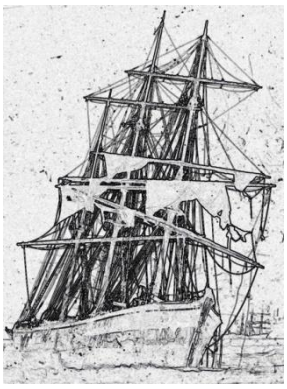
Underwater Heritage Impact Assessment for Marine Prospecting Areas off the West Coast of South Africa



UNDERWATER HERITAGE IMPACT ASSESSMENT FOR MARINE PROSPECTING AREAS OFF THE WEST COAST OF SOUTH AFRICA

NORTHERN CAPE

SOUTH AFRICA

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Prepared for: De Beers Marine Proprietary Limited
Representative: Lesley Roos; Mluleki Caluza
Tel: 021 658 3194 / 021 658 3209
Address: DBM Gardens, Golf Park 2, Raapenberg Rd, Pinelands, South Africa
E-mail: Lesley.Roos@debeersgroup.com / Mluleki.Caluza@debeersgroup.com

Prepared by: Vanessa Maitland
ASAPA Registration #: 326
Field: Maritime Archaeology
Address: 277 Main Road, Hot Bay, Cape Town, 7806
Cell: 082 490-4066
E-Mail: vanessa@cocojams.co.za

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.

Vanessa Maitland
Maritime Archaeologist
12-12-2017

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GLOSSARY OF ACRONYMS

ASAPA	Association of Southern African Professional Archaeologists
DBCM	De Beers Consolidated Mines
EIA	Environmental Impact Assessment
HIA	Heritage Impact Assessment
MPA	Marine Prospecting Area
MUCH	Maritime and Underwater Cultural Heritage (Includes underwater and land maritime heritage)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NM	Nautical Mile
SASA	South African Sea Areas Marine Diamond Concessions
UHIA	Underwater Heritage Impact Assessment

1. INTRODUCTION

De Beers Consolidated Mines (DBCM) holds prospecting rights, under the Mineral and Petroleum Resources Development Act (2002) within the South African Seas Areas (SASA). These include the specific areas, inshore portion of 4C, inshore portion of 5C and 6C. The South African Heritage Resources Agency has requested a Heritage Impact Assessment (HIA) or more specifically an Underwater Heritage Impact Assessment (UHIA) on the designated area.

This report fulfils Section 38 of the National Heritage Resources Act (NHRA) (25 of 1999) which states that an assessment of potential heritage resources in the development area needs to be done. It is a desktop survey of existing shipwreck databases in the areas, as delineated in Section 5. It concludes with recommended management measures for the area, in terms of cultural heritage resources.

2. TERMS OF REFERENCE

The aim of this desktop survey is to determine if there are any known shipwrecks 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

The objectives were to:

- Identify potential MUCH sites within the designated area
- Recommend management measures for sites before and during development

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 m2 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 m2 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 MUCH 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 concession area needs to be done. This is the purpose of the desktop study. These processes identify potential MUCH sites. If a potential MUCH site is uncovered during the work, a maritime archaeologist needs to be contacted to assess the find. Thereafter, in conjunction with SAHRA, a decision will be made regarding the significance of the site. If it is deemed to be culturally significant, the prospector can apply to the Maritime Unit of SAHRA for a permit for removal, excavation or destruction in terms of Section 35 of the NHRA.

4. STUDY APPROACH AND METHODOLOGY

4.1. Extent of the Assessment

This desktop survey is concerned with MUCH and covers the area as described in Section 5. However, as shipwrecks are a difficult cultural resource to pin to a specific area, this UHIA covers the entire SASA area, excluding the 5km wide coastal zone.

4.2. Methodology

4.2.1. Desktop Survey

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

Limitations

- The database is a research tool that is constantly evolving as information is uncovered and added.
- 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.
- Shipwrecks that may initially be considered outside of the area, may drift more many miles on the surface or just under the water surface after being abandoned. Therefore, these are also included in the Desktop Survey.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Site Location and Description

The concessions, 4C, 5C and 6C are situated on the west coast of South Africa, approximately between alexander Bay in the north and Hondeklip Bay in the south. The areas start 5km offshore and stretch for between 80 and 130km offshore. The bathymetry of the seabed varies from 60m and 180m below mean sea level (De Beers Marine 2017).

