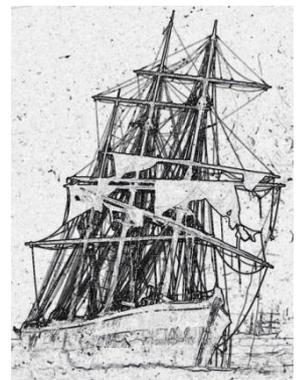


# UNDERWATER ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED MARINE SERVITUDES FOR THE COEGA SEZ

Port Elizabeth

Eastern Cape

South Africa



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**Report #:** 2020/PE/001  
**Status:** Final  
**Revision #:** 3  
**Date:** 20 October 2020

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**Declaration:**

I, Vanessa Maitland, declare that I have no financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.



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20-10-2020

## EXECUTIVE SUMMARY

The Coega Development Corporation (CDC) plans to establish marine pipeline servitudes in which current and future investors in the Coega Special Economic Zone (SEZ) can establish infrastructure to abstract seawater and discharge treated effluent as required by various industrial processes. More than one servitude will be established, based on the findings of the marine dispersion modelling that has been done. The project entails the selection of the servitude areas, as well as the construction and establishment of associated infrastructure in the marine environment and on land, including pipelines, pump stations, holding reservoirs (PRDW 2020).

As part of the Environmental Impact Assessment (EIA), an Underwater Archaeological Impact Assessment (UAIA) needed to be undertaken to identify sensitive cultural heritage sites in the affected environment. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater and cultural heritage sites within the designated area.

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## GLOSSARY OF TERMS AND ACRONYMS

### TERMS

<b>Anomaly</b>	A magnetic change within the earth's natural magnetic field
<b>Impact Zone</b>	Area that may be impacted by the pipeline development footprint
<b>nT</b>	Nanotesla – a unit of measure of the strength of the magnetic field

### ACRONYMS

<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>EIA</b>	Environmental Impact Assessment
<b>HIA</b>	Heritage Impact Assessment
<b>MUCH</b>	Maritime and Underwater Cultural Heritage
<b>NHRA</b>	National Heritage Resources Act (No. 25 of 1999)
<b>RIB</b>	Rigid Inflatable Boat
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SEZ</b>	Special Economic Zone
<b>UAIA</b>	Underwater Archaeological Impact Assessment

## 1. INTRODUCTION

The Coega Development Corporation (CDC) plans to establish marine pipeline servitudes in which current and future investors in the Coega Special Economic Zone (SEZ) can establish infrastructure to abstract seawater and discharge treated effluent as required by various industrial processes. More than one servitude will be established, based on the findings of the marine dispersion modelling that has been done. The project entails the selection of the servitude areas, as well as the construction and establishment of associated infrastructure in the marine environment and on land, including pipelines, pump stations, holding reservoirs (PRDW 2020).

As part of the Environmental Impact Assessment (EIA), an Underwater Archaeological Impact Assessment (UAIA) needed to be undertaken to identify sensitive cultural heritage sites in the affected environment. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater and cultural heritage sites within the designated area.

A Phase I Archaeological Impact Assessment was submitted in 2010 (Binneman), which evaluated the pre-colonial archaeological remains within the SEZ. A HIA of the built environment and graves was undertaken in 2010 (Bennie), which dealt with the terrestrial colonial period sites within the SEZ. A palaeontological Impact Assessment was done in 2010 for the Coega SEZ (Almond).

This UAIA covers the underwater cultural heritage. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater cultural heritage sites within the designated area.

This report consists of 4 sections

1. Desktop study, consisting of a database of known and/or suspected wrecks in the area through study of available written and oral resources
2. A magnetometer survey of the designated area to identify magnetic anomalies that may be underwater cultural heritage sites
3. Diver searches on identified magnetic anomalies
4. Conclusions

South Africa's heritage resources comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (No. 25 of 1999) (NHRA), no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage or archaeological site without a permit issued by the heritage resources authority responsible for the protection of such site.

Therefore, in accordance with the NHRA, an independent maritime archaeologist was appointed to conduct an UAIA to determine the potential sites, to assess their significance and to mitigate negative impacts.

This report is one section of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and is intended for submission to SAHRA.

## 2. TERMS OF REFERENCE

The aim of the UAIA is to determine if any sites, features or objects of cultural heritage significance exist within the defined areas.

The scope of work consisted of the following:

- Desktop study, consisting of a database of known and suspected wrecks in the area ascertained through study of available written and oral resources
- Magnetometer (mag) survey of the impact zone
- Diver searches on identified magnetic anomalies

The objectives were to:

- Identify potential Maritime and Underwater Cultural Heritage (MUCH) sites within the impact zone
- Evaluate the potential impact of development in the impact zone
- Recommend measures to mitigate any negative impacts on MUCH sites in the designated area

### 3. HERITAGE RESOURCES

#### 3.1. THE LEGISLATION

According to Section 32 (1) of the NHRA (No. 25 of 1999), heritage objects consist of:

“An object or collection of objects, or a type of object or list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including— (a) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens.”

The Act further stipulates that the term “archaeological” includes:

“wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation.”

Section 35 of the Act states:

“(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority—

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;”
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.”

Furthermore Section 38 of the Act states:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

- (b) the construction of a bridge or similar structure exceeding 50 m in length;
- (c) any development or other activity which will change the character of a site—
- (i) exceeding 5 000 m<sup>2</sup> in extent; or
  - (ii) involving three or more existing erven or subdivisions thereof; or
  - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, 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.
- (2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)—
- (a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or
  - (b) notify the person concerned that this section does not apply.
- (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): provided that the following must be included:
- (a) The identification and mapping of all heritage resources in the area affected;
  - (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
  - (c) an assessment of the impact of the development on such heritage resources;
  - (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
  - (e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
  - (f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
  - (g) plans for mitigation of any adverse effects during and after the completion of the proposed development.
- (4) The report must be considered timeously by the responsible heritage resources authority which must, after consultation with the person proposing the development, decide—
- (a) whether or not the development may proceed;
  - (b) any limitations or conditions to be applied to the development;
  - (c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;
  - (d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and
  - (e) whether the appointment of specialists is required as a condition of approval of the proposal.
- (5) A provincial heritage resources authority shall not make any decision under subsection (4) with respect to any development which impacts on a heritage resource protected at national level unless it has consulted SAHRA.
- (6) The applicant may appeal against the decision of the provincial heritage resources authority to the MEC, who—
- (a) must consider the views of both parties; and
  - (b) may at his or her discretion—
    - (i) appoint a committee to undertake an independent review of the impact assessment report and the decision of the responsible heritage authority; and
    - (ii) consult SAHRA; and

(c) must uphold, amend or overturn such decision.

(7) The provisions of this section do not apply to a development described in subsection (1) affecting any heritage resource formally protected by SAHRA unless the authority concerned decides otherwise.

(8) The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

(9) The provincial heritage resources authority, with the approval of the MEC, may, by notice in the *Provincial Gazette*, exempt from the requirements of this section any place specified in the notice.

(10) Any person who has complied with the decision of a provincial heritage resources authority in subsection (4) or of the MEC in terms of subsection (6) or other requirements referred to in subsection (8), must be exempted from compliance with all other protections in terms of this Part, but any existing heritage agreements made in terms of section 42 must continue to apply.”

### **3.2 CONCLUSION - THE LEGISLATION IN TERMS OF THE PROJECT**

There is extensive national legislation covering heritage and archaeological sites. Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that an assessment of potential heritage resources in the development area needs to be done. This is the purpose of the desktop study and the magnetometer survey. These processes identify potential MUCH sites.

## **4. STUDY APPROACH AND METHODOLOGY**

### **4.1. EXTENT OF THE ASSESSMENT**

This survey and impact assessment is concerned with archaeological sites and covers the area as described in Section 5.

### **4.2. METHODOLOGY**

#### **4.2.1. DESKTOP SURVEY**

A database was compiled from the available written and oral sources and is available in Section 6.

The shipwreck database highlights the wrecks that are or may be in the area. The nature of the environment, poor historical reporting and the length of time since the wrecks occurred means that underwater cultural heritage sites may literally be anywhere and are thus hard to pinpoint with any accuracy beforehand. It is important to have a database because if MUCH sites are uncovered during the project, it will be easier to identify the wreck and thus assess its cultural and historical significance.

### **LIMITATIONS**

- The database is a research tool that is constantly evolving as information is uncovered and added. In addition, the solitary nature of many wrecks means that information may be scarce and/or inaccurate. Therefore, without definitive information, shipwrecks are allocated to an area, based on limited information and certain assumptions regarding the dynamic nature of the environment.

#### 4.2.2. MAGNETOMETER SURVEY

A Geometrics G-882 cesium-vapor marine magnetometer was towed behind a 7.8m fibreglass rigid inflatable boat (RIB), with a layback of 15 meters, at an average speed of 3 - 6 knots/hour, utilising 15m run-lines. The magnetometer data collected by MagLog® software was analysed twice. The first or field analysis is performed as the magnetometer is towed (Figures 1- 3). Possible sites are tabulated and analysed according to the environmental conditions in the field. The post-field analysis was interpreted with geophysical software (Surfer), with knowledge of the environmental conditions. The analyses were compared and a final analysis completed.

#### LIMITATIONS

- The magnetometer picks up magnetic anomalies in and below the seabed. All the hits may not be MUCH sites, in addition, searches may not find the cause. Their status may only be revealed during the development process. The process gives the developers an idea of where MUCH sites may be uncovered.



