

**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**

**HERITAGE IMPACT ASSESSMENT
FOR TRANSNET & WSP**

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EXECUTIVE SUMMARY

TNPA proposes to have the following activities undertaken as part of the development of the Berth 605 Project and the associated infrastructure at the Port of Richards Bay, KwaZulu-Natal Province :

- New berth pocket and quay wall
- End of berth basin slopes
- Scour protection
- Dredging
- Dredge disposal
- New rail siding
- New access road
- Footprint of the Container Handling Facility (CHF) and apron area
- Provision of electrical supply to feed the facility operations and equipment
- Water
- Sewerage
- Stormwater
- Provision for temporary laydown and stockpile areas

Umlando has undertaken several Phase 1 Heritage Impact Assessments (HIA) for the Port of Richards Bay since 2009 and is familiar with the construction history of the port as well as the human occupation of the area. It was for this reason that a desktop HIA was initially undertaken as the historical maps indicated that the proposed footprint occurs on reclaimed land or old swamps. A field survey confirmed the findings of the desktop PIA. In addition to this, paleontological studies have been undertaken in the surrounding area, and all indicate that Cretaceous Period deposits exist around the Port of Richards Bay.

The result of the desktop study and field survey indicates that there is a very low chance of heritage sites occurring within the study area. The palaeontological report notes that Cretaceous material could occur in the footprint of the two berths; however, if these layers have already been removed during the initial construction of the harbor, then no further mitigation is required. If these layers have not been removed then on site monitoring during the construction phase, or capital phase, will be required.

A Chance Find Protocol for heritage and palaeontology needs to form part of the Environmental Management Programme (EMPr).

ABBREVIATIONS

EIA	Early Iron Age
ESA	Early Stone Age
HIA	Heritage Impact Assessment
HP	Historical Period
IIA	Indeterminate Iron Age
ISA	Indeterminate Stone Age
KZNARI	KwaZulu-Natal Amafa & Research Institute
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency

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1. INTRODUCTION

Transnet National Ports Authority (TNPA) intends to create Berth 605 and associated infrastructure at the Port of Richards Bay (Figure 1 and Figure 3). The following structures and infrastructure are deemed necessary to achieve the overall objective of the project and are included in the project description (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. The location of the end of Berth 606 berth pocket is defined as the end of the existing berth which is the lower retained earth wall. With a slope of 1V:3H from -14.5 m 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** – 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.
- **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 road itself and the berth will not be traffic generating, the traffic that will be generated is associated with the operation of the CHF.
- **Footprint of the CHF and Apron Area** – The CHF will be built and operated by the operator 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 will be designed to tie into the closest existing pipe network or an existing pump station closest to the proposed CHF. Sewerage inside the CHF will be 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 handling facility, 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. The minimum size of stormwater pipelines is 450mm diameter, which considers effective maintenance of the stormwater network. 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 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. In addition, two temporary stockpile areas are proposed. The first image is an area of approximately 2.4 Ha, 250 m in length and 100 m wide. The area is located SE of the CHF. The second area is 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).

Umlando was requested to undertake the Phase 1 HIA study of the proposed. Figures 1 – 4 indicate the location and general area of the proposed development.

2. ASSUMPTIONS AND LIMITATIONS

- The following are assumptions and limitations associated with this HIA: The footprint of the proposed development will remain within the site boundary provided to Umlando by the consultant.
- The site falls in the general pattern of archaeological scatters noted from previous archaeological and heritage surveys.

- The survey cannot locate subsurface features that do not leave visible marks observable from aerial photographs. Since this was all perennial swamp, no occupation is expected.
- The area will be safe and free of criminal elements. No work will be undertaken in unsafe areas.

3. SCOPE OF WORK

The following form part of the Scope of Work for the HIA:

- Undertake a Phase 1 study of the proposed development.
- Assess heritage sites in terms of significance.
- Provide a management plan for each site.



