

APPENDIX 4.4: MARITIME ARCHAEOLOGICAL IMPACT ASSESSMENT

MARITIME ARCHAEOLOGICAL IMPACT ASSESSMENT FOR PROSPECTING RIGHTS APPLICATIONS: SEA CONCESSION AREAS 13C AND 15C - 18C, WEST COAST, WESTERN CAPE PROVINCE

Assessment conducted under Section 38 (8) of the
National Heritage Resources Act (No. 25 of 1999) as part of a Environmental Impact Assessment

Prepared for

SLR Consulting (South Africa) (Pty) Ltd

On behalf of

Belton Park Trading 127 (Pty) Ltd

Draft

August 2020



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EXECUTIVE SUMMARY

ACO Associates cc has been commissioned by SLR Consulting (South Africa) (Pty) Ltd, on behalf of Belton Park Trading 127 (Pty) Ltd to undertake a desktop maritime archaeological impact assessment to support prospecting right applications for sea concession areas 13C and 15C – 18C, located between the Oliphants River Mouth and St Helena Bay on the west coast of the Western Cape Province.

Prospecting operations will be for various minerals within each of the sea concession areas and the target sediments are storm lag beach deposits, at various sea levels below current sea level, which are known to contain mineralised Quaternary gravels and other sediments overlying Pre-Cambrian and Cretaceous bedrock.

The proposed prospecting operations will entail geophysical surveys, drill sampling and bulk sampling. Of these activities the drill sampling and bulk sampling have the potential to affect submerged heritage resources. Drill sampling to 8 m below seafloor will take place at intervals of 500 m to 50 m across the concession areas. The bulk sampling will comprise of excavation of ten sampling trenches per concession area at different geological domains, with each trench up to 180 m long and 20 m wide.

This desktop maritime heritage impact assessment provides an assessment of the maritime and underwater cultural heritage potential of the five concession areas, within a study area defined as the area within a 2 km buffer around the maximum extents of the concession area.

Findings:

Although there have been no specific studies of the submerged prehistory of the West Coast, the archaeological evidence for a hominin presence in the vicinity of the study area in the Earlier, Middle and Later Stone Age is plentiful. The past occupation and exploitation of the continental shelf by hominins during periods of lower sea level suggests that archaeological sites and materials can be expected on and within the current seabed that comprises the three concession areas, where the water depth is less than -120 m.

The maritime history of the West Coast dates back to almost the first days of the Dutch settlement in Table Bay but there are relatively few recorded wrecks in the vicinity of the concession areas. Of the twelve recorded maritime casualties, only four - *Eros*, *Antoinette*, *Blue Bird* and *Jenny-Lee* - could be present on the seabed in the concession areas. While *Blue Bird* and *Jenny-Lee* are of limited, current historical interest, *Eros* and *Antoinette* are older wrecks and hold greater potential archaeological interest.

Conclusions:

This assessment of the maritime heritage resources of concession areas 13C and 15C – 18C indicates that there is the potential for the presence of submerged prehistoric archaeological material in sediments to be affected by prospecting in areas of the seabed less than about -120 m in depth. There is also the potential for the presence of historical shipwrecks in one or more of the areas, although this potential appears to be low.

The significance of impacts from drill and bulk sampling on submerged prehistoric resources, where they occur, has been assessed to be very low. The application of measures to mitigate impacts is not practical given the uncertainty over the presence and distribution of these resources and the nature of prospecting activities being undertaken. However, this assessment has suggested for both the drill and bulk sampling, consideration be given by BPT127 to the retention of samples of the tailings and coarser fraction of sorted seabed material (particularly gravel and stone between c. 20 mm and 150 mm) for assessment by an archaeologist for the presence of prehistoric lithic material.

The implementation of these measures would result in a potential benefit to archaeological research and knowledge from the prospecting programme and it is suggested that the feasibility and mechanics of these suggestions are explored by BPT127 and the project archaeologist prior to the commencement of the prospecting programme.

In respect of historical shipwrecks and maritime heritage resources, this assessment found that the significance of likely impacts will be very low and that impacts can be mitigated through the avoidance of identifiable sites. Should a previously unknown or unrecorded shipwreck material be encountered during prospecting, work at that location must cease until the project archaeologist and SAHRA have been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it.