Figure 1: Deployed magnetometer (Maitland, A 2020)

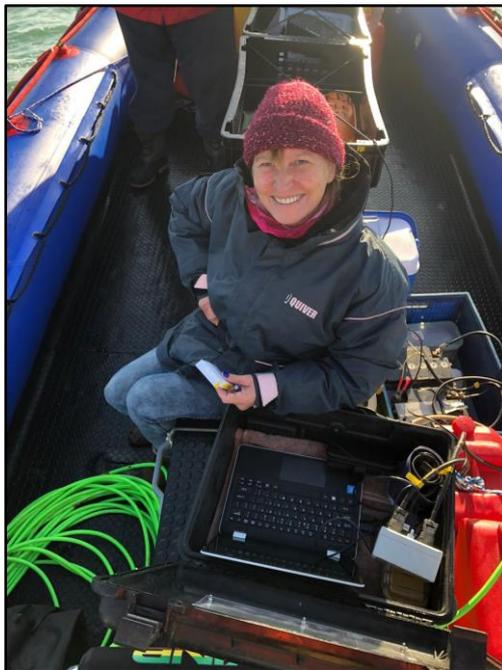


Figure 2: Magnetometer data capture (Maitland, A 2020)

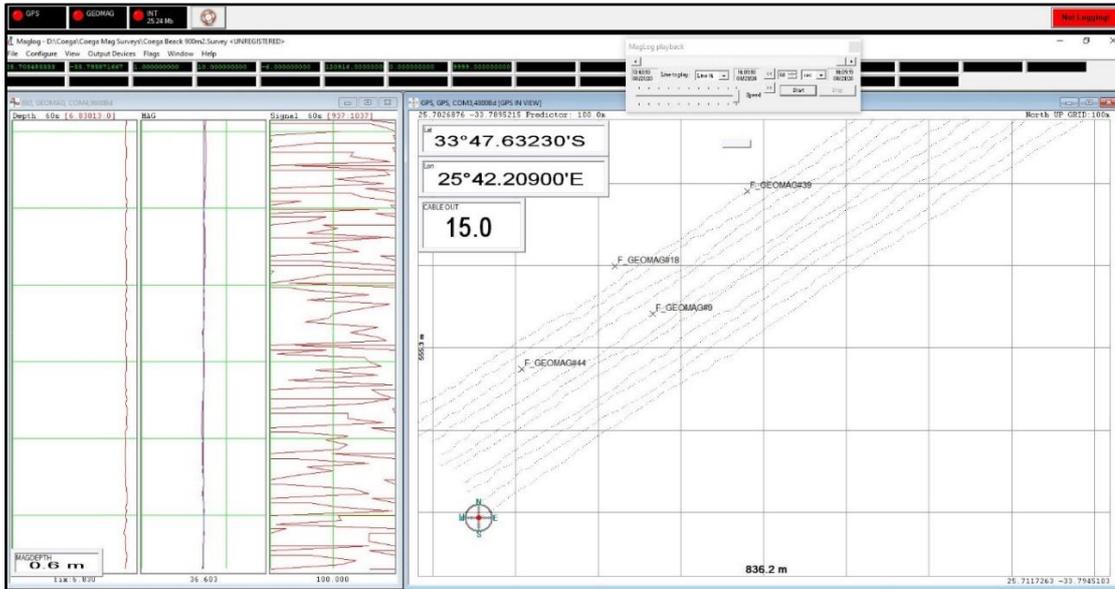


Figure 3: Field Analysis (Maitland 2020)

#### 4.2.3. DIVER SEARCHES

From the analysis of the magnetic data, anomalies are plotted. These need to be investigated by divers. A marker buoy is dropped on the coordinates and a circular search is conducted from this central point (Figure 4 and Figure 5). Results are recorded. A buoy with a handheld GPS attached is held by the diver, this tracks the location of the search (Figure 24).

#### LIMITATIONS

Some anomalies may be obvious shipwreck material while others may be covered in conglomerate and/or sand. The inshore area was very rocky and there were only sandy patches on the deeper anomalies. The rocks hamper circular searches. The Impact Zone, where the most anomalies were noted is very close to the shore, the bathymetry of the seabed is steep, within 3 km it drops from c.3m to 23m (Figure 7). This caused big surge which hampered searches.



Figure 4: Marker buoy and attached search reel (Maitland 2018)



Figure 5: Diver searches (Hookins 2018)

## 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT



Figure 6: Proposed Coega SEZ Marine Servitude and Impact Zone (Google Earth 2020)

### 5.1. BATHYMETRY

“The bathymetry shows a uniformly sloped bottom of gradient of 1/120 to 1/140. The bathymetry steepens in the shallow water from about -10m to shoreline. The surf zone and beach are also fairly steep. The bathymetry shows an undulated rough seafloor, indicative of the absence of a sandy bottom. The bathymetry shows undulations of 10 to 60cm of the seafloor. Rock reefs run mostly parallel to the coastline.

The bathymetry shows a prominent rock reef, 2 km from shoreline and running from left to right across the survey area. This reef has a steep landward slope of about 2 to 3m rise in the east, and a less pronounced slope towards the western part of about 1 to 1.5m rise. On the seaward side the reef has a gentle slope. In the South west quadrant there is an area that has a somewhat less undulated seafloor indicative of a sandier bottom. This area is from the -17m to -22m contours. The bathymetry is otherwise fairly uniform over the survey area” (CSIR 2010: 3-4) (Figure 7).

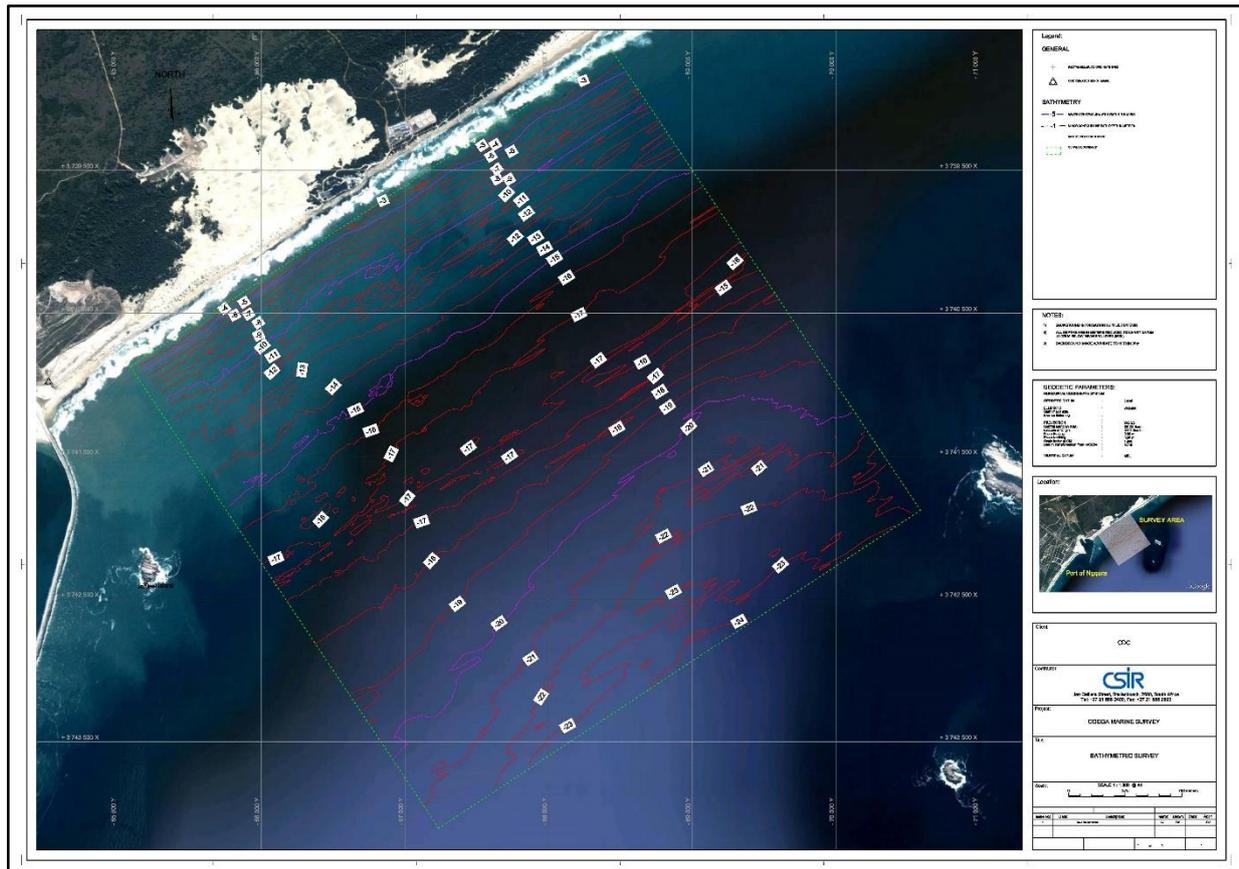


Figure 7: Bathymetric survey, east of the breakwater (CSIR: 2010)

## 5.2. WAVES, WIND AND SEDIMENT

“The beach state between the Swartkops, Coega and Sundays river mouths is generally the intermediate type, transverse bar and rip subtype. This type of beach is characterised by waves 1–1.5m high and small widely spaced rip currents every 150–300m running oblique to the shoreline. The swash zone is generally shallow with low waves breaking on the lee of or behind the terraces. Wave driven longshore drift moves sand along the beach. The wave energy is moderate to high; the prevailing swell is generated in the westerly gale belt and approaches the south coast from the southwest. Net sand movement due to these waves/swells is in a northward direction, although there is movement in both a northerly and southerly direction.” (Coastal and Environmental Services 2001: 109)

All of the above information informs on the possible state of underwater cultural resources. It confirms the dynamic nature of the environment.

After a wreck event, the cultural materials undergo a period of deterioration/stabilisation until an equilibrium is reached with the receiving environment. However, this deterioration/stabilisation process is ongoing as the environmental factors change (Richards & McKinnon 2009).

Shipwreck material on the seabed immediately starts chemically reacting with the environment. The pH, salinity, temperature, oxygen content and chemical composition of the water all affect the rate of corrosion. Artefacts under the sea usually form conglomerate masses. As ferrous metal objects corrode they become encrusted with layers of calcium carbonate, magnesium hydroxide, rust, sand, shells, pebbles, marine life skeletons and marine life (Hamilton 1976). This conglomerate protects the objects within as the internal environment is anaerobic.