FIGURE 1: LOCATION OF THE PROPOSED DEVELOPMENT

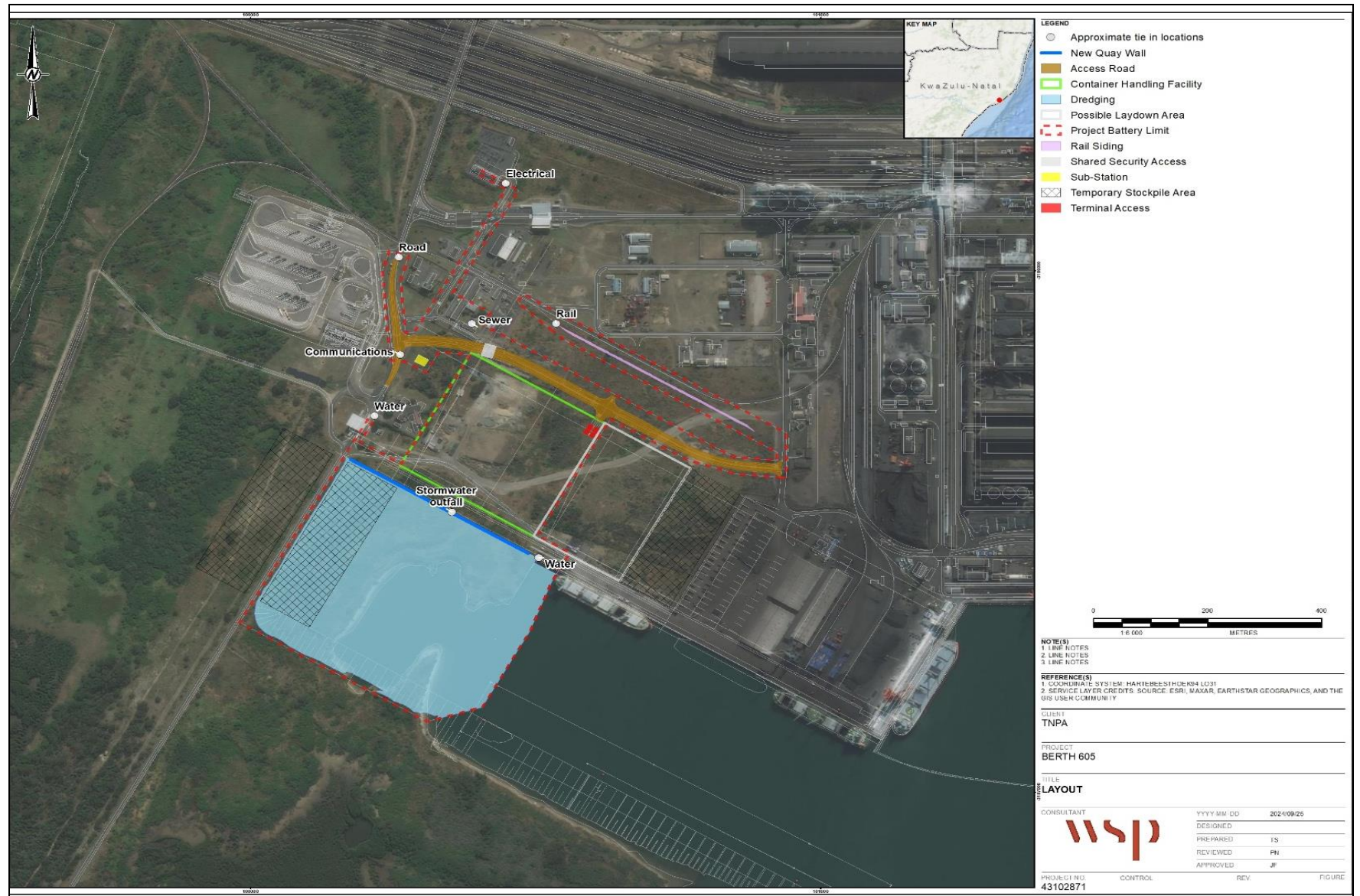


FIGURE 2: LAYOUT PLAN OF THE BERTH 605 AND ASSOCIATED INFRASTRUCTURE

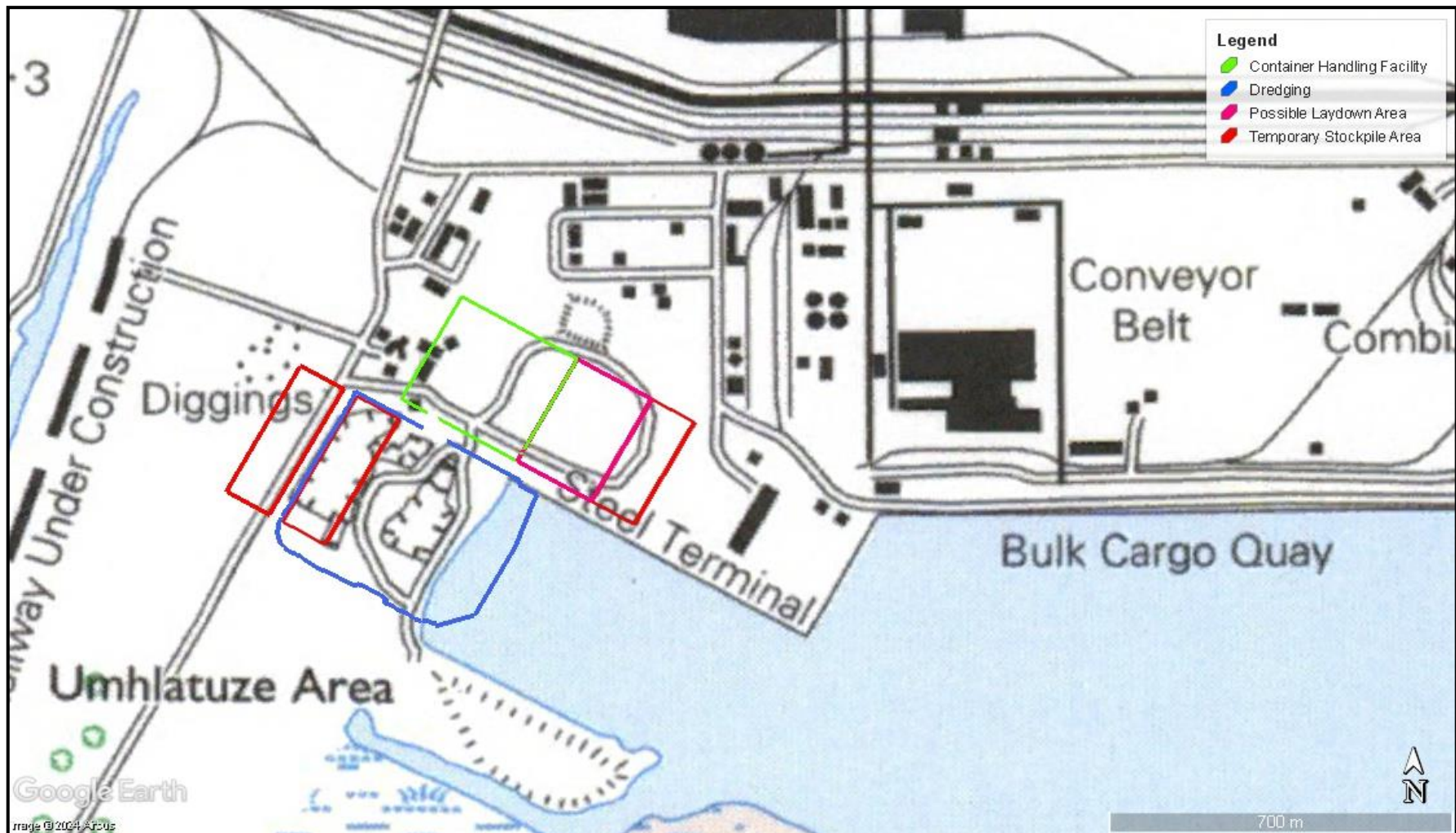


FIGURE 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT¹

¹ 2832CC Richards Bay 2000



FIGURE 4: SCENIC VIEWS OF THE DEVELOPMENT AREA

4. LEGISLATIVE CONTEXT

4.1. KwaZulu -Natal Amafa And Research Institute, Act 05, 2018

The KwaZulu Natal Amafa And Research Institute, Act 05, 2018, Chapter 8 (pp 29 – 32) defines heritage resources as follows:

“General protection: Structures.

37.(1)(a) No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Institute having been obtained on written application to the Council.

(b) Where the Institute does not grant approval, the Institute must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.

The Institute may, by notice in the *Gazette*, exempt—

(a) A defined geographical area; or

(b) defined categories of sites within a defined geographical area, from the provisions of subsection where the Institute is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.

(3) A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.

38. No person may damage, alter, exhume, or remove from its original position

(a) the grave of a victim of conflict;

(b) a cemetery made up of such graves; or

(c) any part of a cemetery containing such graves, without the prior written approval of the Institute having been obtained on written application to the Council.

General protection: Informal and private burial grounds

39.(1) or burial ground older than 60 years, or deemed to be of heritage significance by a heritage authority -

(a) not otherwise protected by this Act; and

(b) not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Council.

The Institute may only issue written approval once the Institute is satisfied that—

(a) the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and

(b) the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

40 (1) No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Institute having been obtained on written application to the Council.

(2) Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Institute without delay.

(3) The Institute may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Institute to be inappropriate within 50 metres of a rock art site.

(4) No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Institute having been obtained on written application to the Council.

(5) No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Institute having been obtained on written application to the Council.

(6)(a) The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vests in the Provincial Government and the Institute is regarded as the custodian on behalf of the Provincial Government.

(b) The Institute may establish and maintain a provincial repository or repositories for the safekeeping or display of —

- (i) archaeological objects;
- (ii) palaeontological material;
- (iii) ecofacts;
- (iv) objects related to battlefield sites;
- (v) material cultural artefacts; or
- (vi) meteorites,

(7) The Institute may, subject to such conditions as the Institute may determine, loan any object or material referred to in subsection (6) to a national or provincial museum or institution.

(8) No person may, without the prior written approval of the Institute having been obtained on written application to the Institute, trade in, export or attempt to export from the Province ~

(a) any category of archaeological object;

(b) any palaeontological material;

(c) any ecofact;

(d) any object which may reasonably be regarded as having been recovered from a battlefield site;

(e) any material cultural artefact; or

(f) any meteorite.

(9){a} A person or institution in possession of an object or material, referred to in paragraphs (a) ~ (f) of subsection (8), must submit full particulars of such object or material, including such information as may be prescribed, to the Institute.

(b) An object or material referred to in paragraph (a) must, subject to paragraph (c) and the directives of the Institute, remain under the control of the person or institution submitting the particulars thereof.

(c) The ownership of any object or material referred to in paragraph (a) vests in the Provincial Government and the Institute is regarded as the custodian on behalf of the Provincial Government."

5. METHODOLOGY

The method for HIA consists of several steps as detailed below:

The first step forms part of the desktop assessment. Here, Umlando consulted secondary data. These databases contain archaeological site locations and basic information from several provinces (information from Umlando surveys and other specialists). Umlando used 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required, Umlando would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. A historical architect, palaeontologist, and an historian would also be consulted where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

5.1. Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

1.1. Organic remains:

1.1.1. Faunal

1.1.2. Botanical

1.2. Rock art

1.3. Walling

1.4. Presence of a cultural deposit

1.5. Features:

1.5.1. Ash Features

1.5.2. Graves

- 1.5.3. Middens
- 1.5.4. Cattle byres
- 1.5.5. Bedding and ash complexes

2. Spatial arrangements:

- 2.1. Internal housing arrangements
- 2.2. Intra-site settlement patterns
- 2.3. Inter-site settlement patterns

3. Features of the site:

- 3.1. Are there any unusual, unique or rare artefacts or images at the site?
- 3.2. Is it a type site?
- 3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

- 4.1. Providing information on current research projects
- 4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

- 5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?
- 5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

- 6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

- 7.1. Does the site have the potential to be used as an educational instrument?
- 7.2. Does the site have the potential to become a tourist attraction?
- 7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

- 8.1. Palaeontological sites
- 8.2. Historical buildings
- 8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites
- 8.4. Graves and/or community cemeteries
- 8.5. Living Heritage Sites
- 8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts. Table 1 lists the grading system.

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A/ 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction

6. BACKGROUND

On 1 April 1976, the first phase of the Port of Richards Bay 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 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 also 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.

