16	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none">■ Vehicles must be regularly serviced to reduce exhaust emissions and noise.■ Appropriate traffic signals at intersections to manage traffic flow will be introduced.■ Where feasible, access points closest to the Berth 605 must be used by trucks that are delivering construction materials■ Only designated roads to be used to access the construction site, trucks must be prohibited from driving along the kerbs and vegetated areas.							

8 CUMULATIVE IMPACT ASSESSMENT

The assessment of cumulative impacts is a critical component of environmental analysis, as required by the DFFE. A Cumulative Impact refers to the combined effect of past, present and reasonably foreseeable future activities associated with a project, including similar or diverse activities that may not individually appear significant but, when combined, can lead to a considerable overall impact. The cumulative impact assessment methodology aims to evaluate whether adding the proposed project to the specified location will elevate the area's overall environmental impact.

This assessment examines if the construction and operation of the proposed development of Berth 605 will result in:

- An unacceptable risk to the environment or surrounding communities.
- An unacceptable loss of environmental quality, resources, or biodiversity.
- Complete or large-scale changes to the environment or the community's sense of place.
- An unacceptable increase in overall impact levels in the area.

The cumulative impact assessment considered the interaction between the proposed Berth 605 development, existing port operations, maintenance activities and reasonably foreseeable future developments identified within the Port of Richards Bay Master Plan. Particular consideration was given to cumulative impacts on biodiversity, estuarine habitats, ecological functioning, shoreline processes and species of conservation concern within the Port environment.

The cumulative impact assessment results, presented below, illustrate the proposed project's combined effects alongside existing and anticipated activities in the vicinity.

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed project. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts. Within this context, it is important to understand that the proposed Berth 605 and associated infrastructure will be developed within an existing port that has been subjected to significant changes and related impacts for many years.

Within the context of the Berth 605 project area there are two types of cumulative impacts to consider. First the impacts of the current projects and the contribution of the Berth 605 to the cumulative impacts but also the cumulative impacts associated with the other planned projects at the PoRB i.e. the Masterplan projects. The figures below represent the current layout plan (**Figure 8-1**) short (**Figure 8-2**), medium (**Figure 8-3**) and long-term (**Figure 8-4**) Masterplan projects for the PoRB which have been considered in the assessment of cumulative impacts.

The cumulative impact assessment concluded that the proposed Berth 605 development will contribute to cumulative environmental change within the Port of Richards Bay. However, when considered within the context of the historically transformed nature of the project footprint, the implementation of avoidance and mitigation measures, and the commitments contained within the Biodiversity Compensation Plan, cumulative impacts are considered manageable and are not expected to preclude the proposed development from proceeding.

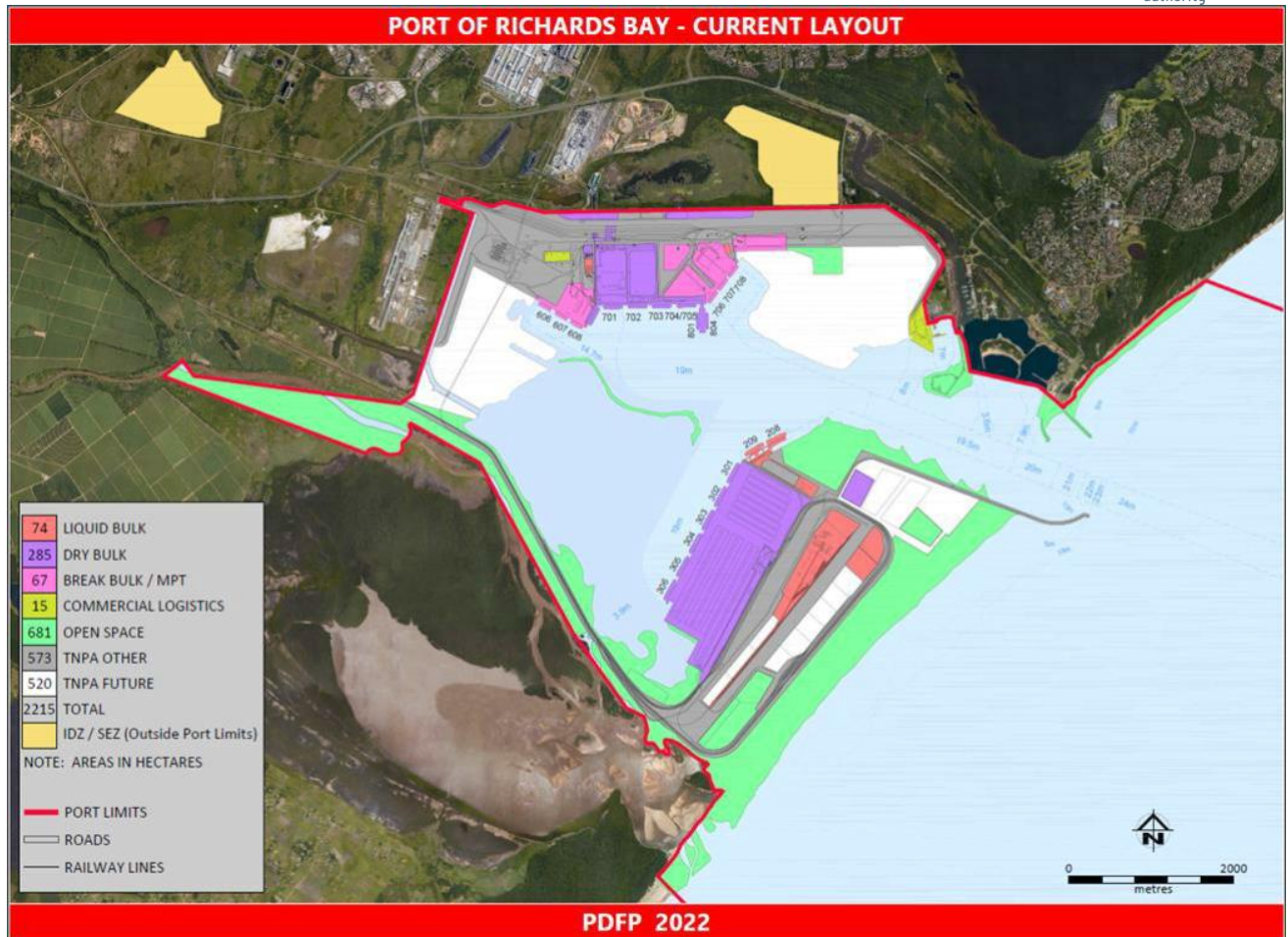


Figure 8-1 - Port of Richards Bay current layout

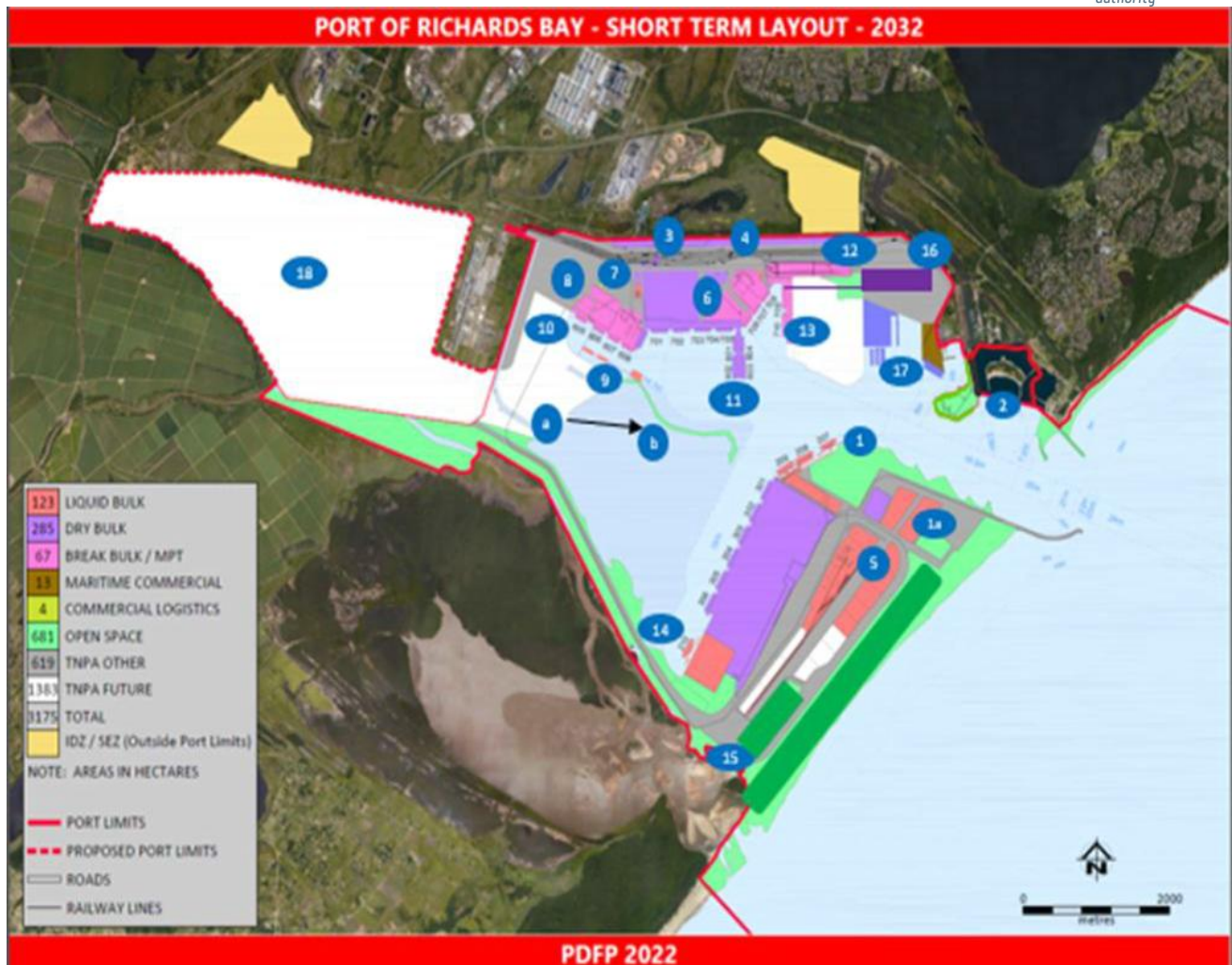


Figure 8-2 - Port of Richards Bay short-term layout (up to 2032)

From the current to short-term layout, the following changes are foreseen:

1. Development of a New LNG berth 207
2. Naval Island & Pelican Island for the Relocation of Navy from Durban Port
3. Relocation site for Bulk Commodities from Port of Durban
4. Bayvue railyard infrastructure upgrade and railyard expansion for 100 wagon trains
5. South Dunes Liquid Bulk Development, land area increases from 74 ha to 162 ha.
6. Development of Mega Chrome Terminal
7. Relocation of South32 Alluminium Storage
8. Development of a new container handling facility
9. LNG Powership becomes available
10. Development of a New Berth 605 for containers
11. Extension of the finger jetty to develop New Berth 802 & 803 for Mega Chrome,
12. Extension of Ferro Slab for Additional Storage Capacity
13. Development of new Berths 709 & 710 for Dry Bulk
14. Development of a New Liquid Bulk Berth 210
15. Reserved sites for Environmental Offsets

16. Development of New Dry Bulk Terminal
17. Development of a New Passenger Facility at the existing Repair Quay
18. Bayvue Precinct – TNPA land acquisition, areas increase from 2215 ha to 3180 ha.