Lastly, it is recommended that the processing of multibeam and sub-bottom profiler data collected to inform prospecting activities includes the noting of and reporting to the project archaeologist of any seabed anomalies that could represent shipwrecks or maritime heritage resources, and the presence in the seismic data of any sediment horizons with pre-colonial archaeological potential.

It is our reasoned opinion that the proposed prospecting activities in concession areas 13C and 15C – 18C are likely to have a very low impact on submerged prehistoric and maritime and underwater cultural heritage resources and provided the recommendations and suggestions to mitigate and offset potential impacts are implemented, can be considered to be archaeologically acceptable.

EXECUTIVE SUMMARY	1
GLOSSARY	4
ABBREVIATIONS	4
1. INTRODUCTION	5
2. PROJECT DESCRIPTION	5
3. RELEVANT LEGISLATION	5
3.1. National Heritage Resources Act (No 29 of 1999)	5
3.2. Maritime Zones Act (No 15 of 1994).....	2
3.3. National Environmental Management Act (Act No 107 of 1998).....	3
4. METHODOLOGY.....	3
4.1. Maritime Study Area.....	3
4.2. Limitations.....	1
5. UNDERWATER CULTURAL HERITAGE	1
5.1. Submerged Prehistory	1
5.1.1. Submerged Prehistory of the Concession Areas	2
5.2. Maritime History of the South African coast	4
5.2.1. Maritime History of the B Concession Areas.....	5
6. IMPACT ASSESSMENT	6
6.1. Submerged Prehistory – All Concession Areas.....	1
6.1.1. Impacts of Drill Sampling.....	1
6.1.2. Impacts of Bulk Sampling	2
6.2. Maritime Archaeology	3
6.3. Summary of Impact Significance Ratings for Heritage Receptors	4
7. CONCLUSIONS	4
7.1. Acceptability of the Proposed Activity with Respect to Heritage Resources	5
8. REFERENCES	6
8.1. Online Sources.....	7
APPENDIX 1: RECORDED WRECKS AND SHIPPING CASUALTIES WITHIN AND IN THE VICINITY OF THE MARITIME ARCHAEOLOGICAL STUDY AREA.....	9
APPENDIX 2: SPECIALIST CV.....	10
APPENDIX 3: SPECIALIST DECLARATION.....	14
APPENDIX 4: IMPACT ASSESSMENT METHODOLOGY	15

Figure 1: Location of concession areas 13C and 15C – 18C between St Helena Bay in the south and Papendorp at the mouth of the Oliphants River in the north on the Cape west coast. The yellow and orange lines which cross the concessions areas are the limits of South Africa’s territorial waters and contiguous zone, respectively (Source: Google Earth)..... 1

Figure 2: Study area used for this EIA report (Source: Google Earth). 1

Figure 3: Possible extent of the South African continental shelf c.137,000 years ago. The location of concession areas 14B, 15B and 17B is marked by the red box (Source: Franklin et al, 2015)..... 3

Figure 4: The south and west coast continental shelf showing the water depths of 45, 75, 120 and 400 m. The location of the concession areas is marked by the red box on the left of the image (Source: Compton, 2011 from Cawthra, 2014). 3

Figure 5: Wrecks recorded in and near concession area 13C, 15C and 16C (Source: Google Earth). .. 1

Figure 6: Wrecks recorded in and near to concession areas 16C-18C (Source: Google Earth). 2

GLOSSARY

Aeolianite: Any rock formed by the lithification of sediment deposited by aeolian processes, that is, by the wind.

Archaeology: Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Holocene: The most recent geological time period which commenced 10 000 years ago.

Hominin: A member of the tribe Hominini which comprises those species regarded as human, directly ancestral to humans, or very closely related to humans.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Marine Isotope Stages: Alternating warm and cool periods in the Earth's paleoclimate, deduced from oxygen isotope data reflecting changes in temperature derived from data from deep sea core samples.

Midden: A pile of debris, normally shellfish and bone that have accumulated as a result of human activity.