Historically the Mhlathuze Lagoon, (Port of Richards Bay was referred to in the 1940s as Mhlathuze Lagoon), was connected to the sea via large sand banks that made entry into the lagoon with boats and ships near impossible. Freak accidents, such as the SS Newark (1908) did occur, where the ship was run aground, and over the sandbank, in a storm.

This area has also been one of the many areas regarding forced removals of the Mandlazini people (Griffiths 1996; Ntuli 2019). This is related to the expansion of the Richards bay harbour and the city itself.

The environment surrounding the harbour has been heavily impacted by the original harbour construction in the early 1970s. The harbour dredged the deep Thulazihleka Lake (or Mhlathuze Lagoon) and cleared areas to

create a harbour entrance at the Mhlatuze River mouth. The lake was divided into two parts with the southern part of the lake becoming a sanctuary with its own newly created river mouth south of the harbour entrance.

The secondary effects were an increase in wetlands in the area, and much of the original area was flooded. Furthermore, the harbour created a larger area than the original lake and thus removed much of the original land. Areas were dredged and other areas were 'created' by the sand from the dredging, or the sand was dumped onto existing land. For example, 103 hectares of coastal dune was cleared along the southern dunes, and the sand was used to reclaim some of the land for the coal terminal (Zululand Observer, 1 April 1976).

The construction of the Richards Bay harbour involved dredging 25m of deposit from the lagoon and creating a direct accessible link to the ocean for the coal terminal. These excavations went through the Cretaceous deposits. Much of this material was deposited on the western side of the harbour where the Lagoon was now divided into two sections. The creation of the harbour means that the lagoon deposits were severely affected and removed all possible existing maritime heritage.

In 2006, Transnet expanded the port and excavated the new Berth 306 in the location of the study area. Again, excavations went beyond the Cretaceous levels removing all palaeontological layers. Berth 605 is located within a different precinct but would have the same geology.

There will be no maritime heritage in the harbour; it was all removed by dredging. However, a chance find protocol for maritime heritage should be part of the EMPr, despite the fact that this area has been terrestrial for thousands of years.

7. RESULTS

7.1. Desktop Study

The desktop study 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 (Figure 5). 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. For example, RBP02, RBP03, and 2832CC 001 are all part of the same layer of stone tools over the last 2 million years.

The historical maps indicate that human settlements did exist in the general area but not in the marsh/swamps (Figure 6 – Figure 9). 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.