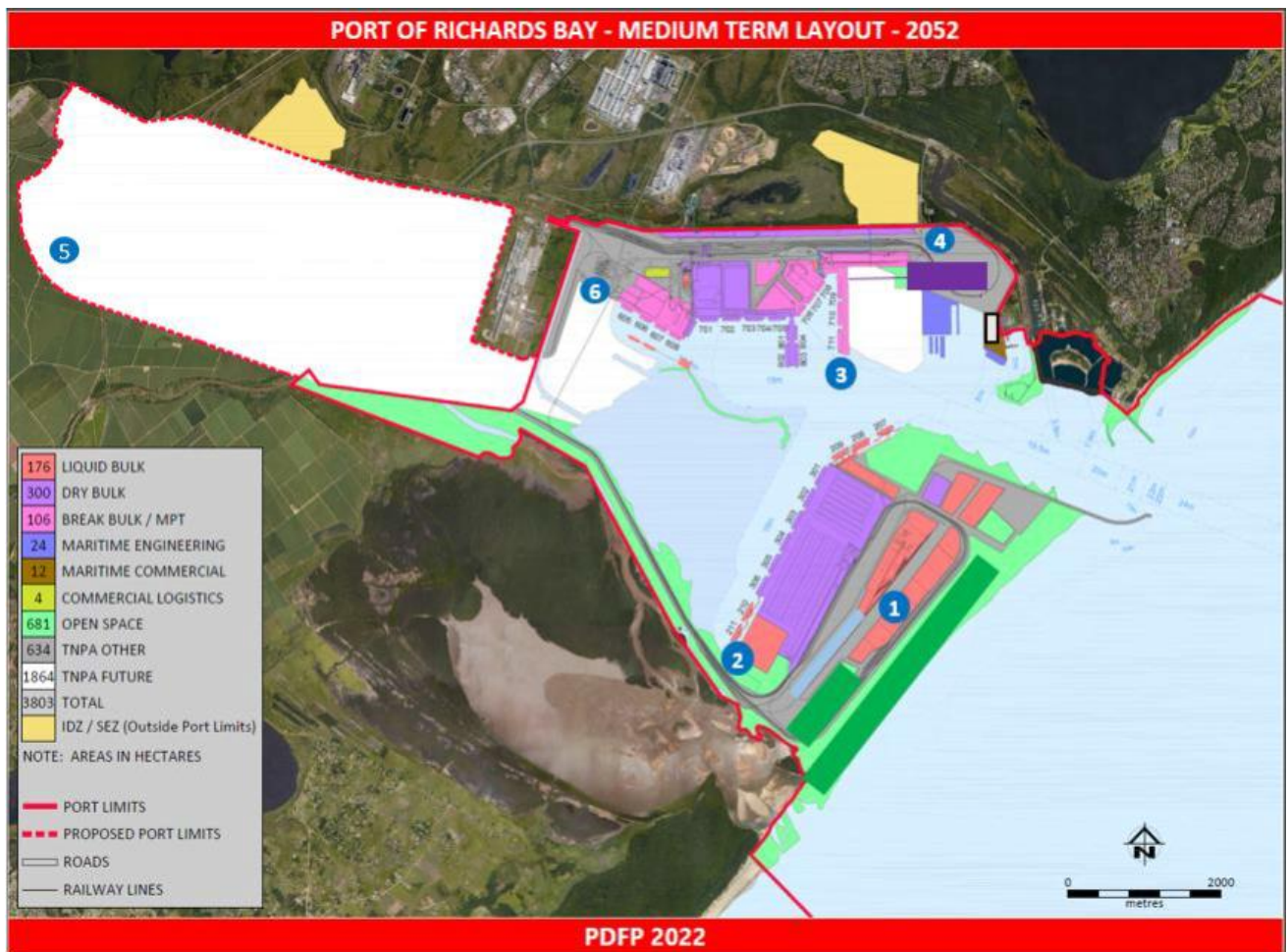


Figure 8-3 - Port of Richards Bay medium-term layout (up to 2032-2052)

The following changes are envisaged from the short-term to the medium-term port layout:

1. Development of More Liquid Bulk Terminals at South Dunes Area, Part of South Dunes land will be used for Gas to Power & LPG
2. New Liquid Berth 211 to Support the South Dunes Liquid Terminals
3. 700 Series: Provision of additional berthing capacity for MPT – 711 (700 m quay wall)
4. Bayvue rail yard expansion – rail balloon for 150 wagon trains
5. Land acquisition for future port development Phase 2, area increased from 3 180 ha to 3 803 ha
6. UMhlatuze Rail Yard Expansion to service 600 series berths.

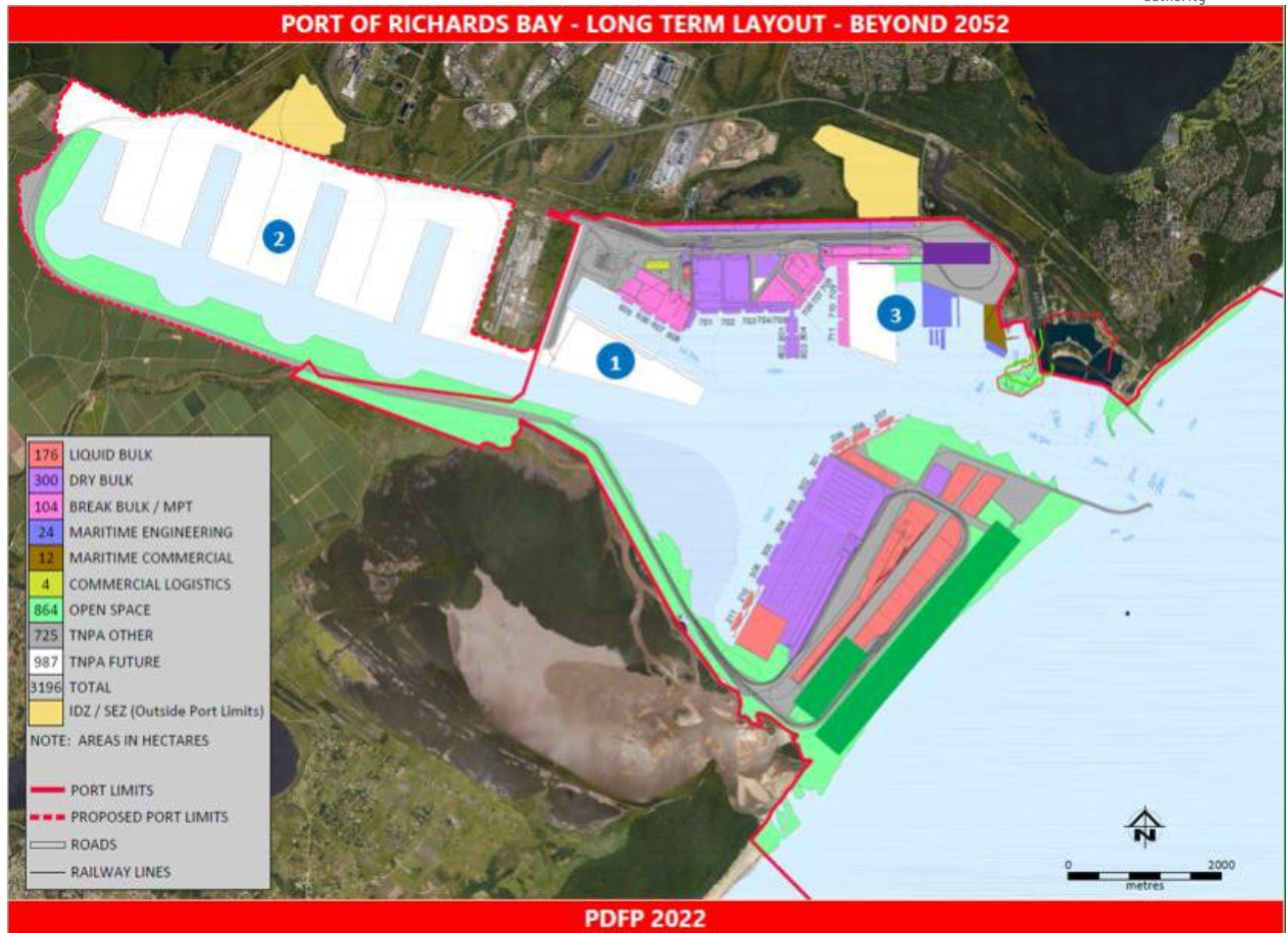


Figure 8-4 - Port of Richards Bay long-term layout (beyond 2052)

With reference to the medium-term layout, the following changes are envisioned for the long-term layout at the Port of Richards Bay:

1. Additional dig-out at the Bayvue Precinct for the provision of additional quay lengths and berths
2. Dig-out inside the new proposed port limits for additional port activities
3. TNPA land area between the break bulk (MPT) terminal and the proposed dry-dock, land to be converted to additional quay lengths and berths.

The following sections assess the potential cumulative impacts on the receiving environment.

8.1 MARINE AND ESTUARINE ECOLOGY

The planned short, medium, and long-term infrastructure developments will not necessarily interact directly with the development of Berth 605 because of spatial and/or temporal separation but will interact cumulatively in some way at the port and nearshore coastal marine environment scale. The ongoing port operations and planned infrastructure developments outlined below were considered in the assessment of cumulative effects for the Berth 605 Project. The main focus was on ongoing port operations and short-term planned infrastructure developments, but projects that involve the development of landside infrastructure were not considered. However, it is important to note that the development of landside infrastructure, while not necessarily impacting directly on the port's aquatic environment, will have indirect impacts by facilitating the transfer and storage of bulk products in the port that may in turn lead to the contamination of water and sediment, including through the increased flow of surface runoff from larger hardstand and other impervious surface areas.

Longer-term (beyond 2052) planned infrastructure developments for the Port of Richards Bay will witness wholesale changes to the port. The long-term plan involves extending the port a considerable distance inland by reclaiming land, such that the port surface area will increase three-fold and the length of quays five-fold. The long-term infrastructure developments will result in the loss of existing ecologically sensitive and valuable habitat, including the Kabeljous Flats and associated mangroves and the Bhizolo-Manzanyama Canal complex. The longer-term plan does, however, present an opportunity for creating estuarine habitat that might compensate the losses if properly planned.

The longer-term infrastructure developments are conceptual at this stage and cannot be effectively evaluated from a cumulative effects perspective along with the Berth 605 project CBA.