If artefacts are buried beneath sediment, this environment is also anaerobic (the deeper it is buried, the less free oxygen in the sediment) (Cursi 2006). However, currents and wave action cause scour within the site. This

scour can expose previously stable artefacts to an oxygen rich environment, this causes the deterioration/stabilisation process to start again. The scouring water is often laden with sediments. The sand can strip conglomerate off wreck material to the bare object and increase deterioration.

The information indicates that the Impact Zone is a dynamic site with periods of high wave energy, with the resultant scour and deposition. From this we can make certain assumptions:

- Cultural resource material will be scattered widely over the seabed
- Although larger artefacts will be intact, the smaller objects are most likely buried within conglomerate and/or scattered throughout the area
- Conglomerated objects may be hard to discern as they will look like reef

## 6. DESKTOP SURVEY

### 6.1. NAVIGATIONAL OVERVIEW OF THE AREA

In van Keulen's map of 1778 (Figure 8), the islands and some of the other rivers are represented but not the Coega River. In the Arrowsmith map of 1844 (Figure 9), the Coega River is drawn in. The British Admiralty map of 1856 (Figure 10) is very accurate and includes depths soundings. The historical anchorage in Algoa Bay was outside the modern-day harbour of Port Elizabeth, protected by Cape Recife. Although, Purdey (1822) mentions vessels anchoring in the lee of St Croix during certain weather conditions (Figure 11).

The majority of the shipwrecks in Algoa Bay occurred in the vicinity of the historical anchorage, as that is where the majority were anchored.

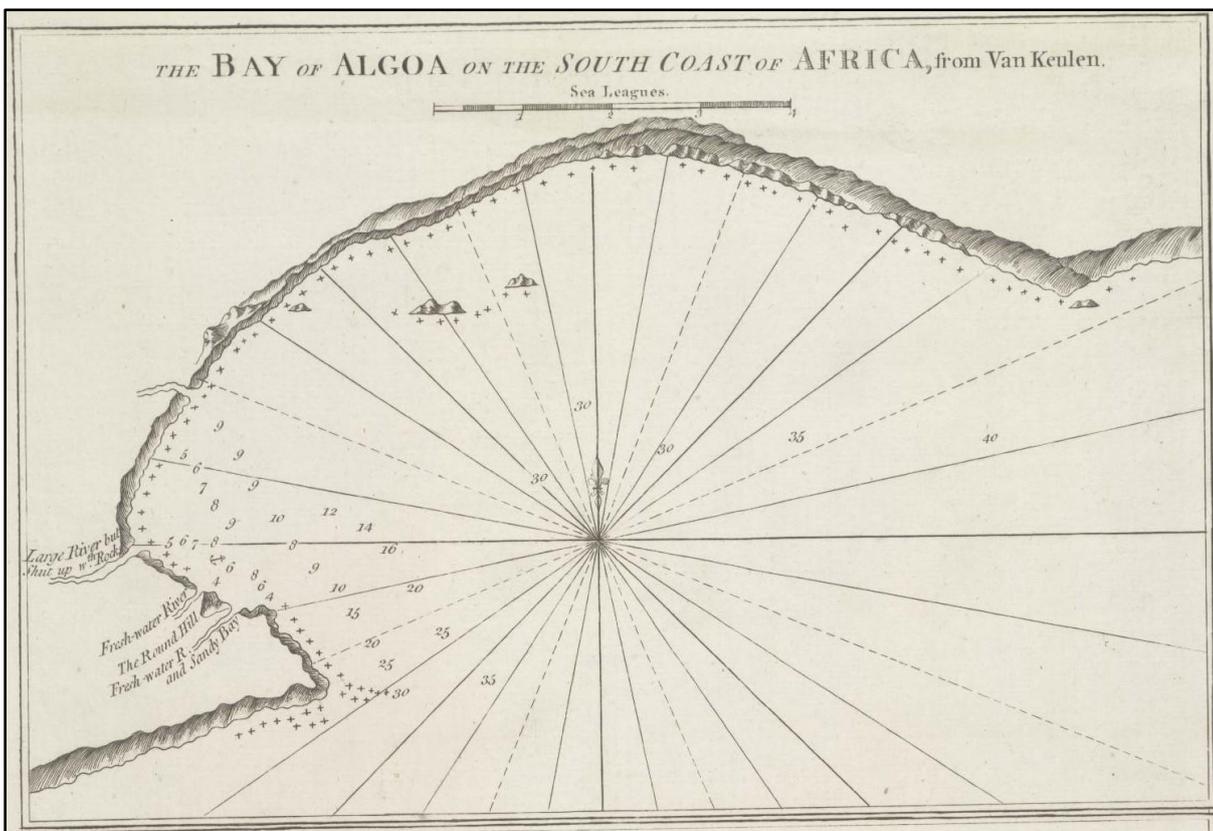


Figure 8: 1778 Map of Algoa Bay (van Keulen)



Figure 9: 1844 Map of Algoa Bay (Arrowsmith)

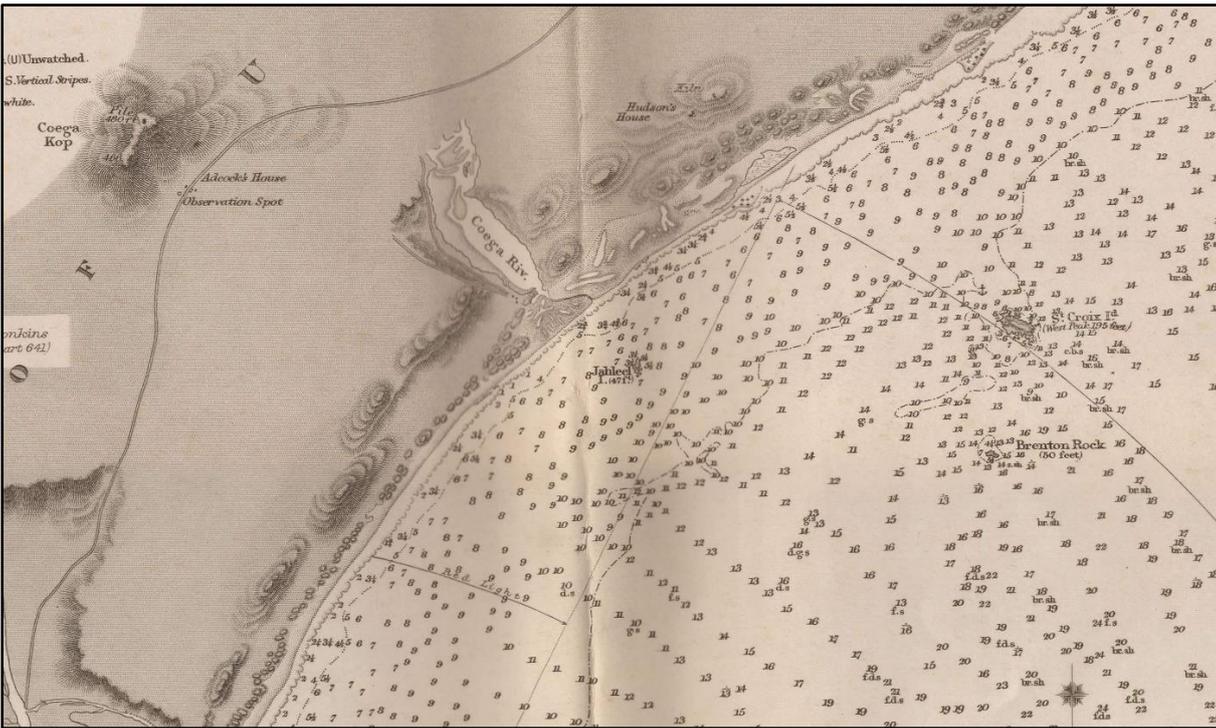


Figure 10: 1856 British Admiralty Chart with the Coega River, Jaheel Island and depths marked (Dayman)

From the Zwartkops to the Kuga River, situated in latitude  $33^{\circ} 48' 36''$  S., longitude  $25^{\circ} 37' 33''$  E., is five miles. The coast, sand hills, with a flat sandy beach. The mouth of this river is closed, and the water peculiarly salt, that flows into a small lake; from hence to the Sunday River is E.  $4^{\circ} 35'$  S. nine miles. The mouth of this river is situated in latitude  $33^{\circ} 43' 6''$  S., longitude  $25^{\circ} 15' 38''$  E. of Greenwich. Between this point and Cape Recife may be denominated Algoa Bay.

The Sunday River runs into the sea close to a remarkable rock; which I have denominated Read's Monument, in remembrance of a fine youth, a midshipman of the *Merai*, who perished, with three seamen, in the execution of their duty, whilst surveying the coast.

On its northern side, the bed of this river is deep, but the surf beats with violence over the bar across its mouth; and, as here the coast is exposed to the constant rolling swell, little chance of its ever being useful to commercial purposes offer. There are times when boats can enter or leave Sunday River; but from its mouth commences that wild inhospitable coast, that refuses shelter to any class of shipping.

The Island of St. Croix, in latitude  $33^{\circ} 47' 30''$  S., longitude  $25^{\circ} 41' 7''$  E., lies S.  $57^{\circ} 50'$  E. from the mouth of the Kuga, three and a half miles; and S.  $71^{\circ} 10'$  W. from the mouth of the Sunday, six miles; it is about two and a quarter in circumference. Another small rocky island, which I have called Brenton's Isle, lies S.  $46^{\circ}$  W. of St. Croix, one and an eighth mile distant, and about three-quarters of a mile in circumference. Off the mouth of the Kuga, south, two-thirds of a mile, is the island of Jahleel, about the same size as Brenton's Isle. Round these islands there is good anchorage; and, in the event of necessity, a ship might find partial shelter near St. Croix.\* These islands are inhabited by immense numbers of seals, which, at times, literally cover their surface.