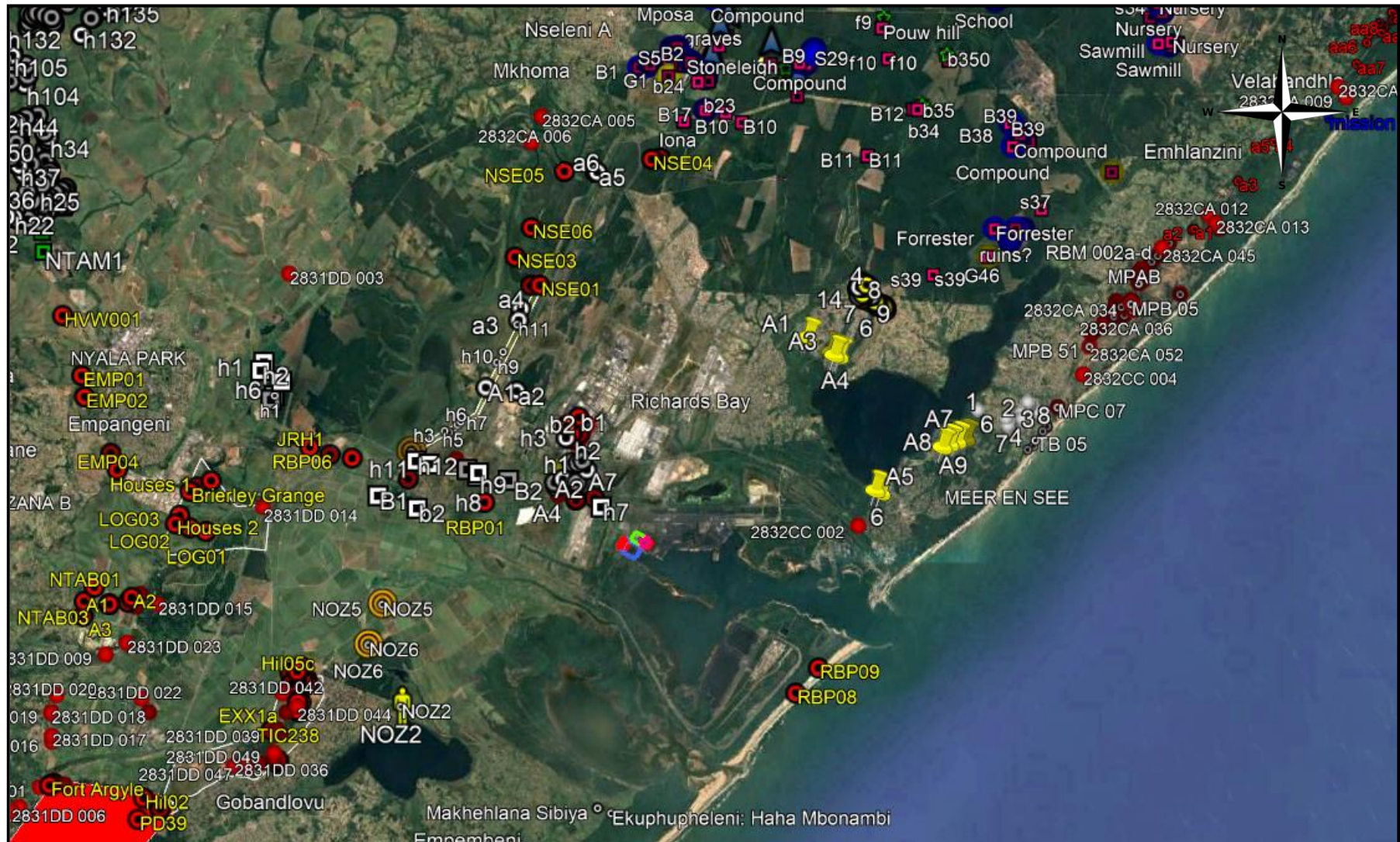


FIGURE 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

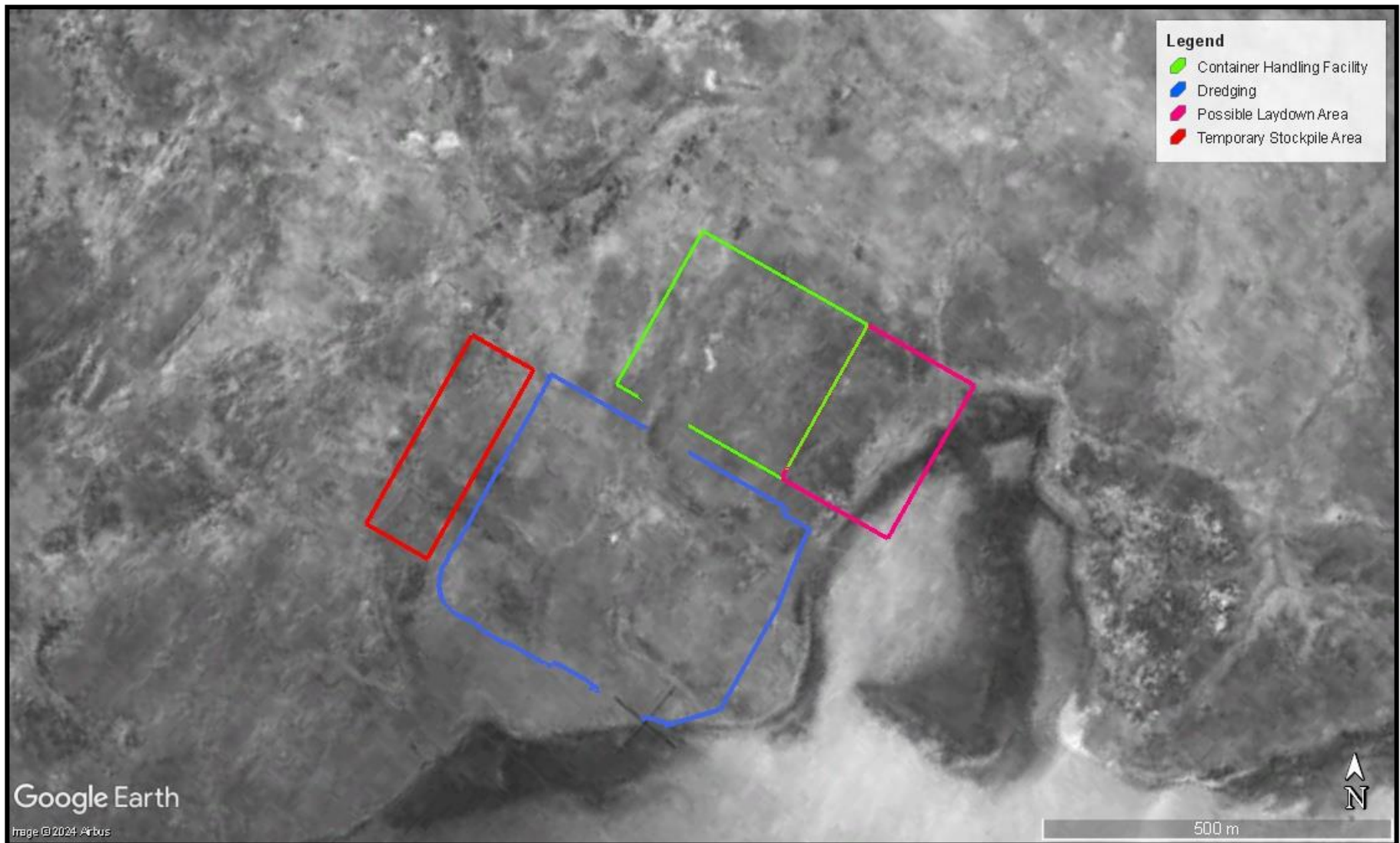


FIGURE 6: LOCATION OF THE FOOTPRINT IN 1937 ²

² 117C_060_66303 - 117C_060_66304

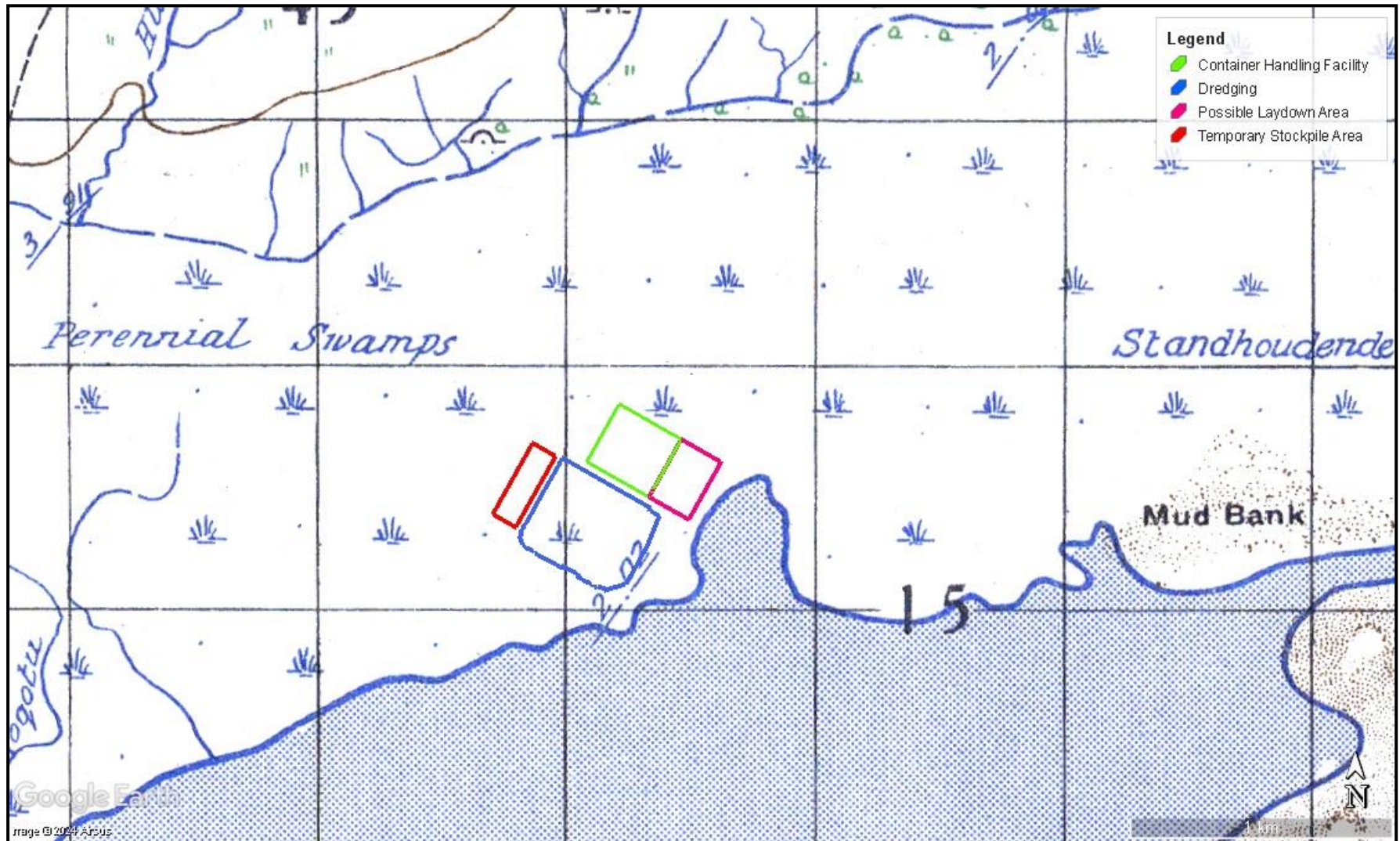


FIGURE 7: LOCATION OF THE STUDY AREA IN 1943³

³ 2832CC Richards Bay 1943

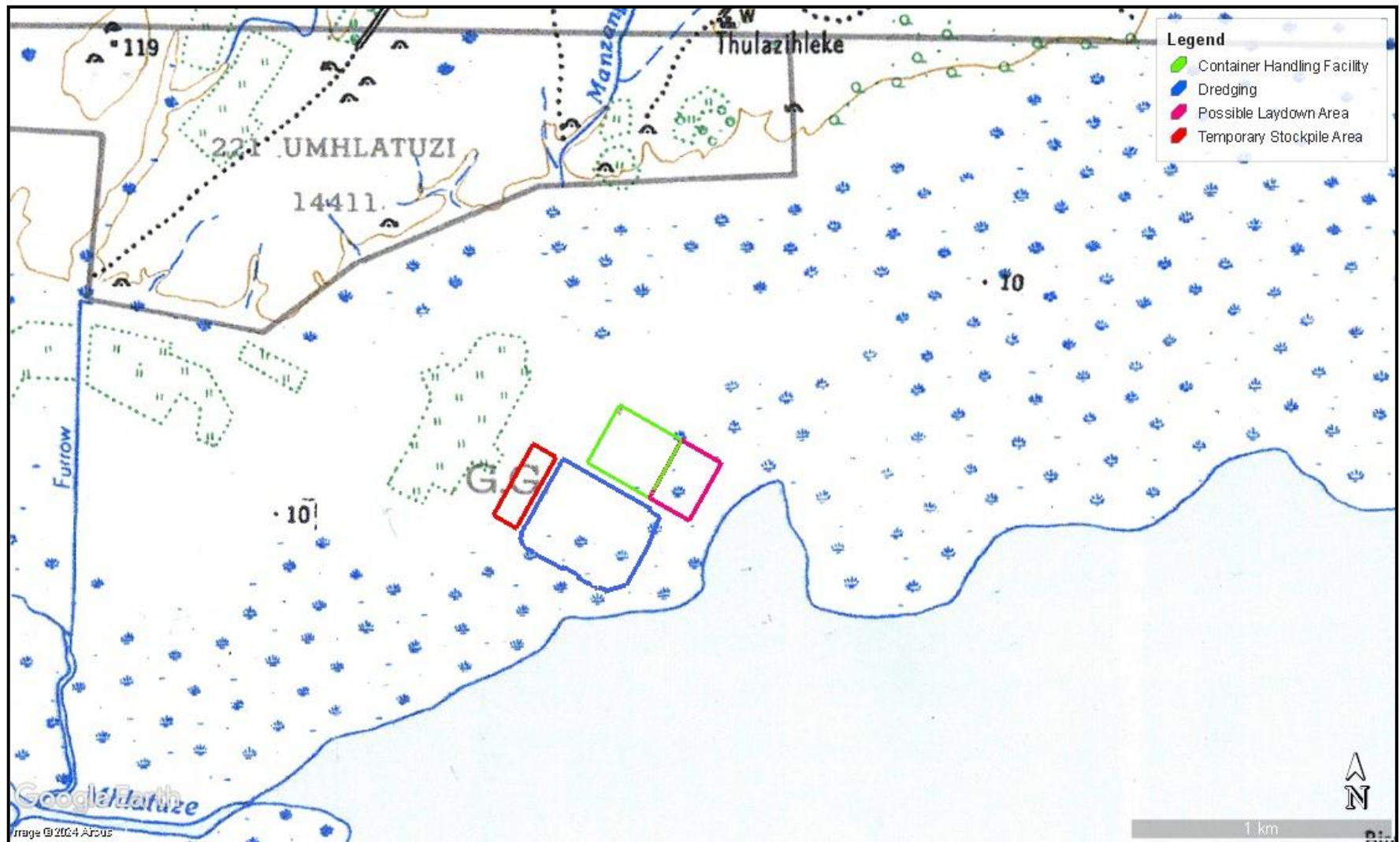


FIGURE 8: LOCATION OF THE STUDY AREA IN 1964⁴

⁴ 2832CC Richards Bay 1964

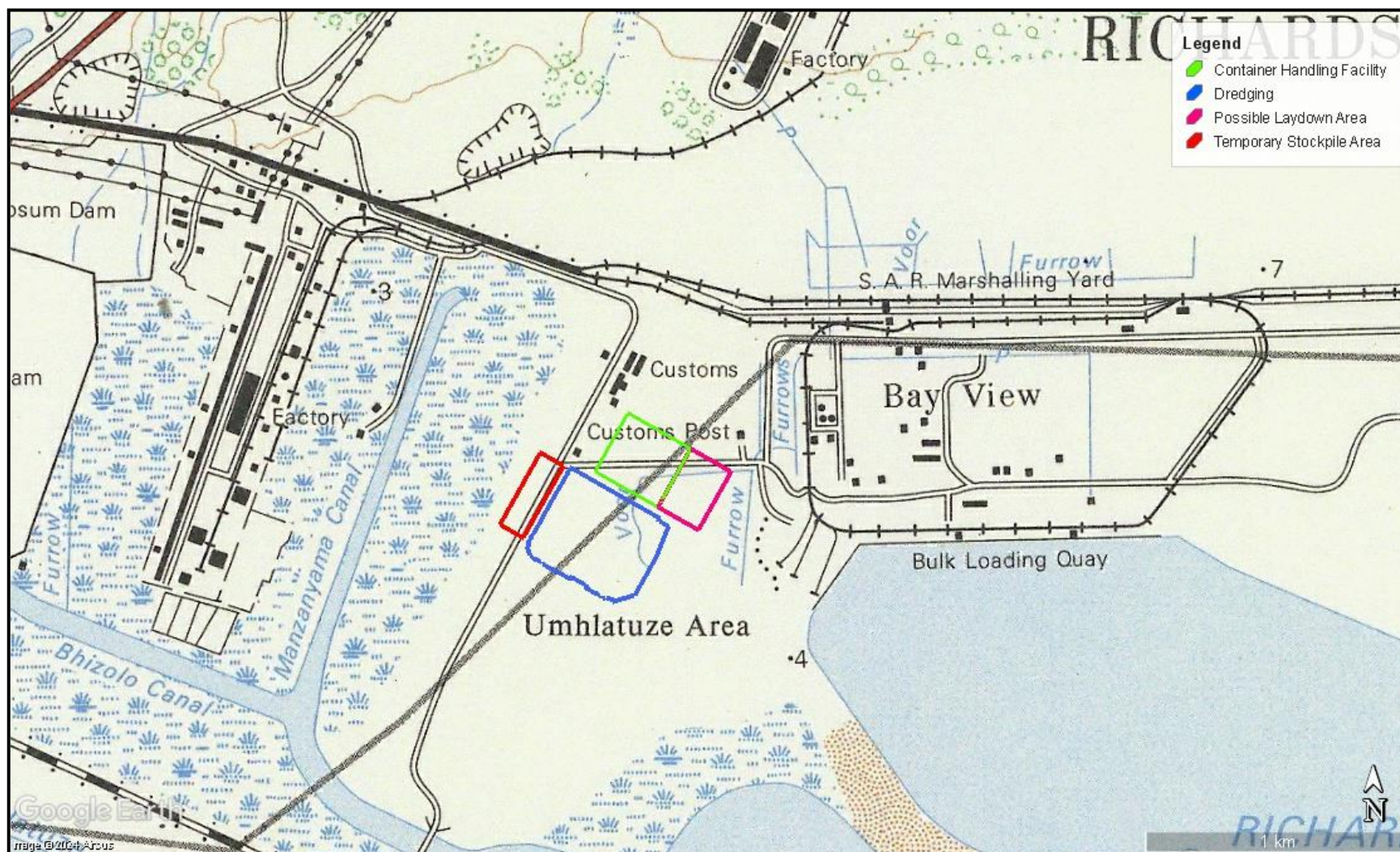


FIGURE 9: LOCATION OF THE STUDY AREA IN 1983⁵

⁵ 2832CC Richards Bay 1983

7.2. Palaeontological Sensitivity

The area is mostly in an area of moderate palaeontological sensitivity (Figure 10 and Table 2). Dr Alan Smith undertook a desktop study of the proposed project area (Appendix A). Quaternary sediments of the KwaMbonambi are present in the proposed subaerial Richards Bay Berth 605 project footprint. This formation is very unlikely to contain fossils and has also been subject to anthropogenic disturbance.

In contrast harbour capital dredging may intersect Cretaceous, Tertiary and Quaternary Rocks (not shown on the SAHRIS Palaeontological Sensitivity Map), which can be highly fossiliferous. Significant Palaeontological Material may be found in the dredge spoil and consequently the temporary dredge spoil sites will require regular inspection by a suitably qualified palaeontologist. A schedule for this can only be developed when the rate of dredging and dumping of spoil is known.