Table 8-1 – Summary of cumulative impacts on the marine/estuarine environment

Cumulative Impact	Discussion	Proposed Mitigation
Loss in aquatic ecological function and productivity due to the physical disturbance, injury, and displacement of benthic biological resources by dredging.	Capital dredging for the Berth 605 project may or will coincide with other port operations and activities that affect benthic biological resources. These include tugboat-assisted vessel manoeuvring, maintenance dredging, and capital dredging for other planned infrastructure developments outlined in the Port of Richards Bay Masterplan. Tugboat-assisted vessel manoeuvring will coincide with the development of Berth 605, but the added effect on benthic biological resources and ecological productivity will be negligible when compared to maintenance and capital dredging. An estimated 10 million m ³ of material will need to be dredged for the development of Berths 207, 210, 709, 710, 802, and 803 (PRDW, 2024).	To mitigate cumulative effects, capital dredging for the Berth 605 Project, maintenance dredging, and capital dredging for other planned infrastructure developments should be scheduled to avoid temporal overlap to the extent possible, although maintenance dredging should not be delayed if doing may pose a navigation hazard. If avoiding overlap is not feasible, a more detailed evaluation of cumulative effects and the identification of mitigation measures for dredging-related impacts for simultaneous infrastructure developments should be performed.

Cumulative Impact	Discussion	Proposed Mitigation
	<p>Maintenance and capital dredging for other infrastructure developments, if they coincide, will not spatially overlap with dredging for the Berth 605 project due to the physical distance between dredging sites.</p> <p>However, simultaneous dredging will degrade benthic biological resources and related ecological productivity over a wider part of the port compared to sequential dredging campaigns. Depending on the infrastructure developments that occur simultaneously, the cumulative effect could be moderately to highly adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on benthic biological resources and related ecological productivity could be moderately adverse.</p>	
Loss in aquatic ecological function and productivity due to a deterioration in water quality related to increased suspended sediment concentrations and related turbidity during dredging	<p>The above is true for this cumulative impact however, the greatest likelihood for spatial overlap is for the development of Berth 802 and 803 in the 700/800 Berth Basin if dredging is required and when maintenance dredging occurs in this same basin. However, even if suspended sediment plumes do not spatially overlap, simultaneous dredging will degrade water quality and adversely affect biological resources and ecological productivity over a wider part of the port compared to sequential dredging campaigns. Depending on the infrastructure developments that occur simultaneously, the cumulative effect could be moderately to highly adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be moderately adverse.</p>	As above
Loss in aquatic ecological function and productivity in subtidal habitats due to the deposition of sediment resuspended by dredging	<p>The above is true for this impact, however, even if sediment deposition areas do not spatially overlap, simultaneous deposition due to dredging will affect biological resources and ecological productivity</p>	As above

Cumulative Impact	Discussion	Proposed Mitigation
	over a wider part of the port compared to sequential dredging campaigns. Depending on the infrastructure developments that occur simultaneously, the cumulative effect could be low to moderately adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on biological resources and ecological productivity could also be low to moderately adverse.	
Loss in aquatic ecological function and productivity in intertidal habitats due to the deposition of sediment resuspended by dredging	Capital dredging for the Berth 605 project will coincide with the tugboat assisted manoeuvring of vessels in the 600 and 700/800 Berth Basins and may coincide with maintenance dredging in other parts of the Richards Bay Estuary. It is possible that sediment resuspended and deposited in the intertidal by vessel propeller wash and maintenance dredging will magnify the impact of sediment deposition due to dredging for the proposed project, and <i>vice versa</i> , but the significance would be very low.	As above
Remobilisation of oxygen depleting substances from sediment during dredging	The effects of the remobilisation of oxygen demanding substances by maintenance dredging and capital dredging for other infrastructure developments, if they coincide, may not spatially overlap due to the physical separation between dredging sites. However, even if there is no spatial overlap, simultaneous dredging will degrade water quality and adversely affect biological resources and ecological productivity over a wider part of the port compared to sequential dredging campaigns. Depending on the infrastructure developments that occur simultaneously, the cumulative adverse effect could be low but probably very low. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity could also be low but probably very low.	As above

Cumulative Impact	Discussion	Proposed Mitigation
Nutrient remobilisation from sediment/soil during dredging	The effects of the remobilisation of nutrients by maintenance dredging and capital dredging for other infrastructure developments, if they coincide, may not spatially overlap due to the physical separation between dredging sites. However, even if there is no spatial overlap, simultaneous dredging will degrade water quality and adversely affect biological resources and ecological productivity over a wider part of the port compared to sequential dredging campaigns. Depending on the infrastructure developments that occur simultaneously, the cumulative adverse effect could be low but probably very low. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity could also be low but probably very low.	As above
Remobilisation of noxious substances from sediment/soil during dredging	Even if noxious chemical plumes do not spatially overlap, simultaneous dredging will degrade water quality and adversely affect biological resources and ecological productivity over a wider part of the port compared to sequential dredging campaigns. However, the cumulative effect is likely to be very low. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be very low. This conclusion is based on toxicity testing of sediment sampled in the port over several years, which has shown an almost complete absence of sediment toxicity. Thus, while noxious chemical concentrations are high in sediment in some parts of the port earmarked for infrastructure development in the short-term, the chemicals are either not in a bioavailable form or if they are they are remobilised at such low concentrations that they do not cause toxicity even to sensitive sea urchin embryos and larvae.	As above

Cumulative Impact	Discussion	Proposed Mitigation
Bioaccumulation and biomagnification of noxious chemicals remobilised from sediment by fish and shellfish	As above	As above
Deterioration in water quality related to increased suspended sediment concentrations during dredged spoil disposal	Simultaneous dredging and dredged material disposal will magnify the impact of individual, temporally separated projects. Depending on the infrastructure developments that occur simultaneously and hence the volume of dredged material that is disposed simultaneously, the cumulative effect could be highly adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be highly adverse.	As above
Remobilisation of oxygen depleting substances from sediment during dredged spoil disposal	Simultaneous dredging and dredged material disposal will magnify the impact of individual projects. Depending on the infrastructure developments that occur simultaneously and hence the volume of dredged material that is disposed simultaneously, the cumulative effect is likely to be low at most. The reason is that sediment in the identified infrastructure development areas is not significantly enriched with particulate organic matter, nor is it likely to hold large amounts of other oxygen depleting substances (CSIR, unpublished data). If capital dredging campaigns do not occur simultaneously, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be low at most for the same reasons given above.	As above
Remobilisation of nutrients from sediment during dredged spoil disposal	As above	As above
Remobilisation of noxious substances from sediment	If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water	As above

Cumulative Impact	Discussion	Proposed Mitigation
during dredged material disposal	quality, biological resources, and ecological productivity is also likely to be low at most but probably very low. This conclusion is based on toxicity testing of sediment sampled in the port over several years, which has shown an almost complete absence of sediment toxicity.	
Deterioration in sediment quality on dredged spoil disposal site due to the disposal of contaminated dredged material	Regardless of whether dredged material disposal from multiple short-term infrastructure developments overlaps or occurs sequentially, it is highly unlikely noxious chemicals transferred to the dredged spoil disposal site will pose a toxic hazard to biological resources on and near the disposal site unless there is a marked change in the types of noxious chemicals introduced to the port's waters. This conclusion is based on the toxicity testing of sediment sampled in the port over several years, which has shown an almost complete absence of sediment toxicity	As above
Smothering and disturbance of benthic biological resources by disposed dredged material	Depending on the infrastructure developments that occur simultaneously and hence the volume of dredged material that is disposed simultaneously, the cumulative effect is likely to be highly adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be highly adverse.	As above
Change in hydrodynamic conditions due to accumulation of dredged material at dredged spoil disposal site	Depending on the infrastructure developments that occur simultaneously and hence the volume of dredged material that is disposed simultaneously, the cumulative effect on shoreline dynamics may be highly adverse. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on shoreline dynamics may also be highly adverse.	As above
Bioaccumulation and biomagnification of noxious	Depending on the infrastructure developments that occur	As above

Cumulative Impact	Discussion	Proposed Mitigation
chemicals by biological resources	simultaneously and hence the volume of dredged material that is disposed simultaneously, the cumulative effect is likely to be low at most. If capital dredging campaigns do not overlap temporally, the prolonged (several years) impact on water quality, biological resources, and ecological productivity is also likely to be low at most. This conclusion is based on toxicity testing of sediment sampled in the port over several years, which has shown an almost complete absence of sediment toxicity.	
Operational Phase		
Loss of tidally influenced pool and related ecological value and productivity	Although the contribution of the Berth 605 development to the cumulative loss of this habitat and related ecological productivity will be small in the context of the other infrastructure developments, the ecological consequence of the cumulative loss for short- and medium-term infrastructure developments will be high to very high. Long-term infrastructure development in the port will, in contrast, result in a substantial gain in intertidal and shallow subtidal sediment habitat, and if properly designed also in mangrove habitat. There will thus be a long-term increase in habitat for biological resources and ecological productivity of a potentially very high significance.	If similar habitat is created to compensate for the loss of the small tidally influenced pool, colonisation of the pool by biological resources should be monitored over time to not only demonstrate that it has achieved the intended goal of creating ecologically valuable habitat, but as importantly as a guide to inform similar habitat creation that might be considered elsewhere in the port in future.
Ecological effects of a change in hydrodynamic functioning in the port	It is impossible to estimate the cumulative effects of changes to the hydrodynamic functioning of the port by considering other infrastructure development outlined in the Port of Richards Bay Masterplan since the plan may change as new information comes to the fore.	It is recommended that the projects associated with the Masterplan for the PoRB conduct site specific studies to assess the individual projects impacts on ecological functional and changes in hydrodynamics.
Ecological effects of increased maintenance dredging and dredged sediment disposal regimes	Maintenance dredging for the lengthened 600 Berth Basin will invariably coincide with maintenance dredging elsewhere in the port and with capital dredging for future infrastructure developments in the short-, medium-, and long-term as	As per the impact assessment section of this report (Section 7).