Figure 11: Purdey's 1822 description of Coega River area

## 6.2. SHIPWRECK DATABASE

The shipwreck database highlights the quantities of wrecks that may be in the area. The nature of the environment, poor historical reporting and the length of time since the wrecks occurred means that underwater cultural heritage sites may literally be anywhere and are thus hard to pinpoint with any accuracy beforehand. It is important to have a database because if MUCH sites are uncovered during the project, it will be easier to identify the wreck and thus assess its cultural and historical significance. Where possible, wrecks have been independently verified.

Algoa Bay is one of South Africa's wreck traps. There are at least 312 recorded wrecks in area. There are also over 42 vessels that were "condemned" at Algoa Bay.

Some of the wrecks, particularly from the early 19<sup>th</sup> century, are easier to allocate to a specific area within the Bay as there was an official maritime presence in the area by then. Before the first settlers, the accounts of wrecks were often passed along by word of mouth and the information becomes less reliable.

Points to bear in mind when reading the below database.

**Abandoned** – This term means, generally, that the vessel was further out to sea. Older ships were sometimes badly maintained. A lifetime of rough seas had a heavy toll on the old vessels. Through storms and possibly bad maintenance, ships could become death traps. If the vessel was leaking badly and running repairs and continuous pumping had little to no effect, the captain would make a decision to abandon ship. However, sometimes these vessels would not sink but float along in the currents and could end up thousands of miles from where they were abandoned. There are numerous accounts of such derelicts being spotted. Figure 12 is an example of such a sighting. This vessel was spotted off the Cape south coast, she was on fire and had been abandoned. The whaler that spotted her could not read her name.

ST. HELENA, 26th July.  
A black clipper barque, apparently abandoned, was seen off the Cape of Good Hope 4th July, by the *Beejopore*. M'Clay, arrived here.  
A ship on fire was seen 6th July, in lat. 35 S. lon. 24 E., by the *Benjamin Morgan* (whaler), arrived here, which vessel lowered a boat and went alongside but could ascertain her name, her stern being burnt away; saw the Danish bark *Mathilda* putting some

Figure 12: London Lloyd's List 13-09-1856

**Condemned** – In the modern era condemned ships are broken up and at least partially recycled. Historically, condemned vessels were often left on the beach or where they were moored until they were covered by sand or sank.

**Sold** – Although numerous shipwrecks were auctioned off and recorded in the newspapers as sold, this did not necessarily mean that they were completely salvaged. Figure 13 is an example of a wreck that was sold. However, wrecks were often sold and never removed. The Port Elizabeth Harbour Master wrote to the government secretary of the Cape Colony stating that, “An Ordinance for the removal of wrecks” was promulgated and that when the H.M.S Thunderbolt (1847) was put on auction, they “could find no bidder owing to the new Ordinance regarding breaking up wrecks in a certain time.” (Ings 1987: 155). There are also numerous historical references to old wreckage being navigational hazards as well as hampering rescue efforts (Maitland 2009)

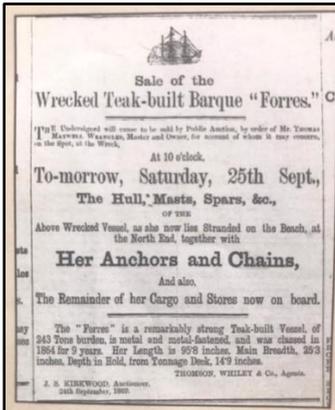


Figure 13: An example of a wreck sale notice (Turner 1988)

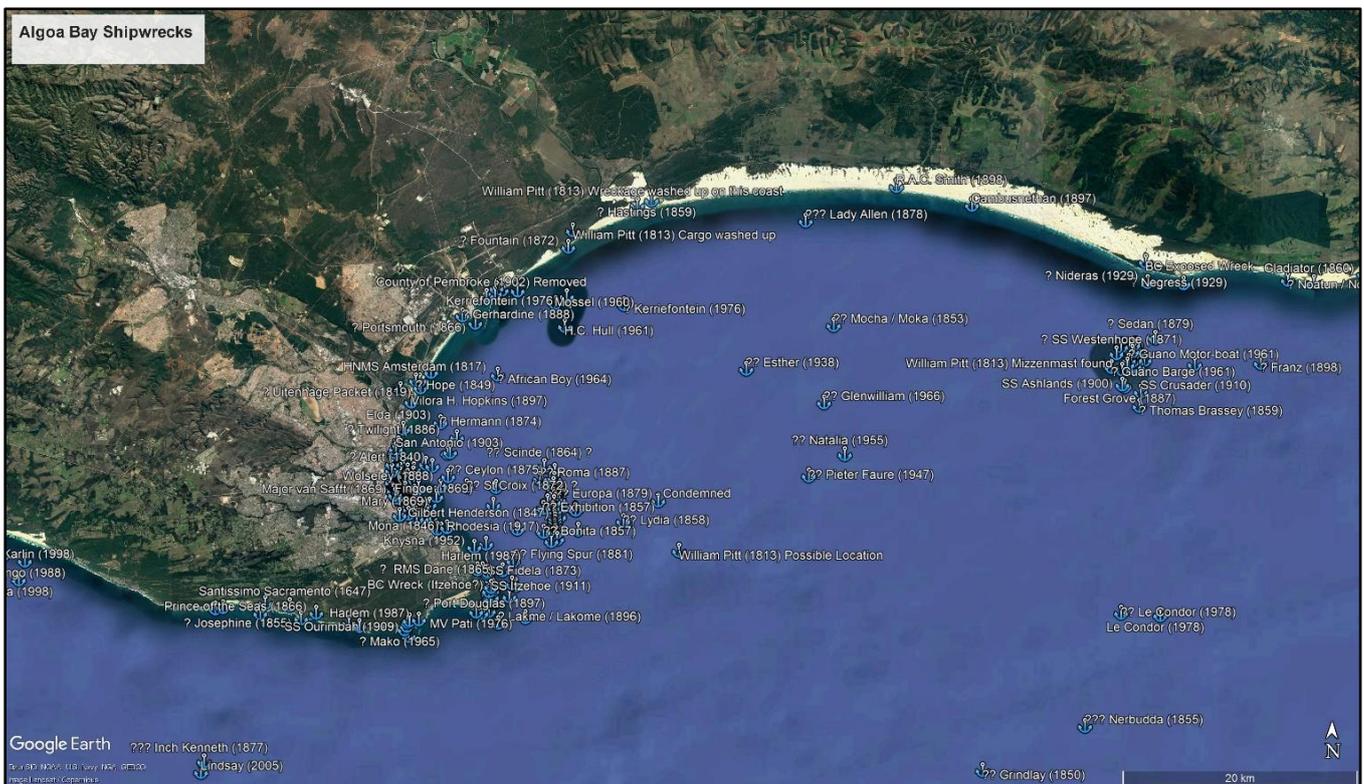


Figure 14: Algoa Bay Shipwrecks (Google Earth 2018; Turner 1988; Levine 1989; Morris 2005; Urquhart 2007; van den Bosch 2009; SAHRIS 2016; Reocities 2017; Maitland 2018)

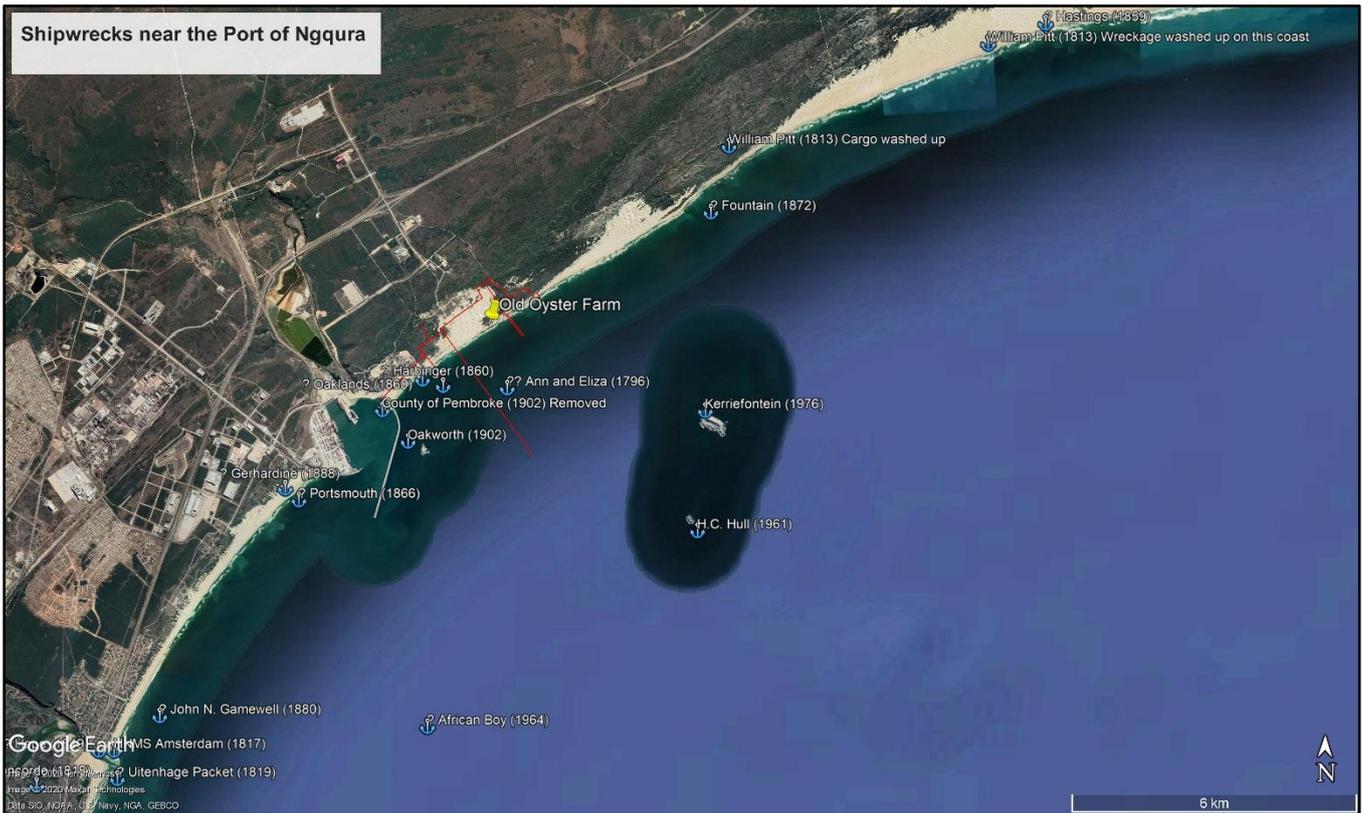
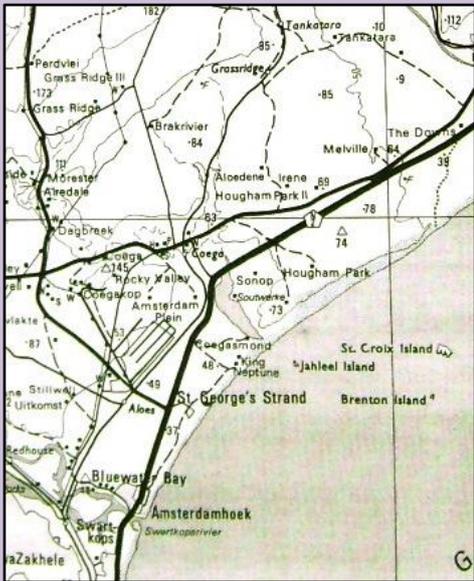