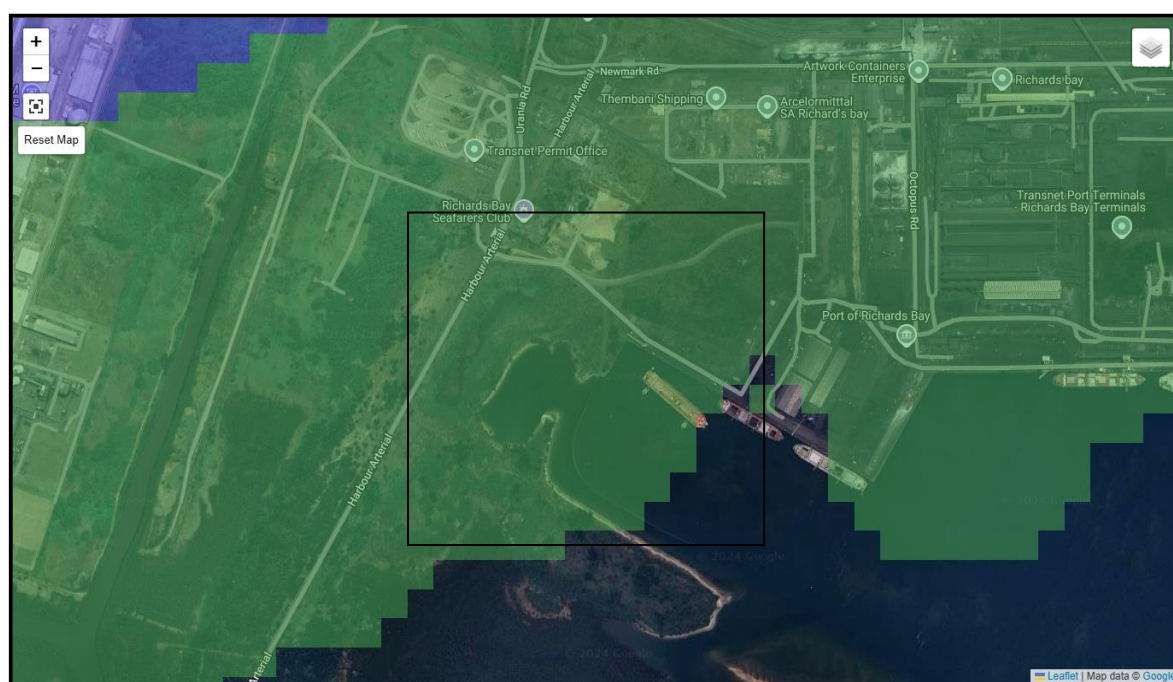


FIGURE 10: PALAEONTOLOGICAL SENSITIVITY MAP

TABLE 2: PALAEONTOLOGY SENSITIVITY RATINGS

COLOUR	SENSITIVITY	REQUIRED ACTION
Red	Very High	field assessment and protocol for finds is required
Orange/Yellow	High	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
Green	Moderate	desktop study is required
Blue	Low	no palaeontological studies are required however a protocol for finds is required
Grey	Insignificant/Zero	no palaeontological studies are required
White/Clear	Unknown	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue

		to populate the map.
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7.3. FIELD SURVEY

The field survey was undertaken on 22 October 2024 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 are located on reclaimed swamp therefore it is highly unlikely that archaeological sites will occur in these areas.

The Desktop PIA requires the geotechnical report to determine when site surveys and sampling must occur.

While it is highly unlikely that any heritage sites will occur on the reclaimed land or in the area to be dredged, a Chance Find Protocol for Terrestrial and Maritime Heritage (Appendix B) should form part of the EMPr.

8. IMPACT ASSESSMENT

Table 3 indicates the assessment of the impacts. In summary the impact on heritage sites is very low at all stages, since it is highly unlikely that heritage sites will be affected. The impact on palaeontological remains will also be low if mitigation is undertaken. The cumulative impact is very low for both heritage and palaeontology.

TABLE 3: IMPACT ASSESSMENT TABLE FOR BERTH 605

CONSTRUCTION

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Heritage	Heritage resources	Construction	n/a	moderate	0	0	0	0	0	0	#N/A	0	0	0	0	0	0	#N/A
Significance						#N/A							#N/A						
Impact 2:	Palaeontology	Palaeontology	Construction	negative		2	2	3	5	2	24	N2	2	1	3	5	2	22	N2
Significance						N2 - Low							N2 - Low						

OPERATIONAL

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S		(M+	E+	R+	D)x	P=	S	
Impact 1:		Heritage	Operational			0	0	0	0	0	0	#N/A	0	0	0	0	0	0	#N/A
Significance						#N/A							#N/A						
Impact 2:		Palaeontology	Operational			2	2	3	5	2	24	N2	2	1	3	5	2	22	N2
Significance						N2 - Low							N2 - Low						
Significance						N2 - Low							N2 - Low						

DECOMMISSIONING

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S		(M+	E+	R+	D)x	P=	S	
Impact 1:		Heritage	Decommissioning			0	0	0	0	0	0	#N/A	0	0	0	0	0	0	#N/A
Significance						#N/A							#N/A						
Impact 2:		Palaeontology	Decommissioning			0	0	0	0	0	0	#N/A	0	0	0	0	0	0	#N/A
Significance						#N/A							#N/A						

CUMULATIVE

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S		(M+	E+	R+	D)x	P=	S	
Impact 1:		Heritage	Cumulative			0	0	0	0	0	0	#N/A	0	0	0	0	0	0	#N/A

Significance						#N/A							#N/A						
Impact 2:		Palaeontology	Cumulative			2	2	3	5	2	24	N2	2	1	3	5	2	22	N2
Significance						N2 - Low							N2 - Low						

9. CONCLUSION

A Phase 1 heritage survey was undertaken of the proposed new Berth 605 and related infrastructure at the Port of Richards Bay. The desktop study noted that the general area is of high heritage significance; however, the study area is on reclaimed land and swamp.

The chances of heritage sites occurring within the study areas are very low; however, a Chance Find Protocol will be initiated and needs to form part of the EMPr. No further mitigation is required.

10. REFERENCES

- Anderson, G. and Anderson, L. 2009. Heritage Survey Of The Proposed Expansion To The Transnet National Ports Authority, Richards Bay. For MSA Environmental, Legal & Mining Services
- Anderson, G. and Anderson, L. 2010a. Heritage Survey Of The Proposed Richards Bay Central Industrial Area. For Coastal & Environmental Services
- Anderson, G. and Anderson, L. 2010b. Heritage Survey Of The Nozelela Minerals Sands (Pty) Ltd 33kv Transmission Line. For SRK Consulting
- Anderson, G. and Anderson, L. 2015. Alton South Transnet Railway, Richards Bay, KwaZulu-Natal For Exigent Environmental
- Anderson, G. and Anderson, L. 2004 – 2018. Annual Report For Archaeological Surveys Of The Zulti North Mining Lease. Report For RBM
- Anderson, G. and Anderson, L. 2004 – 2015. Annual reports for Hillendale Mine. Tronox KZN Sands.
- Anderson, G. 2019. Heritage Survey Of The Proposed 3140mw Combined Cycle Power Plant (CCPP) Power Project At Erf 1854 Alton, .Richards Bay, Kwazulu-Natal. For Exigent Engineering
- Anderson, G. 2020. Heritage Survey Of The Proposed 3140mw Combined Cycle Power Plant (Ccpg) Power Project At Erf 1854 Alton, .Richards Bay, KwaZulu-Natal. For Exigent Engineering
- Griffiths, S, 1996. Competition for Land between Conservation and Low Income Settlement Users: The Classical Case of Reserve 6 in Richards Bay., Master's Thesis: University Of Natal
- Ntuli, H.S. 2019. Memories Of Victims: The Historical Trajectory Of The Removal Of People From Mandlanzini, South Africa. *Southern Journal For Contemporary History* **44 (2)**:74-95
- Zululand Observer, 1 April 1976

Maps:

2832CC Richards Bay 1943, 1963, 1986

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Database

KZN Museum

SAHRA

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EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the South African Archaeology Association – CRM Section in 1998 that then became the Association of Southern African Professional Archaeologists. Gavin is rated as a Principal Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.



Gavin Anderson
Archaeologist/Heritage Impact Assessor

**APPENDIX A:
PIA DESKTOP STUDY**

**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**

DESKTOP PALAEOLOGY ASSESSMENT

FOR

**UMLANDO: Archaeological Surveys & Heritage Management
PO Box 102532, Meerensee, KwaZulu-Natal 3901**

by

**Dr Alan Smith
Alan Smith Consulting
asconsulting@telkomsa.net**

31 October 2024

Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision-making process for the Project.

Specialist: Dr Alan Smith

Signature:



EXECUTIVE SUMMARY

Quaternary sediments of the KwaMbonambi are present in the proposed subaerial Richards Bay Berth 605 project footprint. This formation is very unlikely to contain fossils and has also been subject to anthropogenic disturbance.

In contrast harbour dredging may intersect Cretaceous, Tertiary and Quaternary Rocks (not shown on the Sahr's Palaeontological Sensitivity Map), which can be highly fossiliferous. Significant Palaeontological Material may be found in the dredge spoil and consequently the temporary dredge spoil sites will require regular inspection by a suitably qualified palaeontologist. A schedule for this can only be developed when the rate of dredging and dumping of spoil is known

A "Chance Find Protocol" (Appendix 1) has been incorporated into this report for when a palaeontologist is not on site and MUST be incorporated into the EMP for finds made when a paleontologist is not on site.