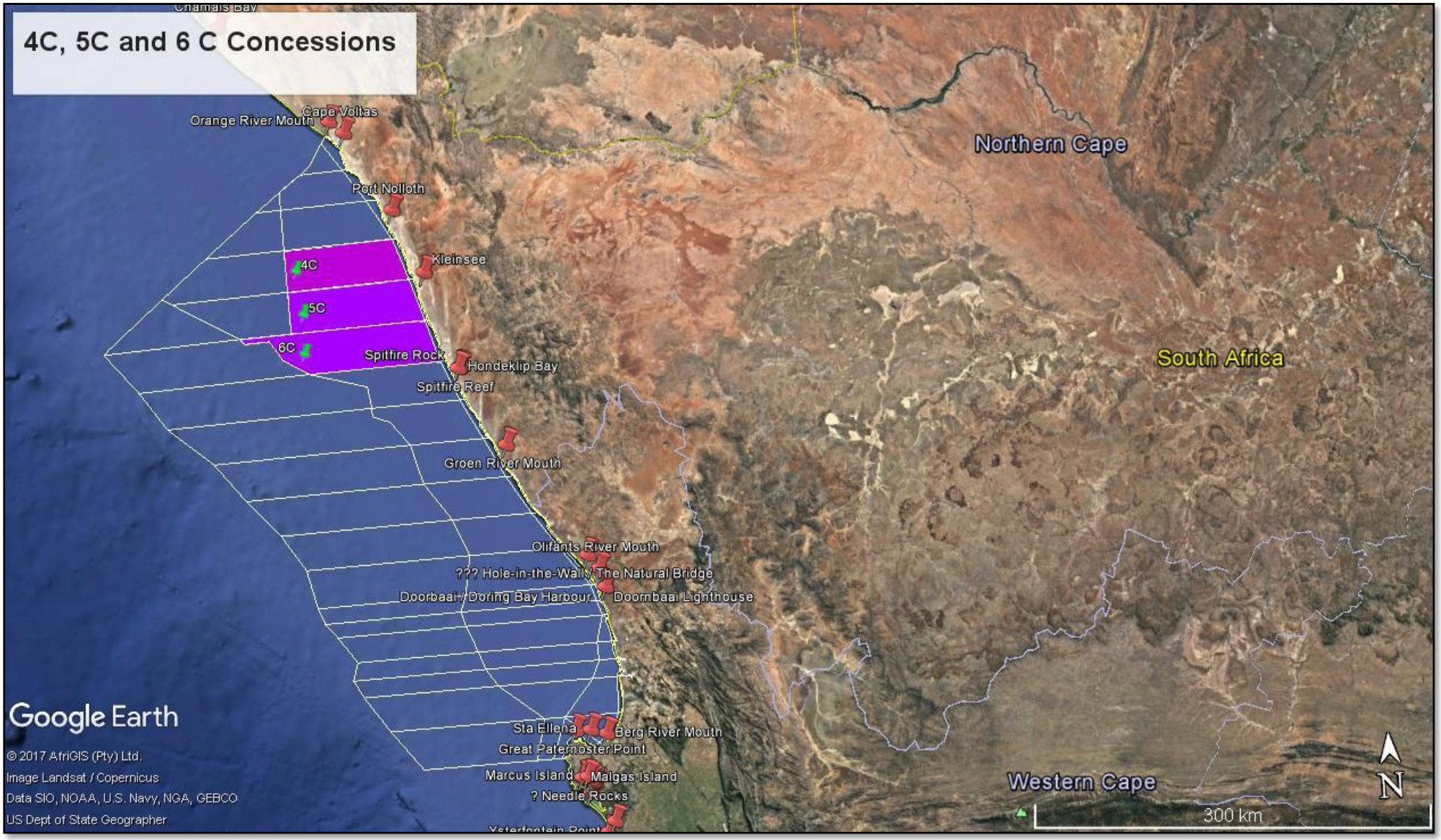

Figure 1: SASA showing concessions 4C – 6C marked (De Beers Marine 2017; Google Earth 2017)

6. SHIPWRECK DATABASE

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.

There are several points to bear in mind when compiling and making use of any shipwreck database.

- The first recorded European voyages down the west coast of Africa were by the Portuguese. When the Portuguese first sent out their explorers, they stuck close to the coastline, in order to map the land. The present-day Cape Voltas may be a survival of the Portuguese name Volta das Angras. Dias and his fleet passed the Orange River Mouth in 1487/1488 (Axelson 1973). Thereafter, the rate of exploration and trade increased exponentially, as is evidenced by the increase in shipwrecks over the centuries.
  These early voyages were not well documented, and the archives often merely report that a fleet of a certain number of vessels left and only a certain amount returned, with only vague references to their place and manner of loss.
  Therefore, there are many undocumented wrecks. This statement is borne out by the Cabral Fleet of 1500 (#11-14 below).
- There is some anecdotal evidence that the Phoenicians circumnavigated Africa (Herodotus 1954). However, if this is true, these ships had to stick right to the coastline and therefore are unlikely to be far offshore.
- There's increasing evidence that the Chinese voyages of the 1400s explored parts if not all of the African coast (Paine 2013). However, once again the archival evidence to date, and availability to Western researchers, limits this knowledge.
- The term, "off", used in reference to a shipwreck location was often merely the nearest known land location and could be 200km from that landmark, in any direction.
- Databases can vary considerably in their locations and information regarding shipwrecks. Where there are discrepancies, I try to track the source of the information to verify the data. Where this is not possible, certain databases are, in general, more accurate and reliable than others. If at all possible, I always try to independently verify database information.
- There are many wrecks within the unsure category. These are ships that were abandoned or last seen in the Atlantic. An abandoned vessel did not necessarily sink after abandonment. There are numerous historical accounts of captains noting the presence of "hulks", these are abandoned vessels, usually half sunk, that drift on the currents, a danger to seaworthy vessels. There are also several accounts of captains coming across abandoned vessels that were then boarded and sailed to the nearest port. Ergo, I have included vessels that were abandoned in certain latitudes that may have caught currents that pushed them towards the west coast of Africa where they may have washed ashore.

The Shipwreck Database uses a number of conventions to assess the impact of projects on heritage resources (Appendix I). The important ones, in terms of this project are:

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

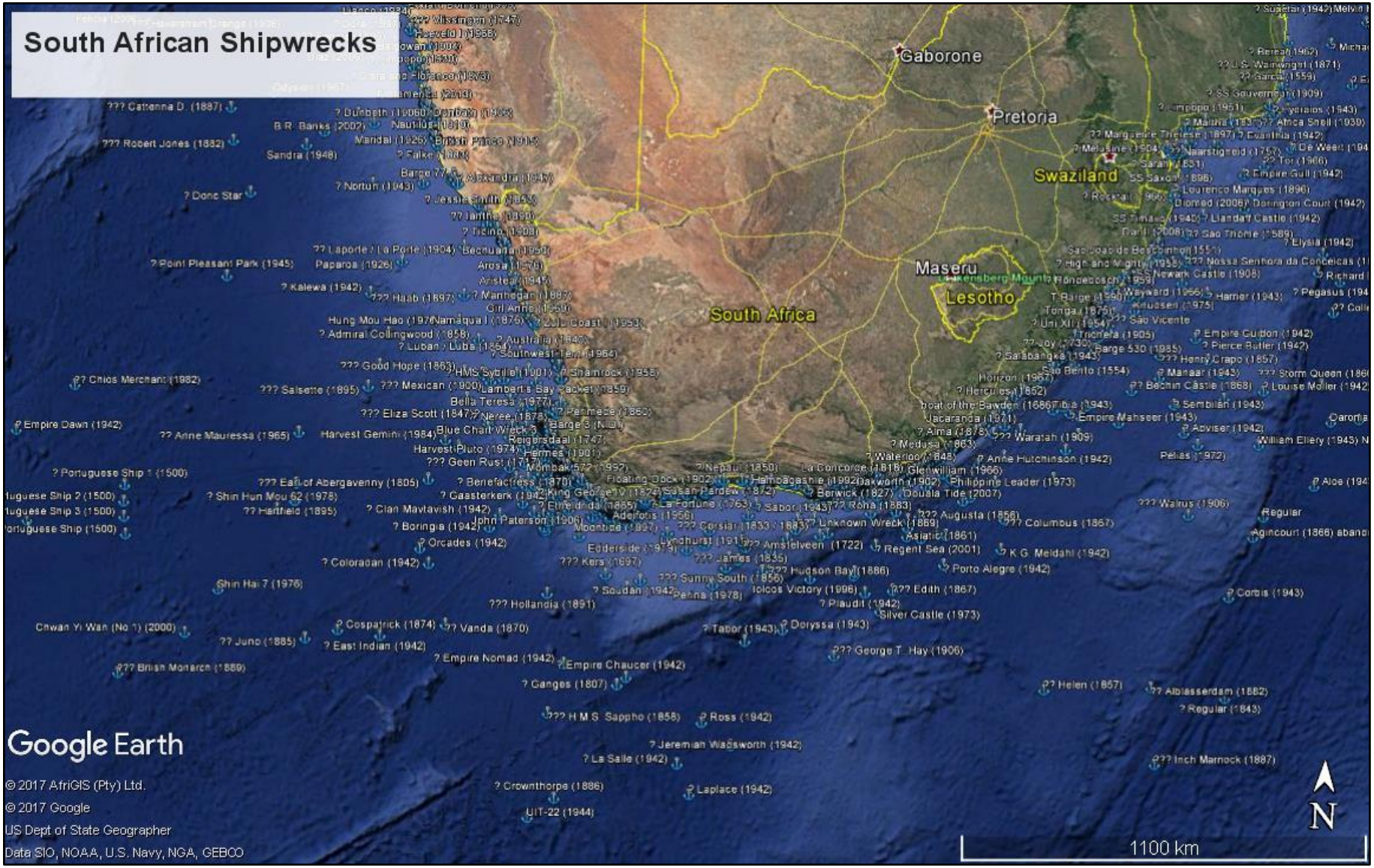

Figure 2: South African Shipwrecks (Google Earth 2017; Wallace 1929; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2017; u-boat.net 2017)

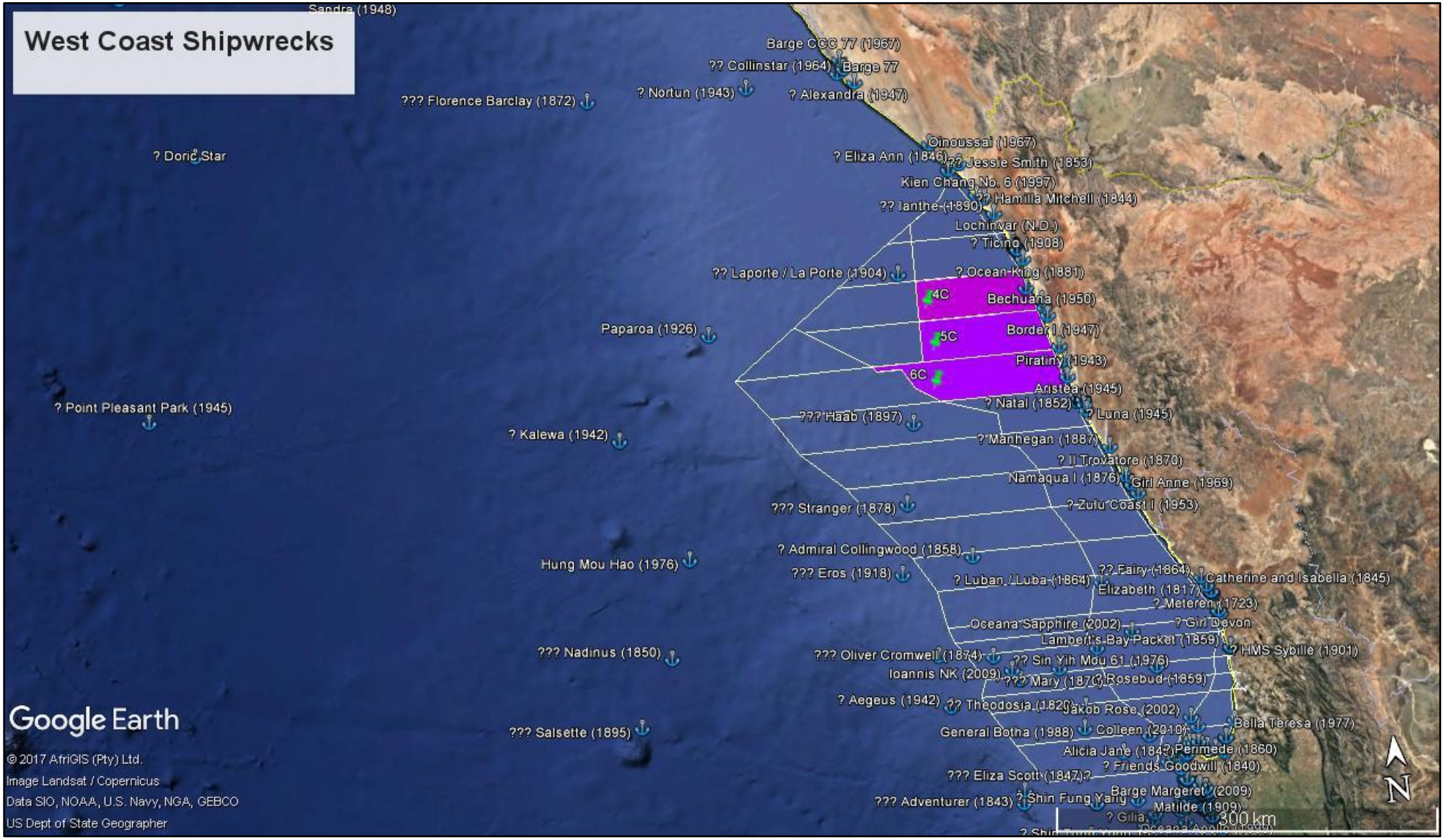

Figure 3: West Coast Shipwrecks (Google Earth 2017; De Beers Marine 2017; Wallace 1929; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2017; u-boat.net 2017)