Figure 15: Port of Ngqura Shipwrecks (Google Earth 2018; Turner 1988; Levine 1989; Morris 2005; Urquhart 2007; van den Bosch 2009; SAHRIS 2016; Reocities 2017; Maitland 2018)

Table 1: Port of Ngqura Shipwreck Database

#	Name	Events	Date	Type	History	Area may be found	Probability
1	<i>Ann &amp; Eliza</i>	Wrecked, plundered	1796-01-22	Wood	<p>This British East Indiaman, built in 1789, was travelling from Bengal back to England with a cargo of arrack (alcohol) and rice. All the databases place the wreck between Bushmans River Mouth and Sundays River Mouth (Turner 1988; Morris 2005; Levine 1989; Theal 1897).</p> <p>The Cape Archives (CD1/45) state that the vessel was lost on 22 January 1796, between The Great Fish River and Sundays River. However, when reading the archival document, a series of events are laid out by the survivors on their arrival in Cape Town in April 1796. The events are summarised as follows:</p> <ul style="list-style-type: none"> <li>On 23<sup>rd</sup> the survivors, two English crewmen (the Chief Mate and Second Mate); a Spanish crewman and three Lascars, set off from the wreck in an easterly direction. After three days they reached the Swartkops River.</li> <li>Unable to cross the river, they returned to the wreck. Assuming they spent at least a day foraging for food and looking for a place to cross, it took them five days to return to the wreck. These men had survived a brutal wrecking that killed at least 36 fellow crewmen. They were bruised and hungry.</li> <li>They spent between 12 and 15 days recuperating at the wreck site, before setting off to the east.</li> <li>They travelled for twelve days along the beach and state that they were unable to travel inland as they were surrounded by thick bush and</li> </ul>	North shore of Algoa Bay	Medium

					<p>sand dunes. They eventually get to a river where they meet indigenous people who feed and shelter them, they get sent on to other indigenous people until they meet some white farmers.</p> <ul style="list-style-type: none"> <li>• They return to the wreck by wagon, and this takes them 22 days.</li> <li>• When they arrive, the wreck has been extensively plundered by the local farmers, including some of the wreckage that has been burnt to retrieve the iron.</li> <li>• The survivors return to Cape Town and give their account on 3 May 1796.</li> </ul>		
2	<i>William Pitt</i>	Wrecked	1813- 12-13	Wood	This British East Indiaman, built in 1803, was possibly wrecked in Algoa Bay around 13 December 1813. Pieces of the wreck and cargo washed up near Bird Island, Sundays River, Gamtoos River, St Francis Bay and Tsitsikamma.	Unknown	Low
3	<i>Hope</i>	Wrecked	1849-08		<p><i>HMS Hope</i> was a 14-gun sloop, built in 1795 and formerly the <i>Dutch Star</i>. She was captured in 1795 and sold in 1807.</p> <p>This vessel, owned by Fredrick Korsten was used as a troopship to convey troops to the Eastern Cape in order to suppress the Graaff Reinet rebellion in March 1799. Apparently wrecked at the mouth of the Zwartkops River in August 1849. Her figurehead, known as "The Little White Lady", was taken to Durban (Levine 1989).</p>	Possibly Swartkops River	Low
4	<i>Mocha</i>	Burned, may have washed ashore.	1853-04-10	Wood	This vessel caught on fire between St Croix and Bird Islands. It was abandoned by the crew before it sank (Morris 2005).	Last seen in St Croix, Bird Island vicinity	Low
5	<i>Harbinger</i> (ex- <i>Recruit</i> )	Condemned; wrecked	1860	Iron	This iron-hulled sailing brig was originally the <i>HMS Recruit</i> and was built in 1846. She was lengthened and converted in 1851 to a screw steamer merchant vessel, with sail. She plied the oceans until in 1860, she was constantly returning to port in a leaky condition and many tenders for repairs were advertised. In August of 1860, apparently working on dismantling the <i>Oaklands</i> , a heavy wind was blowing and large breakers, forced the vessel ashore. There are no further reports on the two vessels. But since the <i>Harbinger</i> was wrecked near the <i>Oaklands</i> , they may well be east of the Coega River Mouth.	Coega River Area	Medium
6	<i>Oaklands</i>	Wrecked	1860-03-20	Wood	This barque of 424 tons, built in 1858, was commanded by Capt. J. Winn, while on a voyage from London with a general cargo. All the databases state the wreck is at the Coega Mouth (Turner 1988; Morris 2005; Levine 1989). According to the Eastern Province Herald of 20 March 1860, the vessel was ashore near the mouth of the Swartkops River, after the wind dropped suddenly, causing her to drift ashore. The 16 passengers were rescued by a Malay fishing boat. The PE Harbour Master proceeded to the wreck in the lifeboat and rescued the captain. However, in The Church Chronicle Vol. VII, September 1887 no. 9 (Morris 2005), it is reported that the ship went ashore on a "sandy beach on the northern edge of the Bay north of the Zwartkops River, and some 15 or 16 miles away from the town and proper anchorage". Since the Sundays River is over 20 miles from Port Elizabeth, and the Swartkops	Coega River Area	Medium

					<p>River only about 7 miles away, the most likely candidate is east of the Coega River.</p> <p>Most of the cargo and passengers' luggage appears to have been saved.</p>		
7	Portsmouth	Wrecked; broke up	1866-03-14	Wood	<p>This American brig, under Capt. Lynch had entered Algoa Bay and anchored near St. Croix Island. A north-west wind was blowing and she parted anchor. The vessel drifted ashore a little to the south west of Jaheel Island, close to the Coega River Mouth. The cook drowned while attempting to swim ashore. While some of the cargo was recovered, thousands of barrels of flour washed ashore. In the Eastern Province Herald of 20 March 1866, it is mentioned that the wreck is a mile and a half from the Coega River Mouth. As the wreck was reported to be to the south west of Jaheel Island, I think it may be on the western side of the port. In addition, the report states that the wreck is on the beach next to Mr Reed's farm Coega Mouth. In Figure 16, it can be seen that the farm Coegasmond is to the west of the river.</p>	1.5 miles from Coega River Mouth	Low
							
					<p>Figure 16: Map with local place names (Bennie 2010)</p>		
8	Fountain	Aground; wrecked	1872-03-20	Wood	<p>This British schooner of 38 tons, registered in St. Helena and under Capt. H. Furnell, was on a voyage from Port Elizabeth to East London. Her cargo consisted of rice, brandy, paraffin and timber. While leaving Algoa Bay, she tacked and missed stays. The vessel struck a rock 12 miles SE of St Croix Island. Thereafter she drifted ashore at low tide. However, it is then reported that she was "high and dry" on the beach and her cargo was removed. It was thought that she would be refloated. Thereafter, water got in her hold and she was abandoned (Morris 2005). Urquhart (2007), states the <i>Fountain</i> was wrecked east of Sundays River.</p>	East of Sundays River	Low Medium
9	Terina	Aground; refloated	1875-12		<p>This vessel is mentioned in only two databases, Levine (1989) and van den Bosch (2009). It is mentioned as grounded in Algoa Bay. Presumably it was refloated.</p>	Algoa Bay	None
10	Sedan	Burned; Adrift	1879-08-26	Wood	<p>This German barque of 834 tons, with a cargo of rails and sleepers caught fire at the anchorage. Through much effort by the steam tug <i>Buffalo</i>, she was</p>	Possibly in the vicinity	Low