ACRONYMS

BA:	Basic Assessment
DFFE:	Department of Forestry, Fisheries and the Environment
HIA:	Heritage Impact Assessment
PIA;	Palaeontological Impact Assessment
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System

1. TERMS OF REFERENCE

Dr Alan Smith was requested by UMLANDO: Archaeological Surveys & Heritage Management to provide a Desk-Top Palaeoenvironmental Impact Assessment for the proposed Berth 605 project, Richards Bay Harbour, Richards Bay, KZN (Figure 1). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) Regulations, Appendix 6.



Figure 1: Location Map showing the area of the proposed Berth 605 Richards Bay Harbour Extension, Richards Bay, KwaZulu-Natal. Image source: Google Earth.

2. SCOPE AND PURPOSE OF REPORT

The intention is to construct a new berth and associated infrastructure in support of a Container Handling Facility at the Port of Richards Bay (Figure 1). A PIA is a means of identifying any significant palaeontological material before development begins, so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This desktop investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (DFFE), who will review the Scoping and EIA and grant or refuse authorisation. The PIA report will outline any

management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

3. METHODOLOGY

Geological maps, a literature review and personal experience (see Appendix 2) were used in this desktop PIA research.

4. GEOLOGY

4.1. KwaMbonambi Formation

The subaerial part of the proposed Berth 605 site is underlain by Quaternary sediments of the Kwambonambi Formation. The KwaMbonambi Formation comprises an extinct dunefield, comprising parabolic dunes which were active from about 57 000 to 7 000 years ago (Ka) (Porat and Botha, 2008; Botha, 2018) (Figure 2). This formation is composed of grey and brown fine-grained sand and has been anthropogenically disturbed.

4.2. Cretaceous, Tertiary and Quaternary Rocks and Sediments

In contrast, the harbour seabed is underlain by marine rocks and sediments ranging in age from Cretaceous to modern sediments. The oldest is the Cretaceous-aged Zululand Group (St Lucia 1:250 000 Geological Map; 2732) which is dated here at 86.5-83.5 Million years (Ma) (MacMillan, 2003). The sediments which gave rise to these rocks were deposited in the ocean created by the fragmentation of the Gondwana Super Continent into Antarctica, Australia and so creating the Indian Ocean.

Dredging will take place to enable a water depth of -14.5m CD at Berth 605. An estimated 2.8 million cubic metres of dredge spoil will be obtained and ultimately disposed offshore. Three adjacent temporary storage sites will be utilized (Figure 2).

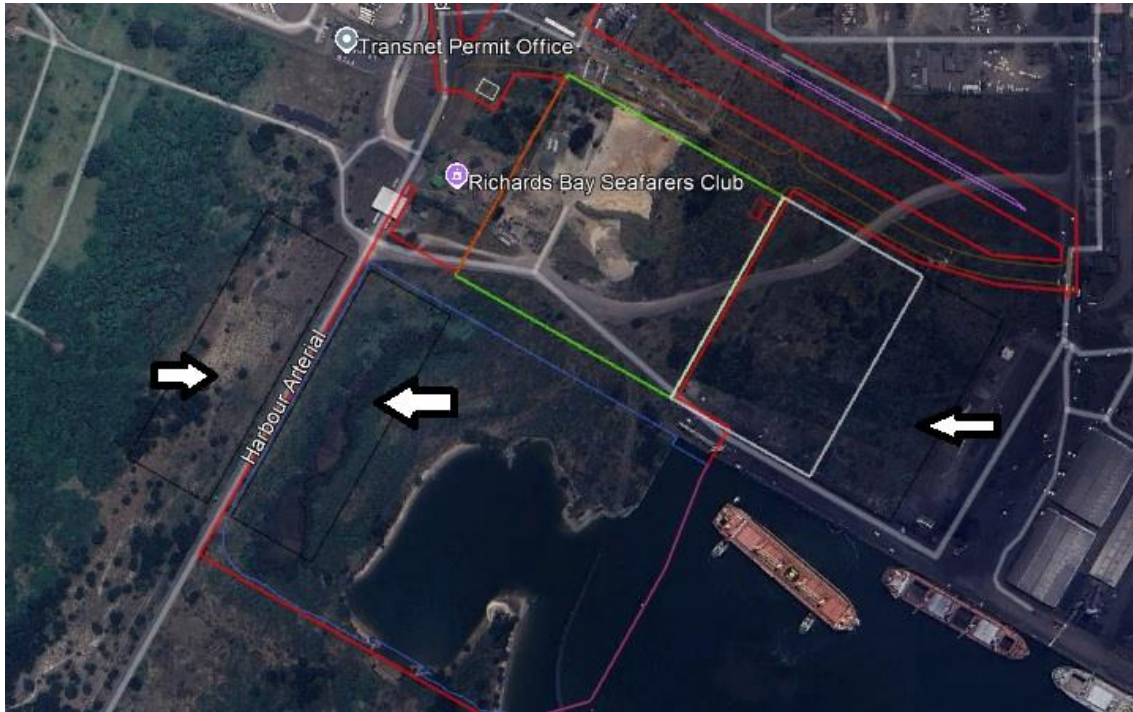


Figure 2: The location of the proposed temporary storage sites (arrowed).

5. PALAEOONTOLOGY

Part of the palaeo-sensitivity underlying the proposed Berth 605 project area is illustrated in Figure 3. The Kwanbonambi Formation is coded green. The sediments below the substrate are not coded (Figure 3) but should be coded red (coding explained in Table 1). Exactly what is present will only become clear when the dredge spoil is inspected.

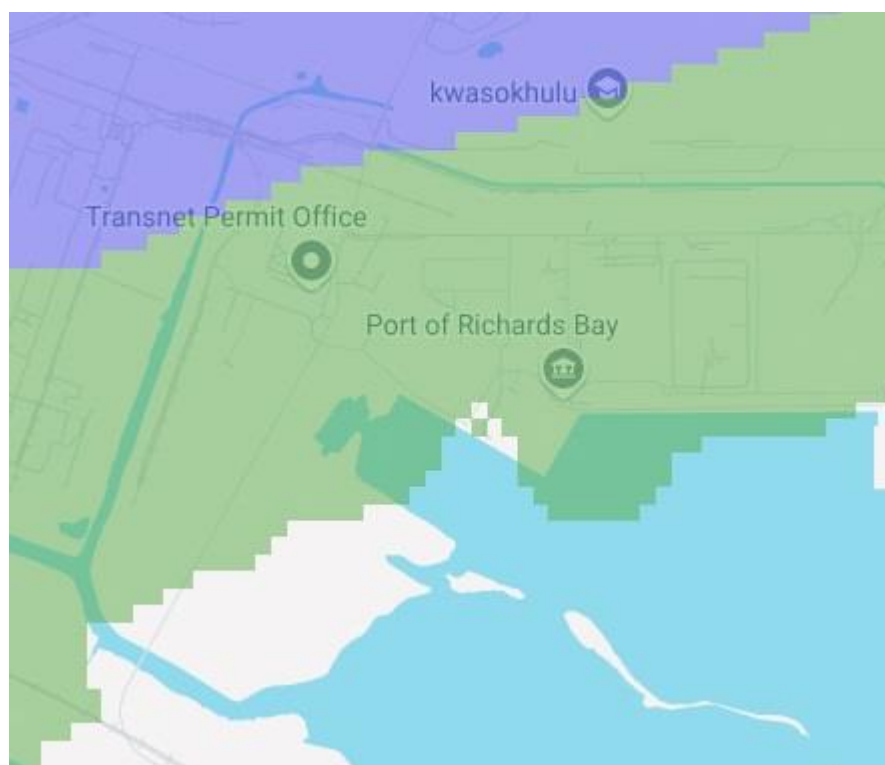


Figure 3: Palaeo-sensitivity of the approximate area covered by the proposed Richards Bay Berth 605 Expansion. Kwambonambi Formation is coded green. The substrate of the harbour (blue) is underlain by Cretaceous to modern unconsolidated sediments which should be red-coded (see Table 1).

Table 1: Summary of SAHRIS categories

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	None	Letter of Exemption required

5.1. Kwambonambi Formation (Green)

This is a relict Aeolian dunefield and as such is unlikely to be fossiliferous.