Cumulative Impact	Discussion	Proposed Mitigation
	outlined in the Port of Richards Bay Masterplan if these developments are commissioned. The additional environmental effects contributed by maintenance dredging of the 600 Berth Basin are anticipated to be low.	
Gain in intertidal and subtidal sediment habitat	There will be a considerable loss in intertidal and subtidal sediment habitat in the short and medium term in the Port of Richards Bay if infrastructure developments outlined to the Port of Richards Bay Masterplan are commissioned. The intertidal sediment habitat created through the lengthening of the 600 Berth Basin will be lost over time since the southern shore of the basin is identified for future infrastructure development. The cumulative contribution of intertidal and subtidal sediment habitat gain due to the development of Berth 605 will thus be low in the short to medium-term but will nevertheless compensate for some of the losses that will accompany other short-term infrastructure developments.	Positive impact therefore no mitigation required
Gain in hard substrate (quay wall) habitat	There will be a considerable increase in the amount of hard substrate (largely quay wall) habitat in the Port of Richards Bay in the short-, medium, and long-term if infrastructure developments outlined to the Port of Richards Bay Masterplan are commissioned. The gain in hard substrate habitat through the lengthening of the 600 Berth Basin will make a minor contribution toward the gain in this habitat type and related ecological productivity in the port. As stated above, although hard substrate habitat is not particularly valued habitat in an estuarine context, the habitat will not be devoid of ecological value.	Positive impact therefore no mitigation required
Gain in open water habitat	There will be a considerable decrease in the amount of open water habitat in the Port of Richards Bay in the short- and medium-term if infrastructure developments outlined in the Port of	Positive impact therefore no mitigation required

Cumulative Impact	Discussion	Proposed Mitigation
	Richards Bay Masterplan are commissioned. However, there will be a large increase in open water habitat if the long-term plans are commissioned. The gain in open water habitat through the lengthening of the 600 Berth Basin will make a minor contribution toward compensating for cumulative losses of open water habitat in the short- and medium-term.	
Increased load of contaminants introduced into the port by surface runoff	There will be a considerable increase in the hardstand and impervious surface area in the Port of Richards Bay in the short-, medium-, and long-term if the infrastructure developments outlined in the Port of Richards Bay Masterplan are commissioned. Contaminants introduced via surface runoff from hardstand and other impervious surfaces constructed for Berth 605 and the Container Handling Facility will add to the quantity of contaminants introduced via surface runoff and other pathways elsewhere in the port, contributing to water and sediment quality degradation, biological resource impairment, and a decline in ecological productivity. It is difficult to assess the cumulative effect save to state that surface runoff is regarded as one of the most important pathways for a very wide range of contaminants into the aquatic environment in ports.	The physical and chemical properties of surface runoff from Berth 605 and the Container Handling Facility should be added to the ongoing monitoring programme at the PoRB
Introduction of artificial light to port aquatic environment	Operations at Berth 605 will add to the quantity of artificial light that is cast into the aquatic environment in the Port of Richards Bay and to that which will be cast when future infrastructure developments outlined in the Port of Richards Bay Masterplan are commissioned. Sensitive biological resources will invariably be affected by the increase in artificial light, but assessing the cumulative effect is difficult due to lack of information on existing artificial light impacts in the port. Nevertheless, in the medium- to long-term artificial light impacts will probably be of a moderate	As per the impact assessment section of this report (Section 7).

Cumulative Impact	Discussion	Proposed Mitigation
	significance for non-avian aquatic biological resources.	

8.2 TERRESTRIAL BIODIVERSITY

The entirety of the project area is mapped as CBA 1: Irreplaceable by the KZN Biodiversity Sector Plan however, the Northern areas of the project footprint has been verified to consist of transformed/ low SEI environmental conditions. The same cannot be said for the Southern extent of the Project area which consist of Estuarine/Forest habitat. Due to years of ecological succession its current natural state condition supports the CBA 1 designation. Development in this area would result in loss of both plant and animal SCC as well as compromise protected habitats resulting in cumulative impacts, in terms of direct losses of these receptors. The development of the proposed infrastructure will also contribute to increased indirect cumulative impacts on nearby intact habitats and species.

The cumulative impacts of the project are therefore potentially significant and requires compensation.

Since direct loss of estuarine and maritime habitats cannot be mitigated, these losses must be compensated for. The guidance provided in the Biodiversity Offset Guidelines (DFFE, 2023) and Ezemvelo KZN Wildlife Offset guidelines, (EKZNW Offset guidelines, 2013) were considered during the compilation of the Biodiversity Compensation Plan.

The guidelines indicate that residual impacts on Irreplaceable biodiversity cannot be fully counterbalanced by compensation because of the high threat status or irreplaceability of affected biodiversity or ecosystem services therefore the compensation area has been incorporated into the overall project design.

The assessment recognised that the proposed development occurs within an area of high biodiversity importance and that cumulative habitat losses within the Port of Richards Bay remain a key environmental concern. However, it is also recognised that substantial portions of the Berth 605 project footprint have been previously disturbed through historical port development activities and that the affected habitats represent ecological recovery within a transformed port environment rather than the loss of previously undisturbed habitat.

Table 8-2 – Cumulative impacts on terrestrial biodiversity

Potential Impact: Cumulative impacts on terrestrial biodiversity	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	5	5	5	85	Very High	(-)
With Mitigation	2	2	3	2	5	45	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> A Biodiversity Compensation Plan has been compiled to counterbalance the loss of irreplaceable terrestrial resources. 							

8.3 AVIFAUNA

According to the Avifaunal Assessment (Allan, 2025) for the Berth 605 project, the PoRB Masterplan includes a large number of planned initiatives which suggests that a consideration of cumulative impacts is highly relevant and essential in the context of the Berth 605 development. This means that where critical avifaunal habitat is to be lost to the Berth 605 development, there is even greater pressure to compensate for such losses.

The avifaunal assessment identified cumulative habitat loss as a key concern given the number of future developments proposed within the Port environment. In particular, cumulative losses of mangrove habitat, intertidal habitat and semi-natural shoreline may affect waterbird habitat availability over time. The Biodiversity Compensation Plan therefore forms an important component of the cumulative impact mitigation strategy for avifaunal receptors.

Table 8-3 – Transformation of terrestrial avifauna habitat

Potential Impact: Transformation of terrestrial avifauna habitat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	5	4	56	Moderate	(-)
With Mitigation	4	2	3	5	4	56	Moderate	(-)
Mitigation and Management Measures	■ No mitigation required							

Table 8-4 – Transformation of mangrove patch and associated intertidal mudflat

Potential Impact: Transformation of mangrove patch and associated intertidal mudflat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	2	3	5	5	75	High	(-)
With Mitigation	2	2	3	5	4	48	Moderate	(-)
Mitigation and Management Measures	■ A Biodiversity Compensation Plan has been compiled to counterbalance the loss of the mangrove and intertidal mudflat							

Table 8-5 – Transformation of the semi-natural shoreline

Potential Impact: Transformation of the semi-natural shoreline	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	5	5	70	High	(-)
With Mitigation	2	2	3	5	4	48	Moderate	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> A Biodiversity Compensation Plan has been compiled to counterbalance the loss of the shoreline. 							

Table 8-6 – Disturbance to the sand spit island

Potential Impact: Disturbance to the sand spit island	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	4	3	30	Low	(-)
With Mitigation	1	2	3	4	3	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> No mitigation required 							

Table 8-7 – Disturbance to the Kabeljou Flats

Potential Impact: Disturbance to the Kabeljou Flats	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	2	3	4	3	30	Low	(-)
With Mitigation	1	2	3	4	3	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> No mitigation required 							

8.4 SOCIO-ECONOMIC

The combined developments in the PoRB, are anticipated to enhance the region's trade competitiveness by improving logistical infrastructure. These improvements will facilitate faster and more efficient cargo handling and distribution, reducing operational bottlenecks and minimising transit

delays. As a result, businesses operating within the logistics, export and manufacturing sectors will benefit from reduced supply chain costs and enhanced reliability. This transformation is expected to position KZN as a prominent trade hub in regional and international markets, attracting new investments and enabling businesses to expand their market reach.

Table 8-8 – Enhanced trade competitiveness

Potential Impact: Enhanced trade competitiveness	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	1	5	2	48	Moderate	(+)
With Enhancement	4	5	1	5	4	60	Moderate	(+)
Enhancement Measures	<ul style="list-style-type: none"> ■ Infrastructure Optimisation: Accelerate the completion of integrated transportation networks, including efficient rail systems and expanded roadways, to handle increased cargo volumes seamlessly. Establish multimodal logistics hubs to improve connectivity between ports, dry ports and industrial zones. ■ Technology Integration: Invest in advanced port and logistics technologies, such as automated cargo handling systems, digital inventory management and real-time tracking solutions, to streamline operations. Adopt green logistics technologies to reduce the environmental footprint and align with global sustainability standards. ■ Marketing and Positioning: Actively market KwaZulu-Natal as a global trade hub through targeted investment campaigns highlighting its enhanced logistical capabilities. Foster trade agreements and partnerships with regional and international markets to leverage the improved infrastructure. ■ Sustainability Practices: Incorporate energy-efficient and eco-friendly practices in all logistics and industrial operations to meet international trade standards and attract environmentally conscious investors. Establish robust monitoring frameworks to ensure sustainable growth and compliance with environmental and social governance (ESG) criteria. 							

The new development is expected to strengthen and increase supply chains, integrating multiple logistical and industrial facilities. This will create a robust and interconnected supply chain network. This synergy can attract additional investments, lower operational costs for businesses and establish KZN as a key logistics and industrial hub in Southern Africa.

Table 8-9 – Strengthened supply chain networks

Potential Impact: Strengthened supply chain networks	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	1	5	2	48	Moderate	(+)
With Enhancement	4	5	1	5	4	60	Moderate	(+)
Enhancement Measures	<ul style="list-style-type: none"> ■ Development of Integrated Infrastructure: Establish seamless connectivity between different logistical hubs such as ports, dry ports, industrial zones and transport networks. This can include dedicated cargo rail links, upgraded road systems and intermodal facilities that streamline goods movement across regions the development of smart infrastructure such as automated ports and digital supply chain management systems that improve cargo tracking, reduce operational bottlenecks and increase overall efficiency. ■ Implement smart solutions such as Internet of Things (IoT) devices, big data analytics, and artificial intelligence (AI) to optimise supply chain operations, predict demand, and reduce transit times. These technologies can help enhance efficiency, lower operational costs, and create a more competitive supply chain network. 							

8.5 CHANGES IN SEDIMENT TRANSPORT

The Wave Climate and Shoreline Change assessment (WSP, 2025) evaluated how dredge spoil disposal might alter northerly longshore sediment transport along the coastline from Location 1 (Far-southern Beach) to Location 15 (Northern Beach) (**Figure 8-5**). The results indicate that the impacts vary significantly along this stretch, strongly influenced by existing natural conditions. Most changes due to the dumped mound will likely be undetectable in the context of other influences. Only in the area of locations 6 and 7 of the Southern Beach could the predicted erosion cause detrimental effects, as the beach is presently narrow in this region.



Figure 8-5 - Cross-shore profile locations

The potential impact is mitigated by the historical observation that material is removed from the disposal site relatively rapidly. This would cause a reduction in the impact on longshore sediment transport and on beach stability (erosion and accretion). Simply stated, the above results are conservative in that the assumed longevity of the changes in water depth on the dredge spoil disposal site (40 years) is unlikely due to the dispersion of dredged material off the disposal site.

Consequently, the model results are deemed very conservative if the capital dredging and dredge spoil disposal activities associated with only the Berth 605 development are considered, less so, should the cumulative impacts of other proposed developments within the Port of Richards Bay be considered. Such cumulative impacts would decrease with an increasing duration between the dredge spoil disposal activities of project likely to lead to such cumulative impacts. Given the likely elapsed time between such capital dredging projects and the rates of removal of material of the disposal site, the results reported above are likely to remain sufficiently conservative should such cumulative impacts be considered likely to occur.