					removed from the anchorage where she was causing havoc and cut free. Drifting, after a few hours the fire went out but it is presumed that the vessel was still adrift. Nobody knows what happened to her. It is later reported that she sank 1 ¾ miles from Bird Island in 12 fathoms (22 m) of water (Morris 2005)	of Bird Island.	
11	<i>John N. Gamewell</i>	Burned; Ashore	1880-12-15		This American brigantine of 534 tons, registered in New York and under the command of Capt. G.B. Weaver was at anchor in the bight of the bay, with a general cargo, including hides, cottons and oils. Bound from Bombay for London, it seems that one of the cabin lights exploded. Although the life boat put out to assist, the fire had taken hold and only the crew could be rescued. Along with a few sails. The burning vessel was left to drift ashore. The reports state that she went ashore on the north west shore of the bight. Another report states she drifted to the north east and went ashore near the Swartkops River (Morris 2005)	Possibly Swartkops River Mouth	Low
12	<i>Gerhardine</i>		1888-05-08	Wood	<p>This 303 ton barque from Hamburg, Germany had a general cargo and had already landed a large part of it when she was wrecked.</p> <p>While anchored in the bay, their anchor snapped, they lowered another anchor which also parted. The crew then put the sails up in an attempt to leave the bay. However, the wind and currents made this impossible, so it was decided to beach the vessel. They steered for the Coega River mouth and before reaching land, in a fit of panic, the cook and carpenter jumped overboard and were drowned. The captain was killed by a falling spar. The mate jumped overboard with a line and swam to shore. Although the line was ripped from him, he made it to shore and the rest of the crew followed him. All getting ashore safely. The barque broke up rapidly and disappeared.</p> <p>The ship was wrecked at six in the evening. Assuming a couple of hours for all the events recounted, if they left at eight, they reached the Swartkops River the following afternoon. That is about 18 hours to walk from Coega to the Swartkops River.</p>	Near Coega River Mouth	Low Medium
13	<i>Oakworth</i>	Wrecked; refloated; taken to Coega River Mouth, drifted ashore	1902-09-01	Iron	<p>This British, iron ship of 1242 tons was built in 1874 by W. Hamilton &amp; Co of Port Glasgow. She was originally wrecked on North End Beach during the gale of 1902. She was carrying a wheat cargo from Port Pirie under Captain J. Davies (Morris 2005).</p> <p>According to Urquhart (2007), this ship was refloated on the spring tide on 7 November 1902, towed out to the Coega River mouth and run ashore opposite Jaheel Island.</p>	Coega River Mouth, opposite Jaheel Island	Medium High
14	<i>County of Pembroke</i>	Wrecked; refloated; taken to Coega River Mouth, drifted ashore; Removed during port construction in 2007	1903-11-14	Iron	This vessel was originally wrecked near North End Beach in 1902. It was refloated and repairs were attempted. Eventually, in 1904, she was towed towards the Coega River and released. It drifted into the Coega River Mouth. In 2004 during the development of the Port of Ngqura, the wreck was discovered and subsequently removed. The process was documented under a rescue archaeological methodology. The full report is available online (Maitland 2009)	Coega River Mouth	None Removed
15	<i>Sedna</i>	Sank	1930-10-05		This whaler apparently foundered off Algoa Bay (Levine 1989; van den Bosch 2009). However, it	Actually Port Alfred	None

					actually sank off Port Alfred (Rand Daily Mail 09-10-1930)		
16	<i>African Boy</i>	Sank	1964	Iron	This fishing trawler was travelling between St Croix and the Port Elizabeth harbour when she started taking on water. The <i>Glenwilliam</i> tried to tow her, however she was taking on too much water, which forced her bow underwater. The crew boarded the <i>Glenwilliam</i> just before the trawler disappeared	Between St Croix and harbour	Low
17	<i>Kerriefontein</i>	Abandoned; submerged	1976-09-05		This fishing trawler got into trouble four miles east of St Croix Island. The crew were rescued but the trawler was partly submerged. The last known position of the vessel was three miles east of St Croix and about five miles from the coast. It is possible that the submerged trawler was swept inshore after she was abandoned.	East of St Croix	Low

Table 2: Vessels scuttled in the vicinity of the Port of Ngqura

Date	Type	Name	Location	Story
1955	Lighter – 80ft	No name	Off St Croix Island	Scuttled
1955-08-08	Whaler/Trawler 238 ton	<i>Natalia</i>	Off St Croix Island	Scuttled
1958	Tug	<i>N.C. Hull</i>	Off St Croix Island	Scuttled
1958-05-17	Trawler	<i>Disa</i>	Possibly off St Croix Island	Scuttled
1960	Trawler	<i>Capensis</i>	Off St Croix Island	Sunk by gunfire
1960	Trawler – 194 GRT – Built 1909	<i>Richard Irvine</i>	Off St Croix Island	Scuttled
c. 1960; 1961	Trawler	<i>Mossel</i>	Off St Croix Island	Sank in PE harbour, towed to St Croix and scuttled

The information in Table 2, relates to vessels scuttled “near St. Croix”. This was done to vessels that were no longer sea worthy and were at risk of sinking, becoming a navigational hazard (Urquhart 2007; pers. comm. August 2020)

Table 3: Vessels condemned at Algoa Bay

Date	Name	History
1818	<i>La Concorde</i>	Condemned; Broken up at Swartkops River
1832	<i>Essex</i>	Condemned; Sale Notice
1845	<i>Pilot</i>	Condemned; Sale Notice
1848	<i>Foxhound</i>	Condemned; Sale Notice
1850	<i>Elephante</i>	Condemned; Sold; Store Ship
1852	<i>Argo</i>	Condemned
1854	<i>Marion Anne</i>	Condemned; Sold
1856	<i>Themis</i>	Condemned; Sold; New Sales Notice
1856	<i>Sarah Lydia</i>	Condemned; Sold
1857	<i>Exhibition</i>	Condemned; Sales Notice; On shore
1857	<i>Bonita</i>	Condemned; Sold; Broken up
1858	<i>Lamorna</i>	Condemned; Sold
1858	<i>Arthur the Great</i>	Condemned; Sold; Broken up
1858	<i>Siri</i>	Condemned; Sold
1858	<i>Albrecht Duerer</i>	Condemned; Sold
1858	<i>Matilda</i>	Condemned; Sold; Hulk; Broken up (1860)
1858	<i>Lydie</i>	Condemned; Sold
1859	<i>Marion</i>	Condemned; Sold
1859	<i>Lismoyne</i>	Condemned; Dismantled; Sold; Hulk; Broken up (1861)
1859	<i>Covenantor</i>	Condemned; Sold
1860	<i>Gaston et Filicie</i>	Condemned; Broken up on beach
1861	<i>May Queen</i>	Condemned; Sold; Ashore near port
1861	<i>Dirigo</i>	Condemned; Sold
1866	<i>Wursatta</i>	Condemned; Sold
1866	<i>Wilhelmina Johanna</i>	Condemned; Sold; Towed out of the basin of the breakwater
1867	<i>Messenger de Nossi Be</i>	Condemned; Sales Notice
1867	<i>British Crown</i>	Condemned; Sold
1867	<i>Charlotte</i>	Condemned; Sold
1867	<i>Salatiga</i>	Condemned; Sold

1868	<i>Nabab</i>	Condemned; Sold
1869	<i>Meg Merriles</i>	Condemned; Sold; Wrecked
1870	<i>Estafette</i>	Condemned; Sold
1870	<i>Alma</i>	Condemned; Sold
1871	<i>Maritana</i>	Condemned; Sold
1871	<i>Roska</i>	Condemned; Sold
1871	<i>Alida</i>	Condemned; Sold
1872	<i>Fred Warren</i>	Condemned; Sold
1873	<i>Auguste</i>	Condemned; Sold
1877	<i>Miltiades</i>	Condemned; Sold
1877	<i>Assyrian</i>	Condemned; Sold
1879	<i>Europa</i>	Condemned
1880	<i>Brilliant</i>	Condemned; Sold
1880	<i>Tromp</i>	Condemned; Sold
1880	<i>Johannes</i>	Condemned; Sold
1880	<i>Tromp</i>	Condemned; Sold
1880	<i>Johannes</i>	Condemned; Sold
1882	<i>Casilda</i>	Condemned; Sold
1887	<i>Roma</i>	Condemned; Sold
1887	<i>Curlew</i>	Condemned; Sold
1892	<i>Avanti Savoia</i>	Condemned; Sold

Table 3 is a list of vessels that were anchored in Algoa Bay at the time that they were condemned. There are reports on some that were beached and broken up, e.g. *La Concorde* (1818). Some were converted into hulks and then broken up later. e.g. *Matilda* (1858). On most of them there is no further information. Given the known scuttling of vessels near Coega River Mouth (*Country of Pembroke* and *Oakworth* 1903) and St Croix Island (1955 – 1961), it is possible that earlier vessels were also “conveniently” disposed of in the area of the present day Port of Ngqura.

#### SHIPWRECK SUMMARY

	Probability of Presence in Impact Zone	Shipwreck Count
	None	3
	Low	8
	Low to Medium	2
	Medium	3
	Medium - High	1

There are 17 wrecks, in various databases, in the Port of Ngqura area. However, deeper investigation of the wrecks showed that one was actually wrecked at Port Alfred, one was in all probability refloated after grounding and one has already been removed during the establishment of the Port of Ngqura. Eight were given a low probability, as their locations were able to be narrowed down to west of the river mouth or further offshore. The six other wrecks had a higher probability of being found within the Impact Zone, based on the information available.

#### 7. MAGNETOMETER SURVEY

The closer the magnetometer is to the seabed, the better the data. In shallow areas, the mag is towed from the nose, this tows the mag about 0.5 m below the surface. As the depth increased, we switched to a top tow, which drops the mag to about 3 m below the surface. At -12 m, we added a lead wing to the mag, this allows the mag to be towed at 7-8 m below the surface. Speed of the survey was also variable, if the mag is required to go deeper, the speed needs to be reduced.

As mentioned in Section 5.1, the bathymetry of the Impact Zone is -3 near the shore to -23 at the end of the Impact Zone. This dramatic change in bathymetry required a different survey plan. The shallower inshore area was surveyed parallel to the shore. The deeper area of the Impact Zone was surveyed vertical to the shore (Figure 17).