Middle Stone Age: The archaeology of the Stone Age between 20 000-300 000 years ago associated with early modern humans.

Pleistocene: A geological time period (of 3 million – 10 000 years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage.

ABBREVIATIONS

DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency
UNCLOS	United Nations Convention on the Law of the Sea

1. INTRODUCTION

ACO Associates cc has been commissioned by SLR Consulting (South Africa) (Pty) Ltd, on behalf of Belton Park Trading 127 (Pty) Ltd (BPT127), to undertake a desktop maritime archaeological impact assessment to support prospecting right applications for sea concession areas 13C and 15C – 18C, located between the Oliphants River Mouth and St Helena Bay on the west coast of the Western Cape Province (Figure 1).

BPT127 has lodged applications for Prospecting Rights with the Department of Mineral Resources and Energy (DMRE) to undertake offshore prospecting activities, in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), as amended.

Prospecting activities require Environmental Authorisation (EA) in terms of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended and a Prospecting Right has to be obtained in terms of the MPRDA. A requirement for obtaining a Prospecting Right is that an applicant must comply with Chapter 5 of NEMA with regards to consultation and reporting. In this regard, an application for EA is also required. In order for DMRE to consider an application for EA for the proposed prospecting operations, a Scoping and Environmental Impact Assessment (EIA) process must be undertaken.

2. PROJECT DESCRIPTION

BPT127 proposes to undertake prospecting operations for various minerals (specifically diamond, gemstones, heavy minerals, industrial minerals, precious metals, ferrous and base metals) within each of the sea concession areas. According to the Prospecting Rights Applications for the three concession areas, the sediments that are the target of the prospecting are storm lag beach deposits, at various sea levels below current sea level, which are known to contain mineralised Quaternary gravels and other sediments overlying Pre-Cambrian and Cretaceous bedrock.

The proposed prospecting operations will entail geophysical surveys (multibeam bathymetry and sub-bottom profiler), drill sampling and bulk sampling. Of these activities the drill sampling and bulk sampling have the potential to affect submerged heritage resources.

Drill sampling to 8 m below seafloor will take place at intervals of 500 m to 50 m across the concession areas. The bulk sampling will comprise of excavation of ten sampling trenches per concession area at different geological domains, with each trench up to 180 m long and 20 m wide. The total footprint of disturbance associated with the drill sampling and bulk (trench) sampling would be approximately 20.4 ha in total.

3. RELEVANT LEGISLATION

3.1. National Heritage Resources Act (No 29 of 1999)

The National Heritage Resources Act (NHRA) came into force in 2000 with the establishment of the South African Heritage Resources Agency (SAHRA), replacing the National Monuments Act (No. 28 of 1969 as amended) and the National Monuments Council as the national agency responsible for the management of South Africa's cultural heritage resources.

The NHRA reflects the tripartite (national/provincial/local) nature of public administration under the South African Constitution and makes provision for the devolution of cultural heritage management to the appropriate, competent level of government. Because national government is responsible for the management of the seabed below the high-water mark, however, the management of maritime and underwater cultural heritage resources under the NHRA does not devolve to provincial or local heritage resources authorities but remains the responsibility of the national agency, SAHRA.