Table 8-10 – Cumulative impact of dredge disposal on the shoreline

Potential Impact: Cumulative impact of dredge disposal on the shoreline	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	4	4	48	Moderate	(-)
With Mitigation	2	2	3	3	3	30	Low	(-)
Mitigation and Management Measures	<ul style="list-style-type: none"> ■ The time lapse between each capital project and the rates of removal of the disposal site acts as mitigation measures for the cumulative impacts. ■ Conduct annual satellite-based shoreline monitoring, particularly along the southern beach. ■ If beach width reduces to 20–30 m, consider targeted beach nourishment. ■ Reassess cumulative impacts if multiple dredging projects are planned in close succession. 							

8.6 NOISE

It is understood that numerous other projects are being proposed within the PoRB Masterplan in the foreseeable future. As such, the cumulative impacts of this project and these proposed initiatives need to be considered. The planned projects as per the PoRB Masterplan include⁶:

1. Development of a New LNG berth 207
2. Naval Island & Pelican Island for the Relocation of Navy from Durban Port
3. Relocation site for Bulk Commodities from Port of Durban
4. Bayview railyard infrastructure upgrade and railyard expansion for 100 wagon trains
5. South Dunes Liquid Bulk Development, land area increases from 74 ha to 162 ha.
6. Development of Mega Chrome Terminal
7. Relocation of South32 Alliminium Storage
8. Development of a new container handling facility
9. LNG Powership becomes available
10. Development of a New Berth 605 for containers
11. Extension of the finger jetty to develop New Berth 802 & 803 for Mega Chrome,
12. Extension of Ferro Slab for Additional Storage Capacity
13. Development of new Berths 709 & 710 for Dry Bulk
14. Development of a New Liquid Bulk Berth 210
15. Reserved sites for Environmental Offsets

⁶Some of these projects are no longer being pursued as part of the Masterplan

16. Development of New Dry Bulk Terminal
17. Development of a New Passenger Facility at the existing Repair Quay
18. Bayvue Precinct – TNPA land acquisition, areas increase from 2215 ha to 3180 ha.

Projects 1, 2 and 15 are to be seen as short term i.e. within 5 years. Projects 1 and 15 will require dredging. There will also be refurbishing of the breakwater at the entrance of the Port between 2a and 14. Project 11, 9 and 13 to be considered for the medium term.

Based on distance from Berth 605, cumulative impacts are only considered with projects 6, 7, 8, 9 and 11. Noise sources and impacts from such projects are anticipated to be negligible. Additionally, based on the location of the Berth 605 project area away from sensitive receptors, the cumulative impacts of these new initiatives are anticipated to be very low.

Table 8-11 – Cumulative noise impacts

Potential Impact: Cumulative noise impacts	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	3	2	2	14	Very Low	(-)
With Mitigation	1	1	3	2	2	14	Very Low	(-)
Mitigation and Management Measures	■ No mitigation required							

9 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that “development must be socially, environmentally and economically sustainable.... and requires the consideration of all relevant factors...”. NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA’s preventative principle, potentially negative impacts on the environment and on people’s environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of “reasonable measures”.

In assessing the environmental feasibility of the proposed construction of the proposed project, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience, and the relevant legislation (where applicable).

The conclusions of this EIA are the result of comprehensive assessments. These assessments were based on issues identified through the EIA process and public participation undertaken to date. The EIR will be subject to public review, which will be undertaken according to the requirements of NEMA with every effort made to include representatives of all stakeholders within the process. The EIR will be updated and finalised taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

The Environmental Impact Assessment identified a range of positive and negative impacts associated with the proposed Berth 605 development. These impacts were assessed through a suite of specialist investigations and have been considered within the context of the existing Port of Richards Bay environment, the historical disturbance of the project footprint, the implementation of the mitigation hierarchy and the commitments contained within the Biodiversity Compensation Plan.

9.1 IMPACT SUMMARY

The table below is a summary of the impacts associated with the proposed Berth 605 project.

Table 9-1 – Summary of impacts associated with the proposed project

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Air Quality	Impact on air quality during construction	C	Negative	Moderate	Low
	Impact on air quality during operation	O	Negative	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Climate	Increase in extreme weather events	C	Negative	Low	Low
	Impact on personnel health and safety	C	Negative	Moderate	Low
	Impact on construction activities and personnel safety	C	Negative	Low	Low
	Impact of costal erosion and storm surges on the project	C	Negative	Moderate	Moderate
	Impact of heavy rainfall and dredging	C	Negative	Low	Low
	GHG emissions during the construction phase	C	Negative	Moderate	Low
	Impact of temperature increases and frequency of hot days	O	Negative	Moderate	Moderate
	Impact of extreme weather events on personnel safety	O	Negative	Moderate	Low
	Impact of increased rainfall intensity and extreme precipitation days	O	Negative	Moderate	Low
	Impact of storm surges on the sewerage system and infrastructure at the Berth 605	O	Negative	Moderate	Low
	Impact of precipitation events on the stormwater system	O	Negative	Moderate	Low
	Impact of increased number and magnitude of high intensity events on the Berth 605 project structures	O	Negative	Moderate	Low
	GHG emissions of the project during operation	O	Negative	Moderate	Low
Geotechnical	Impact of geohazards on the project	C/O	No Impact		
	Impact of shallow rock during the construction of the quay wall	C	Positive	High	High
	Impact of shallow rock associated with disposal of the dredged material	C	Positive	High	High

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	Impacts associated with the operational phase	O	N/A	No Impact	
Hydrology	Impact of inadequate stormwater management during construction	C	Negative	Moderate	Low
	Impact of inadequate stormwater management during operation	O	Negative	Moderate	Low
Marine/Estuarine	Loss in aquatic ecological function and productivity due to the physical disturbance, injury, and displacement of benthic biological resources by dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity due to a deterioration in water quality related to increased suspended sediment concentrations and related turbidity during dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity in subtidal habitats due to the deposition of sediment resuspended by dredging	C	Negative	Moderate	Moderate
Marine/Estuarine	Loss in aquatic ecological function and productivity in intertidal habitats due to the deposition of sediment resuspended by dredging	C	Negative	Moderate	Low
Marine/Estuarine	Remobilisation of oxygen depleting substances from sediment/soil during dredging	C	Negative	Low	Low
Marine/Estuarine	Nutrient remobilisation from sediment/soil during dredging	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of noxious substances from sediment/soil during dredging	C	Negative	Very Low	Very Low
Marine/Estuarine	Bioaccumulation and biomagnification of noxious chemicals remobilised from sediment by biological resources	C	Negative	Very Low	Very Low
Marine/Estuarine	Ecological impacts due to a deterioration in water quality related to increased suspended sediment	C	Negative	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	concentrations during dredged material disposal				
Marine/Estuarine	Remobilisation of oxygen depleting substances from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of nutrients from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Remobilisation of noxious substances from sediment during dredged material disposal	C	Negative	Very Low	Very Low
Marine/Estuarine	Deterioration in sediment quality on the dredged spoil disposal site due to the disposal of contaminated dredged material	C	Negative	Very Low	Very Low
Marine/Estuarine	Smothering and disturbance of benthic biological resources by disposed dredged material	C	Negative	Moderate	Moderate
Marine/Estuarine	Change in hydrodynamic conditions due to accumulation of dredged material at dredged spoil disposal site	C	Negative	Moderate	Moderate
Marine/Estuarine	Bioaccumulation and biomagnification of noxious chemicals in disposed dredged material by biological resources	C	Negative	Very Low	Very Low
Marine/Estuarine	Loss of tidally influenced pool and related ecological value and productivity (without creating a similar environment south southwest of the existing pool)	O	Negative	High	High
Marine/Estuarine	Loss of tidally influenced pool and related ecological value and productivity (with creating a similar environment south southwest of the existing pool)	O	Negative	Very Low	Very Low
Marine/Estuarine	Ecological effects of a change in hydrodynamic functioning in the port	O	Negative	Very Low	Very Low

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Marine/Estuarine	Ecological effects of increased need for maintenance dredging and dredged sediment disposal	O	Negative	Low	Low
Marine/Estuarine	Gain in intertidal and subtidal sediment habitat	O	Positive	Low	Low
Marine/Estuarine	Gain in hard substrate habitat	O	Positive	Low	Low
Marine/Estuarine	Gain in open water habitat	O	Positive	Low	Low
Marine/Estuarine	Increased load of contaminants introduced into the port by surface runoff	O	Negative	Moderate	Moderate
Marine/Estuarine	Introduction of artificial light to port aquatic environment	C	Negative	Moderate	Low
Dredging and dredge disposal	Visual impacts of dredging plumes in the surface waters within the port	Negligible			
Wave climate and shoreline change	Impact on breakwater stability	Negligible			
Wave climate and shoreline change	Impacts of dredge spoil disposal on the central areas of the Southern Beach (Mhlathuze estuary mouth to the south breakwater)	C/O	Negative	Moderate	Low
Wetlands and rivers	Impacts on wetlands outside of the Berth 605 project footprint	C/O	Negative	Moderate	Low
Terrestrial Biodiversity	Direct Loss and disturbance of natural habitat and associated flora SCC	C	Negative	Very High	High
	Establishment and spread of AIPs	C	Negative	High	Moderate
	Injury and mortality of reptile fauna SCC	C	Negative	High	High
	Loss and fragmentation of faunal habitat	C	Negative	Very High	High
	Indirect loss and disturbance of natural habitat and associated flora SCC	C	Negative	Moderate	Low
	Injury and mortality of fauna SCC due to traffic	O	Negative	Moderate	Low