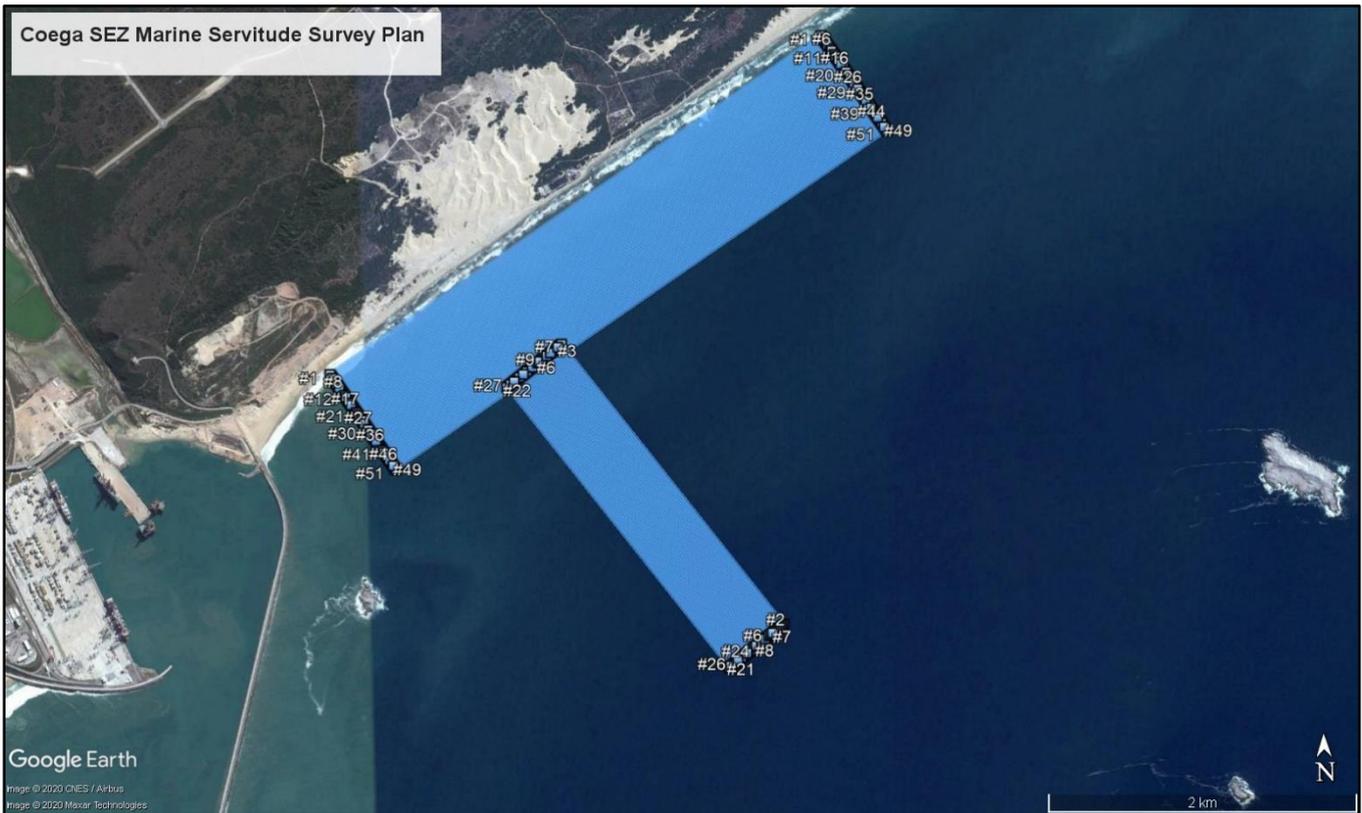


Figure 17: Coega SEZ Marine Servitude Survey Plan

A Geometrics G-882 caesium-vapor marine magnetometer was towed behind a 7.8 m fibreglass RIB, with a layback of 15 meters, at an average speed of 3- 6 knots/hour, utilising 15m run-lines.

The magnetometer data collected by MagLog® software was analysed twice. The first or field analysis is performed as the magnetometer is towed. Possible sites are tabulated and analysed according to the environmental conditions in the field. The post-field analysis was interpreted with geophysical software (Surfer), with knowledge of the environmental conditions. The analyses were compared, and a final analysis completed.

Magnetometer surveys were conducted on 21, 22, 23, 26 and 28 August 2020. The initial weather window was three days, we then had 2 days standing by for weather to ameliorate, managed a further day of surveying, went on standby for another day before completing the mag survey on the 28<sup>th</sup>. No large anomalies stood out, but a number of smaller anomalies were noted.

### 7.1. IMPACT ZONE – SURVEY RESULTS

The magnetometer data collected by MagLog software was analysed twice. The first or field analysis is performed as the magnetometer is towed (Figure 3). This analysis observes real time spikes within the magnetic field. Possible sites are tabulated and analysed according to the environmental conditions in the field. These conditions include:

- Shipping
- Weather / Sea conditions
- Channel marker buoys and markers
- Other metal objects in the vicinity

The post-field analysis was interpreted with Surfer geophysical software, ignoring the environmental conditions (Figure 18 and Figure 19). However, the Surfer analysis did not show the field observed anomalies. Therefore, the coordinates of the field anomalies was plotted into Google Earth (Figure 20).

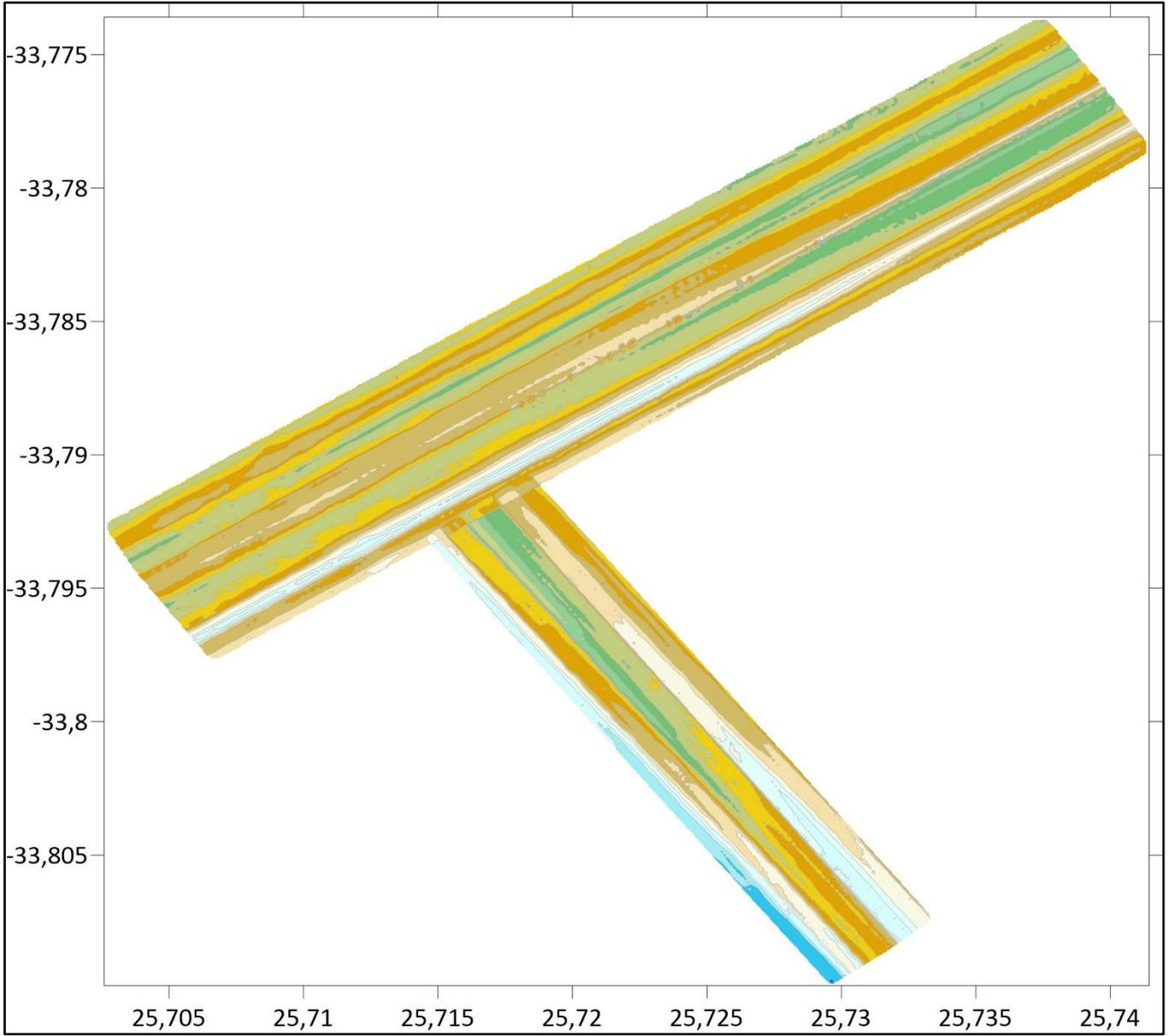


Figure 18: Surfer Survey Plot using contour intervals of 2 nT



Figure 19: Magnetic Map overlain on Google Earth with the Marine Servitudes



Figure 20: Magnetic map of Impact Zone with field anomalies plotted

## 7.2. MAGNETOMETER SURVEY CONCLUSIONS

All shipwrecks, even wooden shipwrecks have a fairly large magnetic signature. The field survey revealed a number of very small anomalies (Figure 20). Some were clustered together, which usually represent a single anomaly. Diver searches were necessary to verify that the anomalies were not MUCH.

## 8. DIVER SEARCHES

Although fourteen dives were planned (Figure 21), the proximity of most of the anomalies to the shore meant that not all the dives would be feasible given the high swell in the Impact Zone, see Table 4.

Dives were planned for the next open weather window, which was 31 August 2020. We dropped the marker buoy on Dive 3, and then watched the sea conditions to ascertain if it was safe to dive, it was not (Figure 22). Thereafter the first two dives (Dive 11 and 12) were a bit further offshore. Figure 23 is the GPS track for Dive 12, and Figure 24 is the metal pipe found at that location. Three further dives were undertaken. Dive 5 was closer inshore, but the underwater surge filled the water column with sediment creating zero visibility. Two further dives at the deeper locations were undertaken on Dive 13 and 14. However, the underwater surge and visibility was the same as the shallower dives (Figure 25).

The rip currents mentioned in Section 5.2 above could be felt during the mag survey and more especially during the diving.