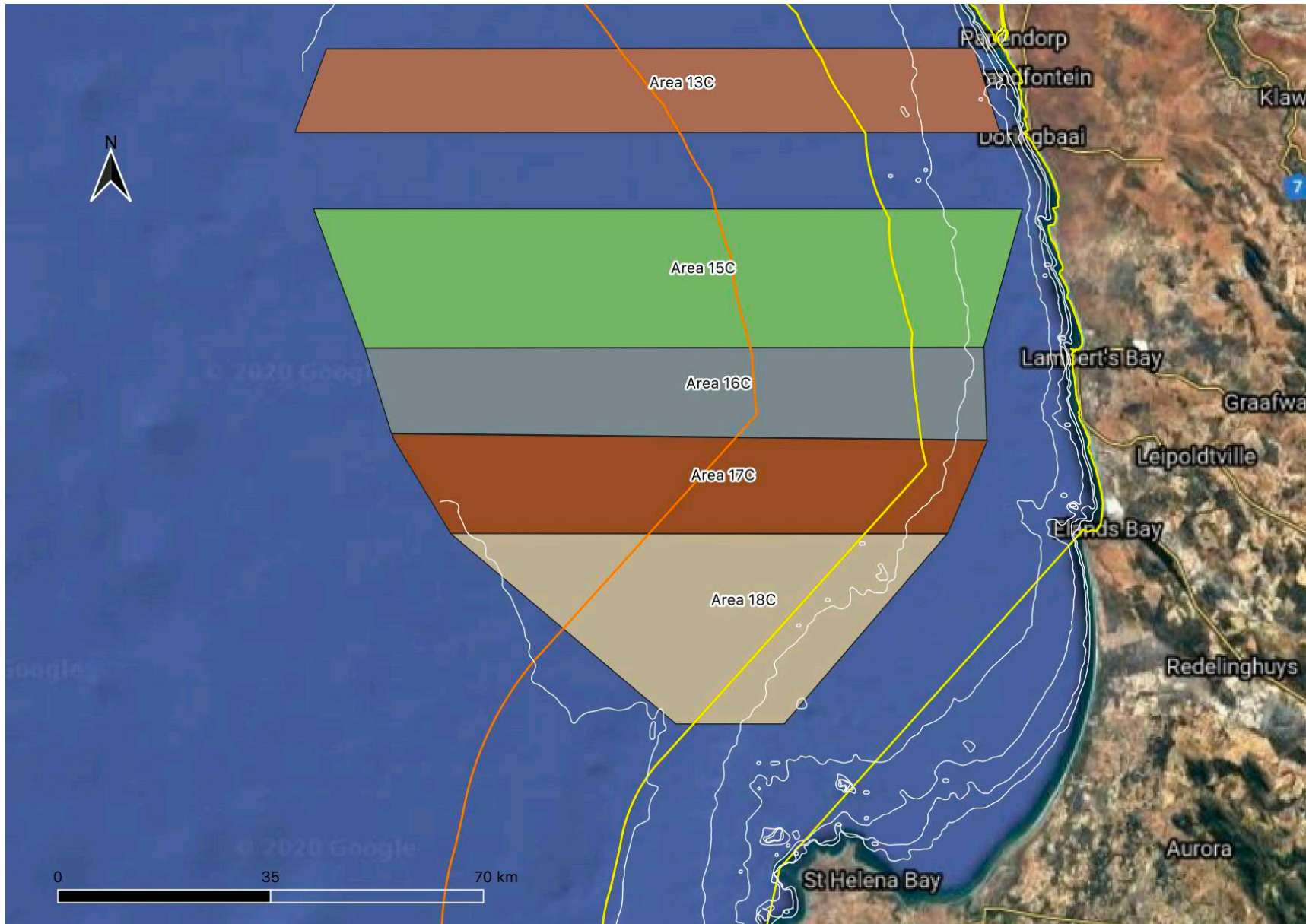


Figure 1: Location of concession areas 13C and 15C – 18C between St Helena Bay in the south and Papendorp at the mouth of the Oliphants River in the north on the Cape west coast. The yellow and orange lines which cross the concessions areas are the limits of South Africa's territorial waters and contiguous zone, respectively (Source: Google Earth).

The NHRA gives legal definition to the range and extent of what are considered to be South Africa's heritage resources. According to Section 2(xvi) of the Act, a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, maritime and underwater cultural heritage can include the following sites and/or material relevant to this assessment:

- material remains of human activity which are in a state of disuse and are in or on land [which includes land under water] and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures (Section 2(ii));
- 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 2(ii)); and
- any movable property of cultural significance which may be protected in terms of any provisions of the NHRA, including any archaeological artefact or palaeontological specimen (Section 2(xxix)).

Of the heritage resource types protected by the NHRA, seabed mineral prospecting has the potential to impact the following:

- submerged pre-colonial archaeological sites and materials; and
- maritime and underwater cultural heritage sites and material, which are principally historical shipwrecks.

As per the definitions provided above, these cultural heritage resources are protected by the NHRA and a permit from SAHRA is required to destroy, damage, excavate, alter, deface or otherwise disturb any such site or material.