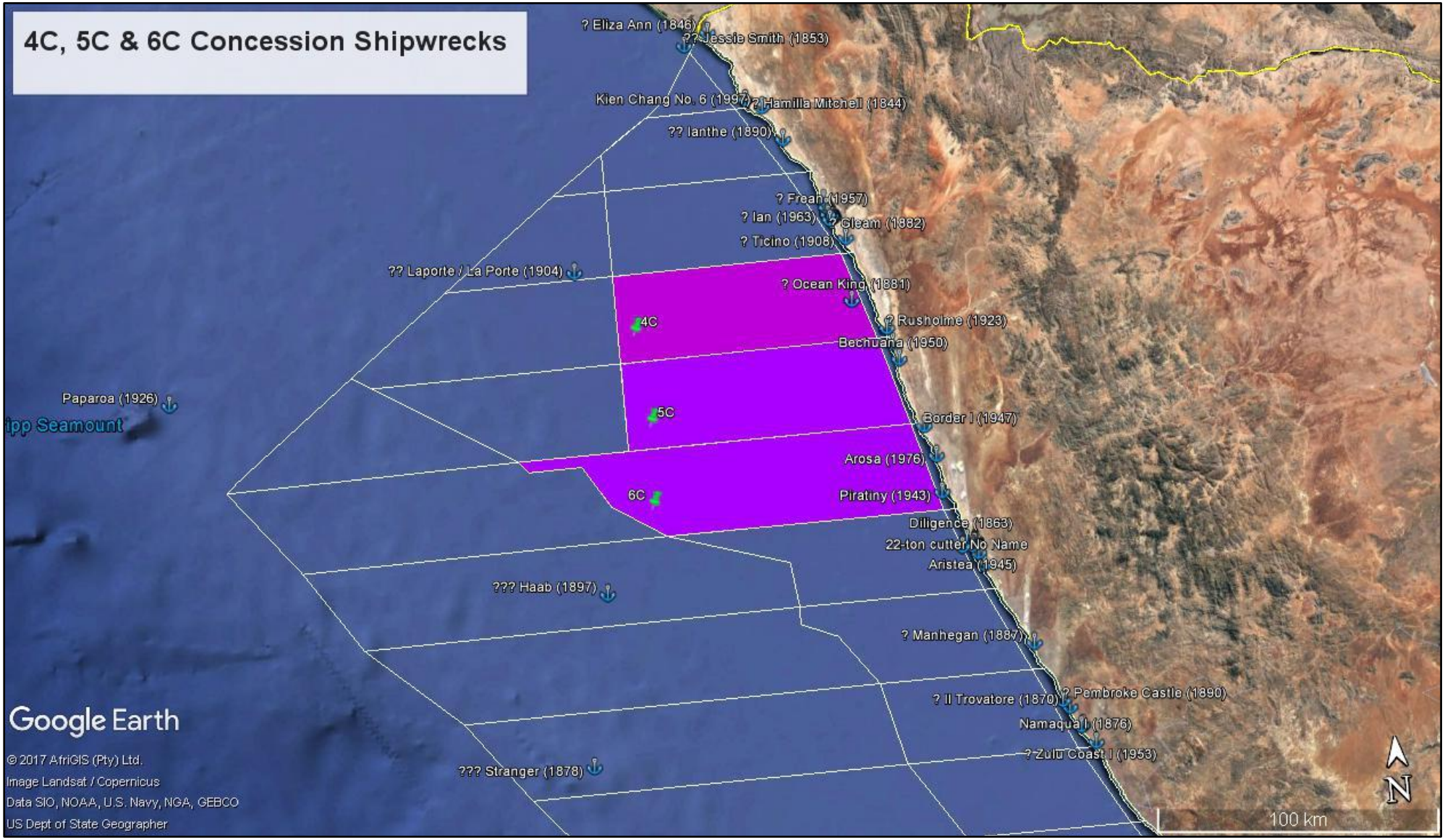

Figure 4: Concessions 4C, 5C and 6C Shipwrecks (Google Earth 2017; De Beers Marine 2017; Wallace 1929; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2017; u-boat.net 2017)