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
Avifauna	Transformation of the terrestrial avifaunal habitat	C/O	Negative	Moderate	Moderate
	Transformation of mangrove patch and associated intertidal mudflat (tidal pool)	C/O	Negative	High	Moderate
	Transformation of the semi natural shoreline	C/O	Negative	High	Moderate
	Disturbance to the sandspit island	C/O	Negative	Very Low	Very Low
	Disturbance to the Kabeljou Flats	C/O	Negative	Very Low	Very Low
Archaeology and Cultural Heritage	Potential impact on terrestrial and marine heritage resources	C	No Impact		
	Potential impact on terrestrial palaeontological resources	C	Negative	Very Low	Very Low
Visual	Potential visual impacts	C	Negative	Very Low	Very Low
Noise	Potential impact on sensitive receptors during construction	C	Negative	Low	Very Low
	Potential impact on sensitive receptors during operation	O	Negative	Low	Very Low
Waste and Chemical Pollution	Potential impacts of improper waste management during construction	C	Negative	High	Low
	Potential impacts of spills during operation	O	Negative	High	Low
Social Impacts	Influx of job seekers	C	Negative	Moderate	Low
	Access constraints to fishermen and port users during construction	C	Negative	Very Low	Very Low
	Temporary disruption of business activities at the PoRB	C	Negative	Moderate	Low
	Temporary stimulation of the regional and local economy	C	Positive	High	Very High
	Temporary creation of employment	C	Positive	Moderate	High
	Temporary increase in household income	C	Positive	Moderate	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation	With Mitigation
	Temporary increase in production	C	Positive	Moderate	Moderate
	Employment and business opportunities	O	Positive	Moderate	Moderate
	Regional economic development	O	Positive	High	N/A
	Improved trade competitiveness	O	Positive	High	N/A
	Government Revenue Increase	O	Positive	Moderate	N/A
Traffic	Increased traffic at and surrounding the project area	C	Negative	Low	Low
Cumulative Impacts					
Avifauna	Transformation of terrestrial avifauna habitat	N/A	Negative	Moderate	Moderate
	Transformation of mangrove patch and associated intertidal mudflat	N/A	Negative	High	Moderate
	Transformation of the semi-natural shoreline	N/A	Negative	High	Moderate
	Disturbance to the sand spit island	N/A	Negative	Low	Low
	Disturbance to the Kabeljou Flats	N/A	Negative	Low	Low
Socio-economic	Enhanced trade competitiveness	N/A	Positive	Moderate	Moderate
	Strengthened supply chain networks	N/A	Positive	Moderate	Moderate
Noise	Cumulative noise impacts	N/A	Negative	Very Low	Very Low
Terrestrial Biodiversity	Cumulative impacts on terrestrial biodiversity	N/A	Negative	Very High	Moderate

9.2 SITE SENSITIVITY

The project footprint occurs within an environmentally sensitive landscape that includes Critical Biodiversity Areas, a Key Biodiversity Area and the Estuarine Functional Zone. However, specialist investigations confirmed that substantial portions of the footprint have been historically disturbed through previous port development activities and that many of the habitats currently present represent ecological succession and recovery within a transformed environment.

Table 9-2 and **Figure 9-1** illustrate the overall sensitivity of the site in relation to the proposed project.

Table 9-2 - Environmental sensitivities identified by specialists

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
Climate Change Impact Assessment	<p>Projected climate changes in the Richards Bay region include increased average temperatures, more frequent hot days, changes in rainfall patterns and a gradual rise in sea level. These trends may increase the Project's exposure to extreme heat, coastal flooding and other climate-related hazards. Based on regional projections and municipal-level data, the Project area may experience low to moderate increases in drought, flood and heat stress. These risks were identified to inform future design and operational decisions.</p> <p>The GHG screening was based on publicly available emission factors and benchmarked assumptions, as no activity-level fuel or electricity consumption data was available at the time of reporting. Emission sources were categorised and assessed for materiality across both construction and operational phases. Scope 1 emissions are expected to arise from capital dredging, diesel equipment and temporary generators, while Scope 2 emissions are likely to result from electricity used to support berth-related infrastructure and systems.</p> <p>No fatal flaws were identified.</p>	A set of mitigation recommendations was developed to support emission reduction efforts. These include the use of lower-emission fuels and equipment, energy-efficient construction practices, and integration with TNPA's renewable energy initiatives.
Noise Compliance Statement	<p>Based on both the day and night-time results presented in the noise compliance statement, acoustic impacts on sensitive receptors due to the operation of the proposed project are not predicted and noise-related complaints from receptors are not anticipated. As such, it is recommended that the project be authorised with no special acoustic-related conditions applicable.</p> <p>No fatal flaws were identified.</p>	The specialist recommended that the project be authorised with no special acoustic-related conditions applicable.
Visual Compliance Statement	The visual compliance statement did not identify any sensitive receptors, no fatal flaws were identified.	The visual specialist recommended that the proposed development be considered favourably from a visual impact perspective.

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
Archaeology and Palaeontology Impact Assessments	<p>The Archaeology and Palaeontology Impact Assessments did not reveal any features of heritage or palaeontological significance.</p> <p>No fatal flaws were identified.</p>	The specialist concluded that this project should be considered favourably from an archaeology and palaeontology impact perspective.
Freshwater/Wetland and Aquatic Impact Assessment	<p>According to the layout of the proposed Berth 605 project, there are no direct impacts on the wetlands delineated as a result of the proposed activities, both the construction as well as the operation phase of the project. Considering the location of the wetlands, which are upgradient of the proposed activities (although within 500 m of the wetlands) and the existing infrastructure within the study area which limits the potential migration of impacts, the overall risk significance to the delineated wetlands is considered negligible.</p> <p>No fatal flaws were identified however since wetlands were identified within a 500 m radius and the specialist rated the significance of the impact as low in the Risk Assessment Matrix, a General Authorisation will be required.</p>	Based on the information presented within the specialist report, the specialist is of the opinion that the EA be considered positively for the proposed Berth 605 and associated infrastructure.
Marine and Estuarine Assessment	<p>The Berth 605 project in the Port of Richards Bay is needed to provide additional container handling capacity in the port. Development of Berth 605 will require an extensive capital dredging campaign that will result in the temporary removal and remodification of sediment habitat in the project footprint, including ecologically important intertidal and shallow subtidal sediment habitat. That said, the project will result in a net gain in estuarine habitat since it involves the excavation of land near the existing 600 Berth Basin to allow development of the berth. Development of Berth 605 will impact on the biophysical environment in the Port of Richards Bay, and on the marine environment off Richards Bay when dredged material is disposed.</p> <p>There are no identified environmental fatal flaws associated with the proposed development of Berth 605 in the context of estuarine and marine ecology. In most cases, the impacts will have negative</p>	<p>The specialist has confirmed that there are no fatal flaws considering marine related impacts however the most important mitigation measure recommended by the specialist is the compensation of ecologically significant habitat in the small tidally influenced pool connected to the Assembly Basin. Equivalent, or similar habitat should be created along the south-southwestern part of the lengthened 600 Berth Basin by excavating a pit into the surrounding land while excavations for the Berth 605 development are underway.</p> <p>If the above measure is implemented, the project should be granted EA.</p>

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
	<p>consequences for the environment, but in three cases the consequence will be positive (beneficial). The negative consequences can be mitigated to an acceptable degree if the proposed mitigation measures are implemented, and in three cases positive consequences can be enhanced.</p> <p>The most important mitigation measure is the compensation of ecologically significant habitat in the small tidally influenced pool connected to the Assembly Basin. Equivalent, or similar habitat could be created along the south-southwestern part of the lengthened 600 Berth Basin by excavating a pit into the surrounding land while excavations for the Berth 605 development are underway. Provided the excavated area is of a depth that it does not drain dry at low tide and there is a permanent tidal connection to the 600 Berth Basin there is every reason to believe it would be similarly colonised by mangroves and other biological resources over time and would make as important an ecological contribution per unit area to the port as the existing tidally influenced pool.</p>	
Terrestrial Biodiversity Assessment	<p>The northern extent is already transformed due to historical port earthworks. However, the southern extent of the project area falls within areas of Very High SEI (Site Ecological Importance). Development here will result in the loss of various animal and plant SCC confirmed to be present. This presents an impact of high magnitude, permanently affecting sensitive/critical habitats within and potentially adjacent to the development footprints. It is also considered definite, resulting in an impact of "Very High" significance.</p> <p>Given the very high sensitivities of the receptors in question, it is impractical to mitigate the impact on the receiving environment. the residual impact would remain 'High' in significance.</p>	<p>The specialist study concluded that avoidance of all undisturbed very high and high SEI areas (estuarine and forest habitat) must be implemented. If development in these areas continue it is considered as a fatal flaw to the project design unless compensation is incorporated into the project design as rehabilitation of this functioning ecological system will not be practical nor effective.</p> <p>Therefore, a Biodiversity Compensation Plan has been compiled and forms part of this EIR. The Compensation Plan Considered the loss of irreplaceable terrestrial and marine resources.</p> <p>The Secondary Grassland/ Woodland of Medium SEI holds existing habitat refugia patches – thus development can proceed given adherence and implementation of mitigation strategies.</p>

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
		Transformed areas of a low SEI have been disturbed and colonised by AIP species. There is no hold to development in these areas. Ongoing mitigation and management will be essential to limit potential AIP spread.
Avifaunal Assessment	This assessment identifies five areas of potential concern relevant to avifauna. One of these, the impact on the terrestrial avifauna, is not considered of high significance and is not thought to require any mitigation. Two others, the potential impact on the Sand-spit Island and the Kabeljou Flats, are considered of high significance but are considered unlikely to manifest due to the distance between these two areas and the project footprint, and thus also do not call for any mitigation measures. The final two aspects, the impact on the mangrove patch and on the 960 m stretch of semi-natural shoreline, both in the project footprint, are considered of high significance and require mitigation however due to the residual impacts of medium to high significance, compensation is required as per the Biodiversity Compensation Plan.	The specialist concluded that provided the recommended mitigation measures (compensation) are implemented, there would appear no justification from an avifaunal perspective to deny the Berth 605 project EA.
Social Impact Assessment	Majority of the assessed impacts can be reduced to low in significance post mitigation, however the cumulative impact of increased traffic remains moderate. Given the above, it is strongly recommended that the mitigation measures described in this report be incorporated into the proposed project's EMPr. Additionally, measures must be put in place to monitor and assess the implementation of these mitigation measures and take corrective action where necessary. WSP believes that given the implementation of the identified mitigation and enhancement measures, as detailed in the report, there is no reason for the project not to proceed.	<p>The specialist concluded that there are no significantly adverse or unacceptable socio-economic impacts at a large scale therefore the proposed project should therefore be considered for development. Application of the recommended mitigation measures will ensure that the negative impacts are minimised and that the distribution of the potential benefits of the project is more balanced. It is expected that there will be positive economic impacts for the development of the Berth 605, but also indirect positive impacts that will be regional.</p> <p>The specialist recommended that EA be granted for the Berth 605 project.</p>
Economic Assessment	The development aligns with municipal provincial, and national economic strategies and supports inclusive and sustainable growth. It will help address	The specialist recommended that EA be granted for the Berth 605 project.