5.2. Cretaceous Rocks to Modern Sediments

The Richards Bay harbour substrate is underlain by the Cretaceous Zululand Group St Lucia (2723) 1: 250 000 Geological Map. These rocks are composed of diamictite, gravel and shale beds 5 to 100 cm thick. Although very weathered marine fossils are present and will be exposed during dredging.

The Cretaceous rocks are penetrated by the trace fossil *Ophiomorpha*. *Thalassinoides* track traces are also common on bed tops. Most noticeably, the Zululand Group is associated with ammonites (Figure 4).



Figure 4: Sample of Ammonites and the mollusc *Trigonia* (bottom right).

The basal Makatini Formation is characterized by abundant fossil woods. These are associated with the matrix-supported conglomerates (diamictites). Two types of woods are observed:

- Trunks with hollow interior sections (by far the most common) and
- Trunks with very prominent tree rings.

The trunks with tree rings may be *protoatherospermoxylon renneiei* (Klinger and Kennedy, 1980). The hollow trunk type (unknown variety) is characteristically very long and thin (up to 30m length) whereas

the solid trunk type tends to be wider, shorter and branched (Smith et al., 2018). The Makatini Formation is also characterized by numerous marine mollusc fossils such as ammonites, clams and gastropods (du Toit, 1954). Sharks' teeth are common within the Cretaceous (Figure 5). These are small and never longer than 1.5cm.



Figure 5: Sharks tooth preserved in the Mzamba Formation (Photo L. Guastella) which is correlated with the Zululand Group.

5.3. Post-Cretaceous Rocks and Unlithified Sediment

This sediment may contain fossils, such as teeth from the extinct *Megalodon* Shark.

5.4. General Comment

The KwaMbonambi Formation is a relict dunefields and hence very unlikely to contain fossils. However, there remains the possibility of a surprise find (none recorded yet) consequently a "Chance Find Protocol" has been inserted (Appendix 1) into this report and this should be written into the EMPr Report.

In contrast the rocks and sediments of the harbour substrate are very likely to contain marine fossils. The dredge spoil will have to be monitored on a regular basis by a competent palaeontologist, how frequently will depend on the rate of dredge spoil dumped in the temporary spoils sites.

6. CONCLUSION

Fossils are very likely to be found in the dredge spoil and this will have to be monitored on a regular basis by a palaeontologist. A schedule for this monitoring can only be developed when the dredging and dumping schedule is known.

In the case of a surprise find a “Chance Find Protocol” has been inserted into this report for any finds made when a paleontologist is not on site.

7. REFERENCES

- Botha, G.A., 2018. Lithostratigraphy of the late Cenozoic Maputaland Group. South African Journal of Geology 121, 95-108.
- du Toit, A.L., 1954. The Geology of South Africa, 3rd Ed, Edinburgh, Oliver and Boyd, 611pp
- Google Earth. <https://google earth. Com>
- Klinger, H.C. and Kennedy, W.J., 1980. The uMzamba Formation at its type section, uMzamba estuary (Pondoland, Transkei), the ammonite content and palaeogeographical distribution. Annals of the South African Museum, 81, 207-222.
- McMillan, I. K., 2003. Foraminiferally defined biostratigraphic episodes and sedimentation pattern of the Cretaceous drift succession (Early Barremian to Late Maastrichtian) in seven basins on the South African and southern Namibian continental margin. South African Journal of Science, 99, 537-76.
- Porat, N. and Botha, G.A., 2008. The chronology of dune development on the Maputaland coastal plain, southeast Africa. Quaternary Science Reviews, 27, 1024-1046.
- Smith AM; Guastella, LA; Botes, ZA, 2018. Submarine mass flow channels as an underlying control for headland-bound embayments, southeast African coastline. South African Journal of Geology, 121.3, 227-236
- St Lucia (2723) 1: 250 000 Geological Map. Government Printer, Pretoria.

Appendix 1: CHANCE FIND PROTOCOL FOR PALAEOLOGY

This Chance Find Protocol must be included in the site EMP.

If any fossils are found, a Palaeontologist must be notified immediately by the CO/EO/EAP/Site Manager and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the CO/EO/EAP/Site Manager or the Site Manager becoming aware of suspicious looking palaeo-material:

- Images must be captured and sent to a competent geologist
- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.
4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.

5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.
7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.
8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

Appendix 2: DETAILS OF SPECIALIST

Dr Alan Smith

Private Consultant: Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091
&

Honorary Research Fellow: Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Durban.

Role: Specialist Palaeontological Report production

Expertise of the specialist: Dr Alan Smith: CV (short)

Dr Alan Smith Pr. Sc. Nat., I.A.H.S.

- MSc in palaeontology. The Stromatolites of Etosha Pan. (University of KwaZulu-Natal).
- Alan has published 9 refereed journal articles on "Stromatolites" with another under review and several in preparation.
 - Alan is part of the **Epstromnet** international collaboration on extant microbialites/stromatolites. This project receives some sponsorship from the United Kingdom's Natural Environment Research Council (NERC). This international project includes the following universities: Essex (UK), Ulster (UK), University of Wollongong, NSW, Australia, Nelson Mandela Bay, Rhodes, Witwatersrand and KwaZulu-Natal (SA) and the SA Geosciences Council.
- PhD in Geology (University of KwaZulu-Natal), Expert in the Ecca Group in northern KZN.
- Other scientific research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits and volcanology.
- Alan's experience includes understanding Earth Surface Processes and hazards they pose.
- Alan has published in both national and international, peer-reviewed journals. He has published 54 journal articles with +690 citations (detailed CV available on request).
- Alan has attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in palaeontological research.

Alan has been writing Palaeontological Reports since 2014.
Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Fieldwork PIA: Mpungoze water supply scheme, Empangeni. Client: Enviropro.
- Fieldwork PIA: Helpmekaar Dam. Client: Afzelia environmental consultants.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.

APPENDIX B
CHANCE FIND PROTOCOL

CHANCE FIND PROTOCOL – HERITAGE RESOURCES

PURPOSE

Potential impacts on heritage resources can occur during construction as a result of unearthing during construction. This protocol outlines the procedures to be followed in the event that a heritage resource is uncovered.

Palaeontological finds

Monitoring Programme for Palaeontology is to commence once the excavations for all structures and infrastructure begin. The following procedure is only required if fossils are seen on the surface and when excavations commence.

1. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (silicified wood, plants, insects, bone, shells) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
2. Where possible, photographs of similar fossils must be provided to the contractor to assist in recognizing the fossil plants and bones that might be encountered on site. This information must be built into the EMP's training and awareness plan and procedures.
3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
4. If there is any possible fossil material found by the Contractor/environmental officer then a qualified palaeontologist should visit the site to inspect the selected material and check the excavations where feasible.
5. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site, a South African Heritage Resources Agency (SAHRA) permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
6. If no good fossil material is recovered, then any site inspections by the palaeontologist will not be necessary.
7. If no fossils are found and the excavations have finished, then no further monitoring is required.

Archaeological finds

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

1. The heritage resource must be avoided and all activities in the immediate vicinity temporarily ceased.
2. A suitably qualified specialist must be informed and commissioned to consider the heritage resource, either via communicating with the Environmental Officer via telephone or email, or based on a site visit.
3. Appropriate measures are to be provided by a qualified specialist towards immediate management of the heritage resource.

Should the specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), the specialist must notify SAHRA on behalf of the Developer.

If required by SAHRA, the specialist must conduct a HIA in terms of NHRA Section 38 that must include rescue actions/excavations.

Graves

Should any unmarked human burials/remains be found during the course of construction:

1. Work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA).
2. Where human remains are part of a burial they would need to be exhumed under a permit from SAHRA (for pre-colonial burials as well as burials later than about AD 1500).
3. For newer graves, should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Section 35 and NHRA (1999) Regulations (Regulation 38, 39, 40) SAHRA may require that an identification of interested parties, consultation and /or grave relocation take place;
4. Consultation must take place in terms of NHRA (1999) Regulations 39, 40, 42;
5. Grave relocation must take place in terms of NHRA (1999) Regulations 34.
6. These measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions, laws and by-laws pertaining to human remains.

If required by current, relevant legislation, a full social consultation process should occur in conjunction with the mitigation of cemeteries and burials. Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.