#	Name	Events	Nation	Date	History	Location
6.1 Shipwrecks definitely in the Concessions 4C-6C						
Not Applicable						
6.2 Shipwrecks possibly in the Concessions 4C-6C						
1	*Eros*	Foundered	Britain	1918	This 174-ton steel steamer had been sent to the Cape for the Namaqua Copper Company. After several voyages, she was laid up in order to alter her specifications. On 25 May, she left Table Bay for Port Nolloth under Captain Robert Brooks. However, she foundered en-route and one man died. (Levine 1989) According to van den Bosch (2009), the vessel is off Port Nolloth and according to the Miramar Ship Index (2009), she is off Lambert's Bay The information is contradictory and further research may show that she grounded on the coast. However, she is included here for the moment.	Either off Port Nolloth or "off' Lamberts Bay (see Section 6 above)
2	*Haab*	Abandoned	Norway	1897	This 861-ton wooden barque was according to Levine (1989) grounded on Dassen Island. However, according to van den Bosch (2009), she was abandoned 260.5 NM off Table Bay and may be off Dassen Island. The problem with this assumption, is that Dassen Island is only c. 35 NM from Table Bay (i.e the Port). 260.5 NM means that the vessel was abandoned in the SASA, near concession 5C and therefore may be in or near 5C.	Co-ordinates worked out on 260.5 NM, however this is an **approximation**. 29° 49.902'S 16° 40.070'E**
3	*Jessie Smith*	Swept out, sank	Britain	1853	Owned by J.O. Smith, built in 1845, this 226-ton British brig under Captain W. Baxter was engaged in the copper trade from the Namaqualand coast. She was anchored in Alexander Bay when a storm drove her from her anchorage. Four men were drowned but the owner, captain and some of the crew managed to reach shore with "great difficulty". (Levine 1989). One may surmise from the above that the vessel was swept out to sea and that the men left the brig before she sank. Therefore, it is possible that the wreck may be somewhere in the concession area 4C.	Somewhere off Alexander Bay, Orange River Mouth
4	*Ocean King*	Grounded, sank	Britain	1881	This 419-ton barque, built in 1859, under Captain Evans was bound from Swansea with a cargo of coal. She apparently hit a reef about 3-4 miles (6.4 – 8km) offshore and about 20 miles (32km) south of Port Nolloth. Although the barque sank within 20 minutes, all aboard survived. The Board of Trade Wreck Report of 1881 (van den Bosch 2009) states that their charts do not record a reef in this area. The Blue Chart Marine Maps also do not record a reef within this vicinity. However, the BlueChart (2016) maps do note that this is a Crayfish Trap Fishing Area. According to the Two Oceans Aquarium website (2017), the West Coast rock lobster (*Jasus lalandii*) are shallow water (up to 50m) lobsters that are caught using baited lobster pots. They inhabit rock reefs and kelp	**Approximate** area 29.47567 S 16.89444 E*, potentially uncharted rocky reefs. *Note: These co-ordinates are estimates based on the reported position of the wreck by the survivors

#	Name	Events	Nation	Date	History	Location
					forests. According to BlueChart (2016), the depth in this area is 78 – 110m deep. Therefore, although there may be an uncharted rocky reef within this area that rises near the surface of the sea, it is more likely that the wreck occurred closer inshore. This vessel may be in the 4C concession.	
5	*Laporte / La Porte*		London	1904	This 2448-ton steamer belonging to the Colorado Steamship Company, was built in 1902 at the Grangemouth & Greenock Dockyard Company. Under Captain H.J. Hill, she was on a voyage from Cardiff for Cape Town with coal when she foundered in a north-westerly gale. The surviving crew report that she was approximately 160km from shore and 80km north of Port Nolloth. Of the 23 crew, only 12 made it to Port Nolloth in a lifeboat. (Levine 1989). According to van den Bosch (2009), the vessel suffered an explosion 43.2 NM north of Port Nolloth and 100m from shore. According to the Miramar Ship Index (2009), she sank 50 NM west of Port Nolloth. As can be seen, although the available information is contradictory, it is possibly within the Port Nolloth area.	All **approximations** Position 1: 28° 35.691'S 14° 48.532'E Position 2: 28° 37.133'S 16° 24.555'E Position 3: 29° 17.078'S 15° 55.764'E**

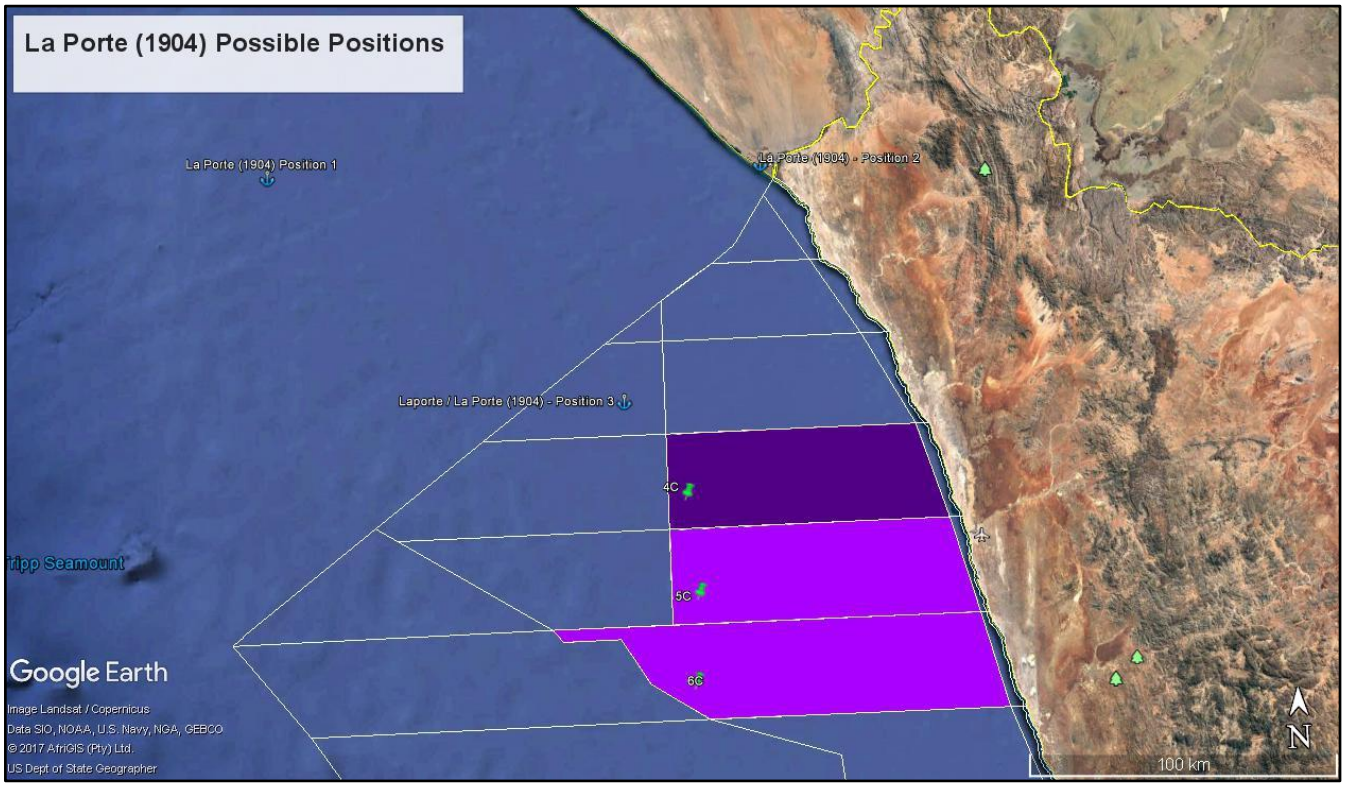

Figure 5: La Porte (1904) Possible Positions (Google Earth 2017)