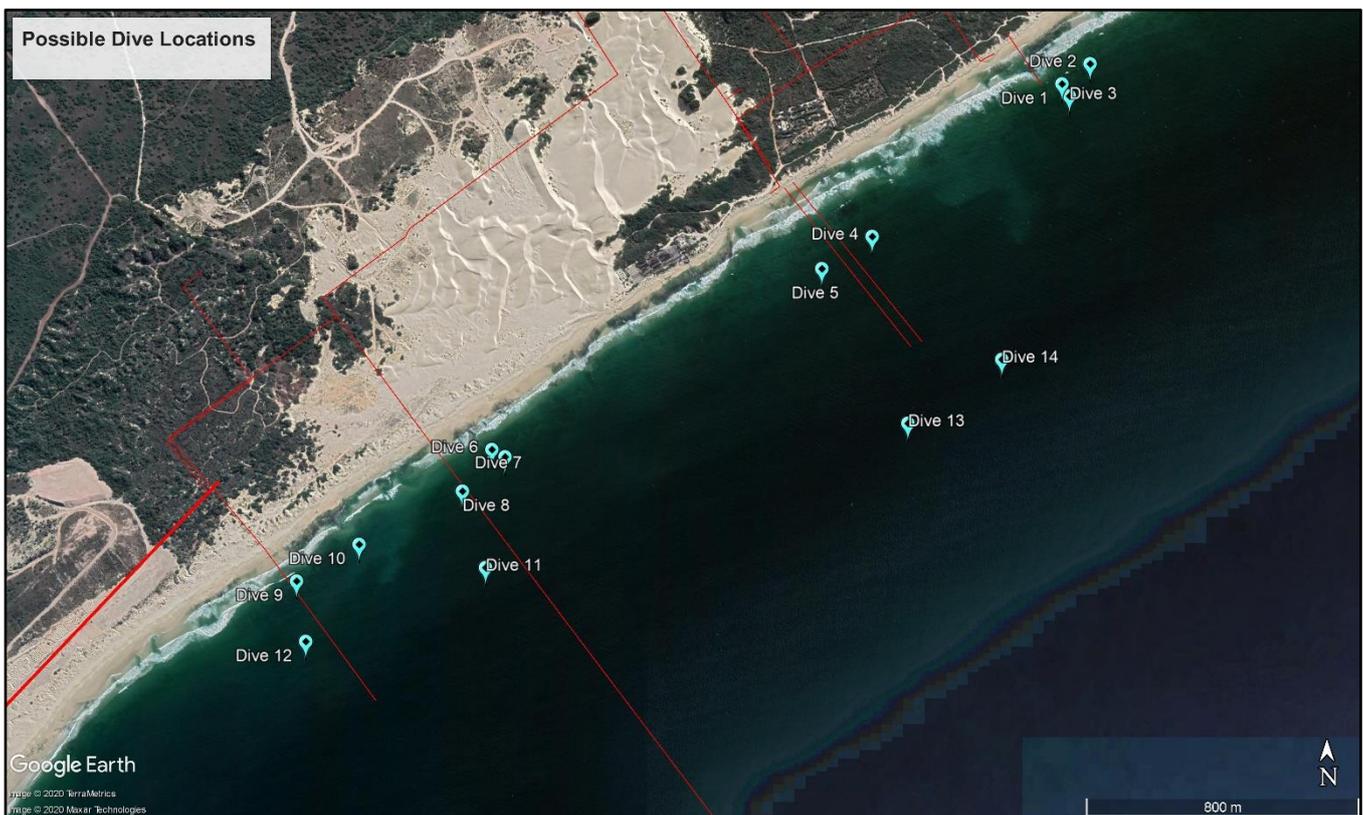


Figure 21: Planned dive locations



Figure 22: Marker Buoy on Dive 3



Figure 23: GPS track of Dive 12



Figure 24: Metal pipe at Dive 12

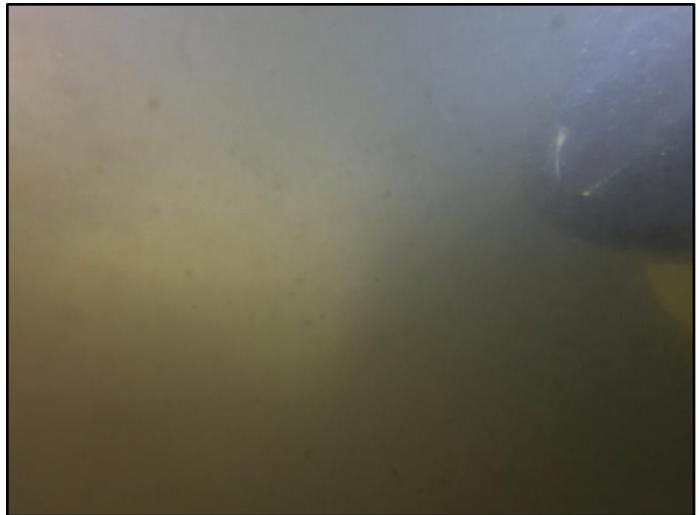


Figure 25: An example of bad visibility on Dive 13

Table 4: Dive Locations and Results

Dive #	Latitude	Longitude	Comments
1	33° 46.627'S	25° 43.874'E	Too close inshore; swell too high
2	33° 46.595'S	25° 43.928'E	Too close inshore; swell too high
3	33° 46.646'S	25° 43.888'E	Buoy dropped; too close inshore; swell too high (Figure 22)
4	33° 46.870'S	25° 43.514'E	Too close inshore; swell too high
5	33° 46.921'S	25° 43.418'E	Dived – No visibility, high surge, no visible MUCH
6	33° 47.209'S	25° 42.791'E	Too close inshore; swell too high
7	33° 47.221'S	25° 42.816'E	Too close inshore; swell too high
8	33° 47.275'S	25° 42.735'E	Too close inshore; swell too high
9	33° 47.418'S	25° 42.420'E	Too close inshore; swell too high

10	33° 47.360'S	25° 42.539'E	Too close inshore; swell too high
11	33° 47.397'S	25° 42.779'E	Dived – Low visibility, no visible MUCH
12	33° 47.515'S	25° 42.437'E	Dived – Low visibility, metal pipe (Figure 24)
13	33° 47.167'S	25° 43.582'E	Dived – No visibility, high surge, no visible MUCH (Figure 25)
14	33° 47.066'S	25° 43.760'E	Dived – No visibility, high surge, no visible MUCH

### 8.1. DIVER SEARCHES CONCLUSION

Only five dives were undertaken. On three of these dives the high surge and zero visibility severely hampered the search. On one dive while visibility was reasonable, no ferrous metal objects were located. On one dive a metal pipe was located.

### 8.2. FIELD SURVEY CONCLUSION

A number of small magnetic anomalies were identified during the magnetometer survey. The majority of these were in the surf zone. Generally, shipwrecks, even wooden ones represent as larger magnetic signatures. However, in the interests of thoroughness, dives were undertaken on those sites that were accessible. Only one metal object was found, a metal pipe.

It is my belief that, due to the small size of the anomalies, their location close to the shoreline and what was found on the diver searches, that the anomalies probably represent construction debris from the old oyster farm on the beach (Figure 15) and from the port's construction.

While there is an extremely low probability that shipwrecks will be found underwater, there exists a chance that shipwreck material and/or pre-colonial sites (shell middens and stone tools) may be found in the dunes during construction. If such materials are found, the steps in Section 10 must be followed.

## 9. SITE SIGNIFICANCE AND ASSESSMENT

### HERITAGE ASSESSMENT CRITERIA AND GRADING

According to the NHRA, No. 25 of 1999, Section 2(vi), the *significance* of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential.

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;
- **Grade II:** Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III:** Other heritage resources worthy of conservation, on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the application of mitigation measures would allow the development activities to continue.

A matrix exists whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, can be applied for identified sites. This allows some form of control over the application of similar values for similar sites. This matrix will be applied if any sites are uncovered (Appendix I).

## 10. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated / recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

### 10.1. OBJECTIVES

- Protection of heritage sites within the marine servitude project boundary, this includes coastal zone against vandalism, destruction, and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during development activities.

The following shall apply:

- An archaeologist must be appointed for the duration of the construction phase of the project.
- The appointed archaeologist must have the requisite experience and knowledge to recognise maritime cultural heritage that may be found in the beach/dune area.
- The appointed archaeologist must do a short induction to familiarise the contractors and workers, including divers, to the potential heritage material artefacts that may be exposed during work. This includes Stone Age, Early Farming Communities, Colonial Period and Shipwreck artefacts and burials.
- Should any heritage artefacts be exposed during marine excavations, work in the immediate area where the artefacts were discovered, shall cease immediately and the on-site archaeologist shall be notified as soon as possible.
- All discoveries shall be reported immediately to the on-site archaeologist so that an investigation and evaluation of the finds can be made. The archaeologist will advise the necessary actions to be taken, including notifying SAHRA and if the artefacts are below the high water mark, SAHRA's MUCH Unit must be contacted.
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

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**APPENDIX I****CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES****Significance**

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

**1. Historic value**

- Is it important in the community, or pattern of history
- Does it have strong or special association with the life or work of a person, group or organisation of importance in history
- Does it have significance relating to the history of slavery

**2. Aesthetic value**

- It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group

**3. Scientific value**

- Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage
- Is it important in demonstrating a high degree of creative or technical achievement at a particular period

**4. Social value**

- Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

**5. Rarity**

- Does it possess uncommon, rare or endangered aspects of natural or cultural heritage

**6. Representivity**

- Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

<b>7. Sphere of Significance</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
International			
National			
Provincial			
Regional			
Local			
Specific community			

**8. Significance rating of feature**

1. Low
2. Medium
3. High

**Significance of impact:**

- low: where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium: where the impact could have an influence which will require modification of the project design or alternative mitigation
- high: where it would have a "no-go" implication on the project regardless of any mitigation

**Certainty of prediction:**

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
- Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

**Recommended management action:**

For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

- 1 = no further investigation/action necessary
- 2 = controlled sampling and/or mapping of the site necessary
- 3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
- 4 = preserve site at all costs
- 5 = retain graves

**Legal requirements:**

Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.