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
	<p>spatial inequality by extending opportunities to previously disadvantaged groups and contribute to long-term poverty reduction through increased economic participation.</p> <p>Overall, while the project may present some manageable challenges during its implementation, it represents a significant step toward strengthening South Africa's trade infrastructure. Its potential to drive economic resilience, create meaningful employment, and support regional development makes Berth 605 a valuable contribution to the future of the Port of Richards Bay and the broader national economy.</p>	
Wave Climate and Shoreline Change	<p>Analysis of extreme wave scenarios at 10 m depth along the breakwater indicates a maximum wave height increase of 5 cm, with a conservative upper bound of 10 cm. These changes are minimal and unlikely to affect breakwater stability.</p> <p>The assessment evaluated how dredge spoil disposal might alter northerly longshore sediment transport along the coastline from the far-southern beach to the northern beach. The impact of dredge spoil disposal on longshore sediment transport varies along the coastline, with most changes expected to be negligible. The central areas of the southern beach (Mhlathuze estuary mouth to the south breakwater) could experience detrimental erosion since the beach is currently narrow. However, this risk is mitigated to some extent by the rapid natural redistribution of dredged material, making the model results conservative for the Berth 605 project alone. Cumulative impacts from future projects are expected to be limited if sufficient time separates dredging events.</p> <p>No fatal flaws were identified.</p>	<p>The specialist study did not identify any fatal flaws however the following recommendations were made:</p> <p>Conduct annual satellite-based shoreline monitoring, particularly along the southern beach.</p> <p>If beach width reduces to 20–30 m, consider targeted beach nourishment.</p> <p>Reassess cumulative impacts if multiple dredging projects are planned in close succession.</p>
Dredging and Dredge Disposal	<p>The study did not identify any fatal flaws. The impacts of dredging and dredge disposal identified have been considered by the marine/estuarine specialist and assessed accordingly.</p>	<p>The only other substantive requirement/recommendation is that the compliance monitoring procedures and management options (see Section 7 of the Dredge Disposal Study) be</p>

Specialist study	Fatal Flaw Analysis	Specialist Recommendations/Conclusion
		followed diligently and to adhere to the normal due diligence measures associated with dredging.

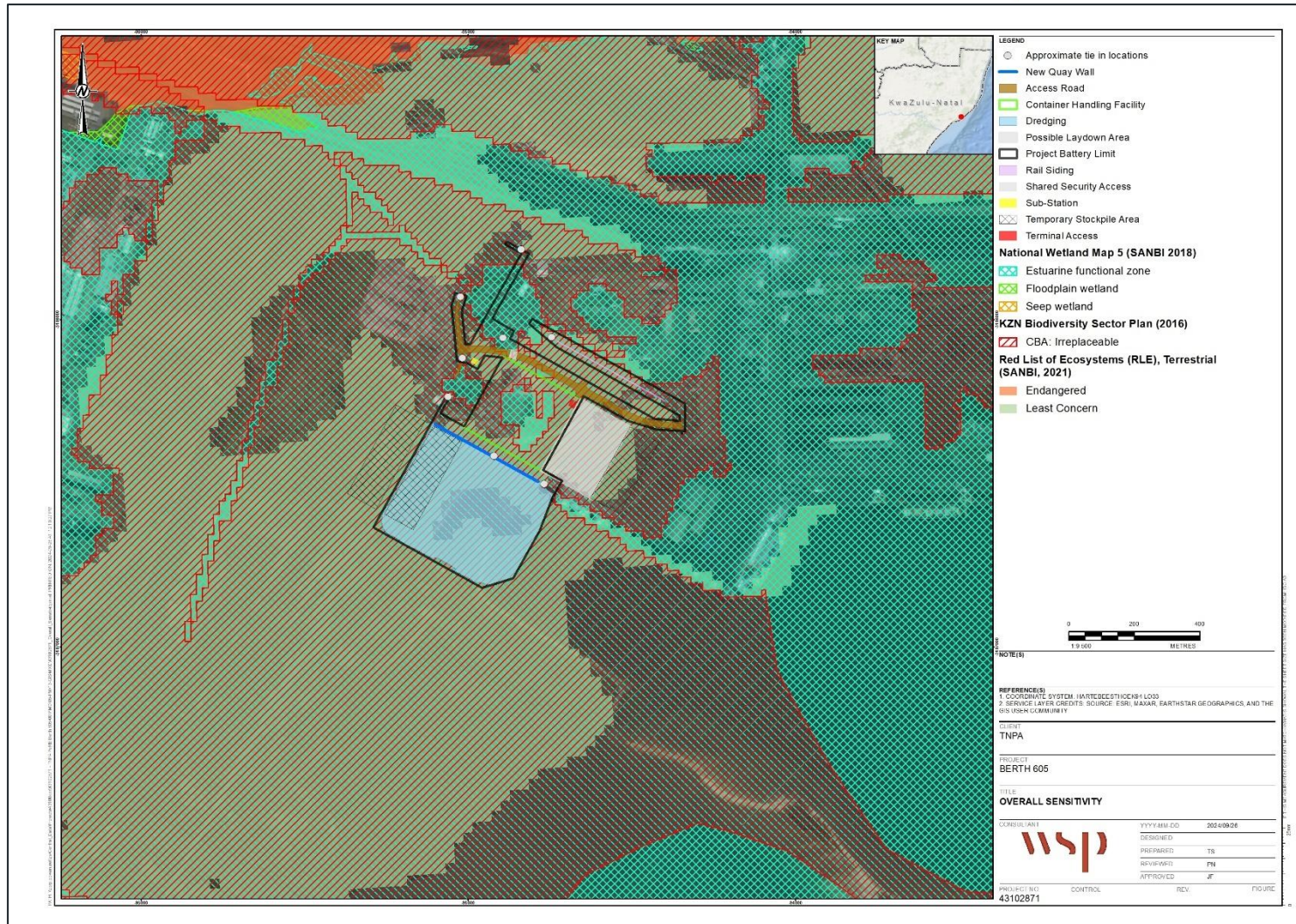


Figure 9-1 - Combined Sensitivity Map for the proposed Berth 605 project

9.3 IMPACT STATEMENT

The overall objective of the EIA process is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

In assessing the environmental feasibility of the Berth 605 and associated infrastructure, the requirements of all relevant legislation have been considered. The identification and development of appropriate management and mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience and the relevant legislation (where applicable).

The EIA process has found that the proposed project will involve activities which will lead to a number of direct and indirect negative impacts on the biophysical and socio-economic environment. These impacts were found to vary in terms of their consequence and probability. Positive impacts are associated with the overall local and regional economic benefit of the project which is of moderate to high significance.

Negative impacts are associated with the loss of forest and intertidal habitat (tidal pool), the loss of protected mangrove species⁷ and the loss of habitat for faunal SCC. Overall, the complete removal of the tidal pool environment is considered a negative impact of very high significance if not compensated for.

The Biodiversity Compensation Plan was developed as the final step in the mitigation hierarchy to address residual biodiversity impacts associated with the proposed development. The plan includes habitat creation, habitat restoration, invasive species management, ecological monitoring, adaptive management measures and long-term legal protection of the compensation area. The final compensation area achieves an overall compensation ratio of approximately 1:1 and provides replacement habitat opportunities within the Port of Richards Bay environment.

A 1:1 compensation ratio was initially not supported during consultation with Ezemvelo KZN Wildlife (EKZNW). In response, the project team investigated opportunities to enlarge the compensation footprint, with particular emphasis on securing land adjoining the berth basin so that replacement tidal habitat could be created and directly connected to the estuarine system. An additional area of approximately 42 ha immediately south of the 600-series berth basin was evaluated. However, this land could not be secured because its allocation to biodiversity compensation would constrain and sterilise land required for implementation of the Port of Richards Bay 2052 Strategic Masterplan. No other practicable area is available that would enable direct recreation of the affected tidal and associated terrestrial habitats as part of the proposed berth expansion. Consequently, the only

⁷ Mangroves are considered invasive in the PoRB and will not be compensated for, these will be allowed to re-establish naturally

secured and implementable option is a 1:1 compensation ratio within the originally identified 11 ha compensation area

The Biodiversity Compensation Plan identified two key components related to estuarine biodiversity compensation. First, newly created tidal pool habitat should be functionally equivalent to the existing tidal pool connected to the assembly basin, including surface area. Second, the transformation of the Assembly Basin will result in the loss of sandy shoreline habitat. The south–southwestern shoreline of the 600 Berth Basin should therefore be reconfigured to ensure that the total length of sandy shoreline within the expanded basin is equivalent to that currently present within the combined 600 Berth and Assembly Basins. This could be achieved by introducing indentations or scalloping along the shoreline, including in the extended part of the 600 Berth Basin.

For biodiversity compensation in terrestrial ecosystems, rehabilitation and preferably restoration of areas in modified condition (i.e. no longer natural or near natural) is seen as an integral part of the required management of the site. It is ideal for candidate biodiversity compensation sites to be in a good ecological condition (natural or near-natural state), to minimise the additional burden of having to rehabilitate or restore an area (DFFE, 2023); however, some level of rehabilitation of natural habitats with a low level of disturbance is normally anticipated.

The proposed compensation area can be characterised as consisting of broadly similar habitat types as what is expected to be lost and can compensate for Mangrove forests (add 3.3 ha/ratio of 1.6:1), Coastal Forest (1.27 shortfall) and Grassland (add 5.9 ha/ratio of 2.8/1).

Table 9-3 - Gains per Options

Vegetation Type Lost	SEI: Ha lost	V1Gain	Difference	Ratio
Mangrove forests	Very High total: 2.06	3.3	1.84	1.8/1
Coastal forest	High total: 5.17	2.7	-2.47	0
Grassland	Medium total 3.78	5.9	2.22	1.6/1
Total		11.9	1.69	

It is important to evaluate the restoration/recovery trajectory of the area to be lost. This area was cleared of all vegetation approximately 20 years ago. In the complete absence of access to that area (this is inside the control port environment) the area has progressed through natural colonisation from a bare footprint to reflect the habitat units characterised on site. It's equally important to understand that there is an ecological transition that is taking place through Grassland towards Forest dominated communities and that this will progress within the compensation area. Consequently, the compensation plan that is proposed recognises that while there is a shortfall in the coastal forest habitat unit that the areas identified currently as Grassland will transition into coastal forest over time. This is favourable to the site given the disturbed nature of both the area to be lost and the recovering nature of the identified compensation area (it has also been disturbed in the past). Ecological trajectory towards coastal forest can be accelerated further should that be the desired outcome, through judicious planting of targeted indigenous species into this area to accelerate forest transition. Consequently, we remain of the view that the compensation area, managed in isolation and in the absence of any form of controlling intervention (burning, grazing et cetera) will transition through

grassland to coastal forest. This trend is evident in the area that will be lost. It is also evident in the areas of land reclaimed during primary port development elsewhere in the port environment which have transitioned from bare reclaimed dredging sand piles to a combination of mangrove grassland and ultimately coastal forest

The proposed biodiversity compensation area is indicated in **Figure 9-2** which indicates the position in relation to the proposed development area. This area is the only area where the shoreline and intertidal basin habitat can be recreated in proximity to the development site. The identified compensation site is slightly smaller than the proposed development area. The compensation plan does however support reinstatement of similar estuarine habitat types of equitable area and ensures protection from development to similar terrestrial habitat on land immediately adjacent to Berth 605.

As indicated in the figure below, TNPA will be implementing a plan for the control and management of AIS within the area indicated to be mixed forest and grassland habitat.