6.3 Shipwrecks in the Concessions 4C-6C that have an unsure prediction certainty

6	*Adventurer*	Wrecked	Britain?	1843	From Sandown Bay (Isle of Wright?) to Table Bay or Algoa Bay. The Reocities website states the vessel was lost west of Saldanha. But the newspaper states lost in Sandown Port. I e-mailed Ann Barrett (Isle of Wright) to see if she can confirm or not that the wreck is there. The vessel is not listed in Lloyds as per Levine	West of Saldanha, along the west coast or Sandown Bay (RSA) or Isle of Wright

#	Name	Events	Nation	Date	History	Location
					(1989). Ann Barret responded that the wreck is not on their local lists. The wreck may be in the South African Sandown Bay near Kleinmond, Western Cape. All that is known for sure is that it was lost between Britain and one of the South African ports. Therefore, I am leaving it in the database pending further research	
7	*Admiral Collingwood*	Foundered	Britain	1858	This 360-ton barque under Captain Smith was bound from London for Algoa Bay when she apparently foundered 320km off St Helena Bay. (Levine 1989) This may put her somewhere in the SASA.	West Coast
8	*Aegeus*	Torpedoed, sank	Greece	1842	This 3 792-ton steamship left Trinidad for Saldanha Bay and then Durban. She never arrived. After WWII, German records indicated that she was torpedoed by the U-177 at 32º 30´ s 16º 00´ E. (Levine 1989; van den Bosch 2009) These co-ordinates are just west of the SASA and is where the U-boat reports torpedoing the vessel, not necessarily where she sank. In addition, the co-ordinates mentioned are subject to the technical limitations of the period.	West Coast
9	*Australia*	Fire, sank	Britain?	1840	This 250-ton brig, under Capt. A. Yule was built in Dundee, Scotland in 1839. She was on her maiden voyage to Australia with passengers and cargo when the vessel caught fire and sank, apparently 9.6 nautical miles (NM), north of the Olifants River Mouth. However, she was 800 km west of the Cape of Good Hope when the fire broke out. The twenty-eight passengers and crew entered the lifeboats shortly before she was overwhelmed by the flames. A boy died at sea and a man died after they made land at Olifants River after nine days at sea. Farmers helped the survivors to reach Cape Town. (van den Bosch 2009) Ergo this vessel could be in the concession area.	West Coast
10	*British Monarch*	Fire, abandoned	Britain	1889	The 1262-ton iron barque under Captain Morrow was on a voyage from Hamburg to Sydney with a general cargo. She was abandoned at 37º58´ S 05º20´ E. The crew took to the boats and stayed with the burning vessel until she exploded and sank. One of the boats with six crew aboard disappeared. Two days later some of the surviving crew were picked up by an American whaler, the *Canton*. The whaler took them to within 50km of Cape Town, where apparently, they were reloaded into their boats and had to make their own way to Cape Town. Their entire ordeal lasted 18 days. (Levine 1989; van den Bosch 2009) This vessel is left in the database as the co-ordinates are not necessarily very accurate and by staying with the burning vessel, drift needs to be taken into account.	West Coast

#	Name	Events	Nation	Date	History	Location
11 – 14	*Cabral Fleet*	Lost	Portugal	1500	Levine (1989) states: "Thirteen vessels under command of Pedro Alvares Cabral – the first Portuguese fleet which sailed annually to the Indies – and found Brazil. Twenty days after the fleet sailed from Brazil, it was struck by storms and four ships, including the one under command of Bartolomeu Dias, foundered. Duffy [Shipwrecks and Empire, 1955] writes that the ships were lost off the Cape of Good Hope, but, according to Axelson [Levine cites personal correspondence], the fleet could not have been off the Cape of Good Hope then; they would have been in the vicinity of the shortly-to-be-discovered islands of Tristao da Cunha." There is such scant and contradictory information regarding the loss of these four vessels that I am including them in this database.	Disappeared
15	*Catterina D.*	Fire, abandoned	Austria	1887	This 610-ton barque from Liverpool for Cape Town with a cargo of coal caught fire. She was apparently abandoned before she sank, 480km west of Hottentot Point. The Captain and crew reached Walvis Bay in the lifeboats. (Levine 1989) As she was abandoned before she sank, this vessel is included in the database.	West Coast
16	*Columbine*	Torpedoed, sank	South Africa	1944	This 3 268-ton steamship owned by the South African government was initially a German vessel. She was seized at the start of WWII. On 16 June 1944, she had 52 people on board when she was torpedoed by the U-198. 23 people died when their lifeboat capsized, including two naval officer wives. The co-ordinates for her torpedoing are 32º 44´ S and 17º 22´ E. (Levine 1989; van den Bosch 2009) These co-ordinates are in the southern end of the SASA and is where the U-boat reports torpedoing the vessel, not necessarily where she sank. In addition, the co-ordinates mentioned are subject to the technical limitations of the period.	West Coast
17	*Earl of Abergavenny*	Lost	Britain	1805	This English East Indiaman, under Captain J. Wordsworth was lost "off the Cape Coast" (van den Bosch 2009).	Disappeared off Cape Coast
18	*Juno*	Fire, abandoned	Sweden	1885	The 1274-ton schooner, under Captain T. Keyller was bound from Norway for Melbourne with a cargo of deals (timber). She caught fire and was abandoned at approximately 37 24.00S,11 30.00E. the 22-man crew took to the lifeboats and set off towards the Cape. The currents washed them towards the Orange River. They attempted to beach the lifeboat 32km south of the river but capsized and there were only four survivors. These four were picked up by the *Namaqua* and taken to Cape Town. (Levine 1989; van den Bosch 2009). It follows that if the current brought the lifeboat towards the Orange River, that the same	Abandoned

#	Name	Events	Nation	Date	History	Location
					principle could apply to the abandoned schooner.	
19	*Florence Barclay*	Fire, abandoned	Britain	1872	This 243-ton barque was built in 1866. Under Captain J.H. Voller, she was bound from Hull for Table Bay and Mauritius. Somewhere off the west coast, the vessel caught fire and was abandoned. The crew were in three lifeboats, one of which disappeared during the first night at sea. The other two boats arrived at Pomona Island (Namibia) three days later. The survivors were taken to Table Bay by the *Lilla.* (Levine 1989) As the crew beached only 120km north of the concession areas, I have included this vessel.	West Coast
20	*Glenogle*	Fire, abandoned	Britain	1901	According to van den Bosch (2009), this 914-ton steel barque caught fire and was abandoned at 34 38.00S,03 40.00E. The Equatorial current which runs west to east here could have pulled the abandoned vessel into the Benguela current and up the west coast.	Abandoned
21	*Good Hope*	Fire, sank	Cape?	1863	I have very little information on this wreck. Only that she was a Cape trader and burned at sea. (van den Bosch 2009)	Burnt at Sea
22	*Hartfield*	Fire, sank	Britain	1895	According to van den Bosch (2009) and Levine (1989), this 852-ton iron barque caught fire at 34 30.00S,11 30.00E, 259 NM west of Table Bay. The Equatorial current which runs west to east here could have pulled the abandoned vessel into the Benguela current and up the west coast.	West Coast
23	*Joachim*	Fire, abandoned	German	1868	Apparently the 763-ton barque under Captain Helenmeyer was on a voyage from Bremen to Rangoon with a cargo of coal. When she "burnt off the Cape". Her crew were rescued by the American vessel, *China* and brought to Cape Town (Levine 1989).	Off the Cape
24	*Kalewa*	Collision, sank	Britain	1942	This 4389-ton steamship collided with the *Boringa*. Hocking's (1969) co-ordinates are 30º 16´ S 13º 38´ E; van den Bosch's (2009) co-ordinates are 30 14.00S,12 50.00E. As this position is near the SASA, and due to the inaccuracy of geographic positioning in the middle of the 20th century, I have included this vessel in the database.	**Approximately**: 30º 16´ S 13º 38´ E **or** 30 14.00S,12 50.00E**
25	*Luba / Luban*	Fire, abandoned	Cape	1864	This barque was on her way from Leith for Cape Town with a cargo of coal and coal tar when she caught fire and sank 86.3 NM off Table Bay. Her crew were rescued. (Levine 1989; van den Bosch 2009) This puts the wreck in the SASA.	West Coast
26	*Mariner*	Leaking, abandoned	Britain?	1826	This vessel was having a hard time of it, the month before she was abandoned, she lost her topmasts and a man was swept overboard. Two weeks later she lost her rudder and started leaking. Despite pumping the water from her holds continuously, the water continued to rise.	Abandoned

#	Name	Events	Nation	Date	History	Location
					When it was over a metre deep, the vessel hoisted a distress signal. The *Harriet* came to their rescue and the vessel was abandoned in "the latitude of the Cape of Good Hope". The crew were landed in Mauritius. (Levine 1989) As the vessel was abandoned near the Cape Peninsula, it could have drifted north on the currents into the SASA.	
27	*Mary*	Disappeared	Britain	1870	Under Captain Anderson, this vessel left Simon's Bay for Falmouth and disappeared. (Levine 1989) As the intended route goes up the west coast, I have included this vessel.	Disappeared
28	*Mistress of the Seas*	Fire, lost	?	1869	Built in 1863, this 1241-ton ship, on a voyage from India to Havre with a cargo of cotton, was reported as "lost by fire off the Cape". (Levine 1989). However, an entry in Record of Canadian Shipping (Wallace 1929: 191), "…ship, 1241 tons, 190.0 x 38.0 x 24.0 Built 1863, Miramichi, N.B. Sold Greenock. Foundered Indian Ocean, 1870, ten drowned." This vessel could be anywhere off the Cape Coast. More probably the southern Cape coast.	Off the Cape
29	*Mona*	Fire, abandoned	Britain	1887	The 1045-ton barque under Captain Pearson was on a voyage from Grimsby to Durban with coal when she caught fire at 27º 14´ S 24º 55´ W. The following day the crew took to the lifeboats. After a week, the crew were picked up by the German barque, *Livingstone* and landed at Mossel Bay. (Levine 1989) The current was clearly pushing the survivors towards the Cape coast and, so it follows that their vessel, abandoned before sinking, may also have been pulled by the currents towards the west coast.	Abandoned
30	*Nortun*	Torpedoed	Panama	1943	This 3 663-ton ship was bound from Table Bay to Bahia when she was torpedoed and sunk by the U-516 about 130km south-west of Lüderitz at 28º 00´ S 14º 55´ E. (Levine 1989; van den Bosch 2009). These co-ordinates are just north of the SASA and is where the U-boat reports torpedoing the vessel, not necessarily where she sank. In addition, the co-ordinates mentioned are subject to the technical limitations of the period.	**Approximately:** 28º 00´ S 14º 55´ E.**
31	*Oliver Cromwell*	Fire, abandoned	Britain	1874	This vessel, on a voyage from Newcastle to Aden with a cargo of coal, caught fire. The crew were rescued by the barque *Saxon* and brought to Table Bay. (Levine 1989). There is very little information on this vessel, so she is included in the database.	Abandoned
32	*Orissa*	Fire, abandoned	Britain	1869	This 634-ton, three-masted, wooden ship was built in 1862. Under Captain R. Adams, bound for Mauritius with a cargo of coal, she caught fire and was abandoned 343.2 NM west of Table Bay. (Levine 1989; van den Bosch 2009).	Abandoned