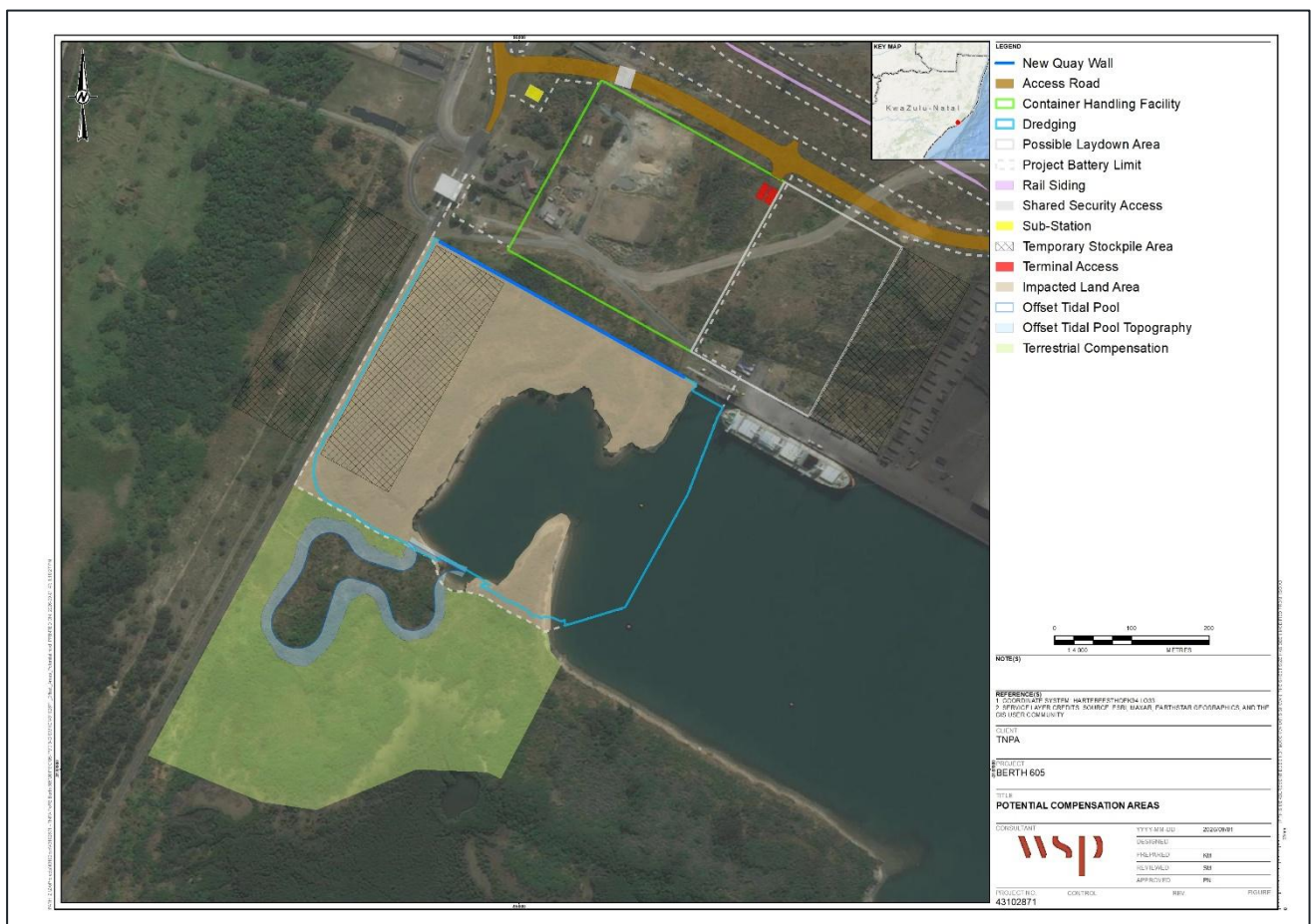


Figure 9-2 – Proposed Compensation Area in relation to project infrastructure

In addition, mitigation measures have been developed where applicable for identified impacts and are presented within the EMP. The mitigation measures are necessary to ensure that the project is planned, constructed and operated in an environmentally responsible manner. It is imperative that all impact mitigation recommendations contained in the EMP, of which the environmental impact assessment took cognisance, are legally enforced.

It is the opinion of WSP that the information contained in this document is sufficient for the DFFE to make an informed decision for the EA being applied for in respect of this project. The findings of this S&EIR process and associated specialist studies conclude that there are no fatal flaws associated with the proposed development if an appropriate compensation plan is implemented. It is therefore the opinion of the EAP that the project can proceed, and that all the listed mitigation measures and recommendations are considered by the DFFE.

9.4 CONDITIONS OF AUTHORISATION

The environmental management system provided for by NEMA, and the EIA Regulations provide for a CA to grant an EA subject to conditions. In appropriate circumstances a CA may grant an EA subject to the condition that a measurable biodiversity offset or compensation is implemented by the EA.

EA can, and in the case of compensation contain conditions, these conditions stipulate the compensation requirement in detail. The conditions will also stipulate that the EA holder will add the compensation area to the PDFP. Thus, showing that an agreement may not always be required for and EA to be issued, but will be a binding condition.

The below-listed conditions are proposed for inclusion in the environmental authorisation, should the Project be authorised, based on the guidance provided in the National Biodiversity Offset Guideline:

- The Environmental Authorisation (EA) holder must select biodiversity compensation from a range of compensation options including non-hectare-based compensation, that is sufficient to meet the targets for compensation (as described in this report and agreed with stakeholders including the Biodiversity Offset Group).
- A Biodiversity Compensation Implementation Management Plan must be prepared for the biodiversity compensation site and incorporated into the EMP or a Biodiversity Compensation Implementation Agreement.
- The duration of the liability period is at least 30 years or as long as the duration of the authorised activity, whichever is longer. The applicant will be responsible for the implementation cost of the compensation plan and subsequent management and monitoring costs.

9.5 LEGAL AGREEMENT

The proposed compensation area lies within the regulated area of the PoRB. The compensation area will be protected through inclusion of the area in the Port Development Framework Plan (PDFP) as a no development area. The PDFP is regulated under Section 11 (1) (b) of the National Ports Act (No. 12 of 2005) which mandates the National Ports Authority to prepare and periodically update (typically five years) the PDFP for each commercial port under its jurisdiction. Regulated PDFP's address short-term (<10yrs), medium-term (to 30yrs) and long term (beyond 30 yrs) developments within the port environment.

The compensation area will be secured through an appropriate legal protection mechanism, including the registration of a conservation servitude, and will be excluded from future development planning. Long-term management and monitoring commitments have been incorporated into the Biodiversity Compensation Plan to ensure the sustainability of compensation outcomes.

10 REFERENCES

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2. Climate Change Impact Assessment: Karpower Gas to Power Project: Port of Richards Bay (Promethium Carbon, 2022)
3. Coastal, Estuarine and Marine Impact Assessment Report Port of Richards Bay (GroundTruth, Anchor Environmental and Coastwise, 2022).
4. Composition, abundance and seasonality of fish larvae in Richards Bay Harbour, KwaZulu-Natal, South Africa. South African Journal of Marine Science 23, 56–78 (Harris and Cyprus, 1997).
5. Desktop baseline estuarine and marine ecology information for the Berth 605 project (CSIR, 2024).
6. Draft Basic Assessment Report for the construction of marine infrastructure in the Port of Richards Bay (Sivest, 2018).
7. EIA Report for the Proposed Gas to Power Project at Port of Richards Bay, Umhlathuze Municipality, KZN (Tripl4, 2022).
8. Long-term Ecological Modelling Programme for the Port of Richards Bay. Surveys made in 2019/2020. CSIR Report: CSIR/SPLA/IR/ 2020/0044/C (CSIR, 2020)
9. Port Development Framework Plans 2022 Update (TNPA, 2022).
10. Specialist Climate Change Impact Assessment: Phakwe Richards Bay Gas to Power 3 CCP (Promethium Carbon, 2022).
11. Surface water monitoring sites for the summer 2020 survey (CSIR, 2020)
12. Terrestrial Ecological Assessment for the proposed Gas to Power Project, Richard's Bay, KZN (De Wet, L, 2022).
13. The zooplankton community of Richards Bay Harbour and adjacent Mhlathuze Estuary, South Africa. Afr J Mar Sci 30, 55–62 (Jerling, H.L., 2008).

Appendix A

EAP CV



Appendix B

EAP DECLARATION



Appendix C

SPECIALIST DECLARATION



Appendix D

STAKEHOLDER ENGAGEMENT REPORT



Appendix E

MAPS AND CIVIL DRAWINGS



Appendix E.1

LOCALITY MAP



Appendix E.2

LAYOUT MAP



Appendix E.3

CRITICAL BIODIVERSITY AREAS



Appendix E.4

WATERCOURSES



Appendix E.5

VEGETATION TYPES



Appendix E.6

HABITAT UNITS



Appendix E.7

SENSITIVITY MAPS



Appendix F

DFFE SCREENING TOOL



Appendix G

SPECIALIST STUDIES



Appendix G.1

TERRESTRIAL BIODIVERSITY ASSESSMENT



Appendix G.2

AVIFAUNAL ASSESSMENT



Appendix G.3

AQUATIC AND FRESHWATER ASSESSMENT



Appendix G.4

ESTUARINE AND MARINE ECOLOGY ASSESSMENT



Appendix G.5

SEDIMENT AND SOIL QUALITY ASSESSMENT



Appendix G.6

TERRESTRIAL HERITAGE ASSESSMENT



Appendix G.7

MARINE HERITAGE ASSESSMENT



Appendix G.8

DESKTOP PALAEONTOLOGY ASSESSMENT



Appendix G.9

VISUAL COMPLIANCE STATEMENT



Appendix G.10

SOCIAL IMPACT ASSESSMENT



Appendix G.11

ECONOMIC ASSESSMENT



Appendix G.12

CLIMATE CHANGE IMPACT ASSESSMENT



Appendix G.13

NOISE COMPLIANCE STATEMENT



Appendix G.14

DREDGING AND DREDGE DISPOSAL STUDY



Appendix G.15

WAVE CLIMATE AND SHORELINE CHANGE STUDY



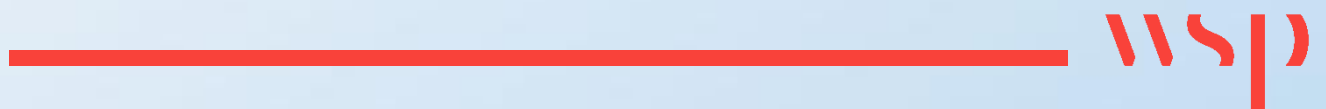
Appendix G.16

BIODIVERSITY COMPENSATION PLAN



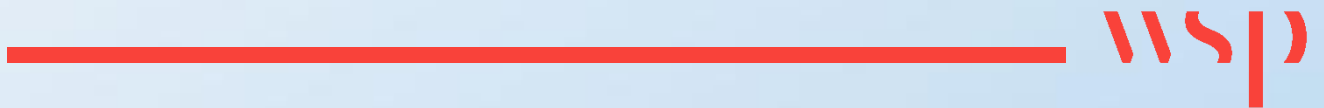
Appendix H

ENVIRONMENTAL MANAGEMENT PROGRAMME



Appendix I

DREDGE DISPOSAL CERTIFICATE





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