#	Name	Events	Nation	Date	History	Location
					The Equatorial current which runs west to east here could have pulled the abandoned vessel into the Benguela current and up the west coast.	
33	*Oswin*	Leaking, abandoned	Britain	1819	According to Captain Ray, the commander of the vessel, the ship had sprung a leak in the vicinity of Cape Agulhas and while the pumps were working 24 hours a day, they were unable to make any headway on the leak. By the next day, there was 1.5m of water in the hold and this was increasing. The crew launched the longboat and filled her with supplies. "Embarking in the boat the commander and crew steered for Saint Helena, and were from the 31st Jan. to the 12th Feb. exposed to great sufferings and anxiety, until they reached Saint Helena. During this time they ran about 1400 miles and were particularly fortunate in making the Island to a mile." (The Asiatic Journal 1820: 388) Depending on whether this newspaper report was using nautical miles or statute miles, makes a difference to the location of the wreck. Statute miles puts the vessel near Lüderitz, nautical miles puts the wreck in the vicinity of the SASA.	West Coast
34	*Stranger*	Fire, abandoned	Britain	1878	This 288-ton barque was built in 1872. Under Captain Bendon, it was bound from London to Port Nolloth with a general cargo. The vessel caught on fire and was abandoned at sea. Two days after taking to the lifeboats, the crew arrived at Port Nolloth. (Levine 1989) The location of the abandonment puts this vessel firmly in the SASA.	Abandoned
35	*Typhoon*	Leaking, abandoned	Britain	1860	Built in 1852 by Cannon & sons in Glasgow, this 965-ton ship under Captain J. Brown was bound for India from Liverpool when she was abandoned in a leaking condition, "off the Cape". (Levine 1989; van den Bosch 2009).	Abandoned
36	*U-179*	Depth charges	Germany	1942	U-179 was responsible for torpedoing the British steamship *City of* Athens, about 45km to the south-east on the same day as the U-boat was surprised on the surface by *H.M.S. Active*. As she dived, the British vessel launched depth charges. Van den Bosch (2009) gives her co-ordinates as 33 25.00S,17 10.00E. All hands were lost (61 crew). (Levine 1989; U-boat.net 2017) These co-ordinates are just south of the SASA and is where the vessel reports depth charging the U-boat, not necessarily where she sank. In addition, the co-ordinates mentioned are subject to the technical limitations of the period.	**Approximately:** 33 25.00S,17 10.00E.**
6.4 Modern shipwrecks						
37	*Chios Merchant*	Leaking, sank	Greek	1982	It was leaking but under control when the leak worsened dramatically. After sending out an SOS, the crew abandoned the vessel in a sinking condition at 520.9 NM west of the Orange River Mouth. (van den Bosch 2009)	Approximately 520.9 NM west of the Orange River Mouth

#	Name	Events	Nation	Date	History	Location
					It may have drifted quite far from its original reported position.	
38	*Sin Yih Mou 61*	Exploded, sank	China	1976	Fishing vessel, exploded and sank possibly in the vicinity of Port Nolloth (van den Bosch 2009).	129.5 NM north west of Cape Town, near Port Nolloth

6.5 Shipwrecks along the coast – North to South

Location	Date	Name
Orange River	1846	*Eliza Ann*
	1853	*Jessie Smith*
Orange River – Port Nolloth	1844	*Hamilla Mitchell*
	1890	*Ianthe*
	1997	*Kien Chang No. 5*
Port Nolloth	1909	*Celestial Empire*
	1859	*Florence*
	1855	*Flying Fish*
	1957	*Frean*
	1882	*Freda*
	1882	*Gleam*
	1963	*Ian*
	1892	*Lieutenant Maury*
	1878	*Lion*
	1874	*Lizzie*
	N.D.	*Lochinvar*
	1889	*Namaqua I*
	1869	*Rosalind*
	1889	*S.T.*
	1886	*Veronica*
Port Nolloth - Kleinsee	1985	*Poseidon Cape*
	1923	*Rusholme*
	1908	*Ticino*
Kleinsee – Hondeklip Bay	1976	*Arosa*
	1950	*Bechuana*
	1947	*Border I*
	1943	*Piratiny*
Hondeklip Bay	1873	*Clipper*
	1863	*Diligence*
	1853	*Espiegle*
	2003	*Jahleel*
	1866	*Jonquille*
	1862	*Maria*
	1858	*Maria Smith*
	1852	*Natal*
	1882	*Queen*
	1854	*Rachel*
	1867	*Robert Brown*
	1859	Unknown Cutter

** Please note these co-ordinates are all approximations. The datums and methods used through time and within various areas, to record latitude and longitude, change. This can cause large deviations in real-world locations. Without knowing the datum and method that was used to record the

co-ordinates, they cannot be converted accurately. In addition, the recording of co-ordinates has become much more accurate in the 21st century. All co-ordinates here WGS84.

7. CONCLUSIONS

There may be at least one wreck in the 4C concession, with a possibility of another four being located within the 4C – 6C concession areas. In addition, as can be seen in the database, there are at least five vessels that wrecked in the SASA as well as a further 28 vessels that may be somewhere in the area.

8. 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.

A meeting was held on 13 October 2017 with Lesley Roos, Michele Kruse and myself. At which the De Beers Marine prospecting methodology was explained and the company's commitment to compliance with legal requirements was confirmed. Bearing this in mind, in conjunction with the company's excellent geophysical survey techniques, De Beers Marine is in a prime position to report on suspected wrecks within their concessions. Any discovery would need to follow the legal reporting requirements.

Objectives

- Protection of heritage sites within the project boundary 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:

- Normally, the Environmental Control Officer should be given a short induction, by the heritage practitioners, on archaeological site and artefact recognition. Whilst, I have been assured that the De Beers Marine geophysical technicians are well-versed in geophysical data interpretation, it may be worthwhile to arrange a short induction on decoding anomalies by a heritage practitioner.
- The contractors and workers should be notified that archaeological sites might be exposed during the prospecting activities.
- Should any heritage artefacts be exposed during prospecting, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- 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 it 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.

7. Sphere of Significance	High	Medium	Low
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.