It is also important to be aware that in terms of Section 35(2) of the NHRA, all archaeological objects and palaeontological material is the property of the State and must, where recovered from a site, be lodged with an appropriate museum or other public institution.

3.2. Maritime Zones Act (No 15 of 1994)

South Africa's Maritime Zones Act of 1994 is the national legislative embodiment of the international maritime zones set out in the United Nations Convention on the Law of the Sea (UNCLOS). The Act defines the extent of the territorial waters, contiguous zone, exclusive economic zone (EEZ) and continental shelf (which together comprises of some 4.34 million square kilometres of seabed) and sets out South Africa's rights and responsibilities in respect of these various maritime zones.

Under the terms of Sections 4(2) and 6(2) of the Maritime Zones Act respectively, "any law in force in the Republic, including the common law, shall also apply in its territorial waters" and "subject to any other law the Republic shall have, in respect of objects of an archaeological or historical nature found in the maritime cultural zone, the same rights and powers as it has in respect of its territorial waters".

The NHRA applies, therefore, within South Africa's territorial waters (12 nautical miles seaward of the baseline) and to the outer limit of the maritime cultural zone (24 nautical miles seaward of the baseline) (see Figure 1 above).

Approximately half of concession areas 13C and 15C – 18C lie within South Africa's territorial waters and contiguous zone and are thus subject to the NHRA (see Figure 1 above). Any offshore activities that have the potential to disturb or damage cultural heritage resources located in or on the seabed within the territorial waters and maritime cultural zone require the involvement of SAHRA, as a commenting body in respect of the National Environmental Management Act environmental assessment process (see below) and as permitting authority where impacts to sites or material cannot be avoided and damage or destruction will occur.

In the seaward portions of the concession areas which lies beyond the outer limit of the contiguous zone, within South Africa's Exclusive Economic Zone (EEZ) (see Figure 1 above), the NHRA technically does not apply.

However, in terms of Section 9 of the Maritime Zones Act, any law in force in the Republic, including the common law, shall also apply on and in respect of an installation. The definition of an installation includes:

- any exploration or production platform used in prospecting for or the mining of any substance;
- any exploration or production vessel; and/or
- any vessel or appliance used for the exploration or exploitation of the seabed.

The activities on or related to the platform to be used in the proposed prospecting may thus be subject to the requirements of the NHRA.

3.3. National Environmental Management Act (Act No 107 of 1998)

The National Environmental Management Act (No 107 of 1998) (NEMA) provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals that are likely to have a negative effect on the environment.

Regulations governing the environmental authorisation (EA) process have been promulgated in terms of NEMA and include the EIA Regulations (GNR 982/2014, as amended) and Listing Notices (LN) 1-3 (R983, R984 and R985, as amended) that list activities requiring an EA.

The proposed prospecting in concession areas 13C and 15C – 18C, triggers activities listed in LN2 and requires an application for EA that follows the Scoping and Environmental Impact Assessment (EIA) process.

The EIA process aims to identify and assess all potential environmental impacts (negative and positive) and the Environmental Impact Report (including Environmental Management Programme) should recommend how potential negative impacts can be effectively mitigated and how benefits can be enhanced.

4. METHODOLOGY

This desktop maritime heritage impact assessment (HIA) provides an assessment of the maritime and underwater cultural heritage potential of the three concession areas described above and within the study area defined in Section 4.1 below.

The report includes a short description of what comprises South Africa's maritime and underwater cultural heritage and the maritime history of West Coast, followed by a discussion of potential maritime heritage resources of the three concession areas within that wider context.

The report draws information from readily available documentary sources and databases, including SAHRA's Maritime and Underwater Cultural Heritage database, a database of underwater heritage resources maintained by ACO Associates, and from relevant primary and secondary sources and aims to identify as accurately as possible the maritime heritage resources within the concession areas.

An assessment of the potential impacts of the proposed prospecting on maritime and underwater cultural heritage resources is provided and this is supported by recommendations for measures to mitigate possible impacts arising from prospecting operations in the concession areas.

4.1. Maritime Study Area

The study area for this HIA is defined as the area within a 2 km buffer around the maximum extents of the concession areas (Figure 2).

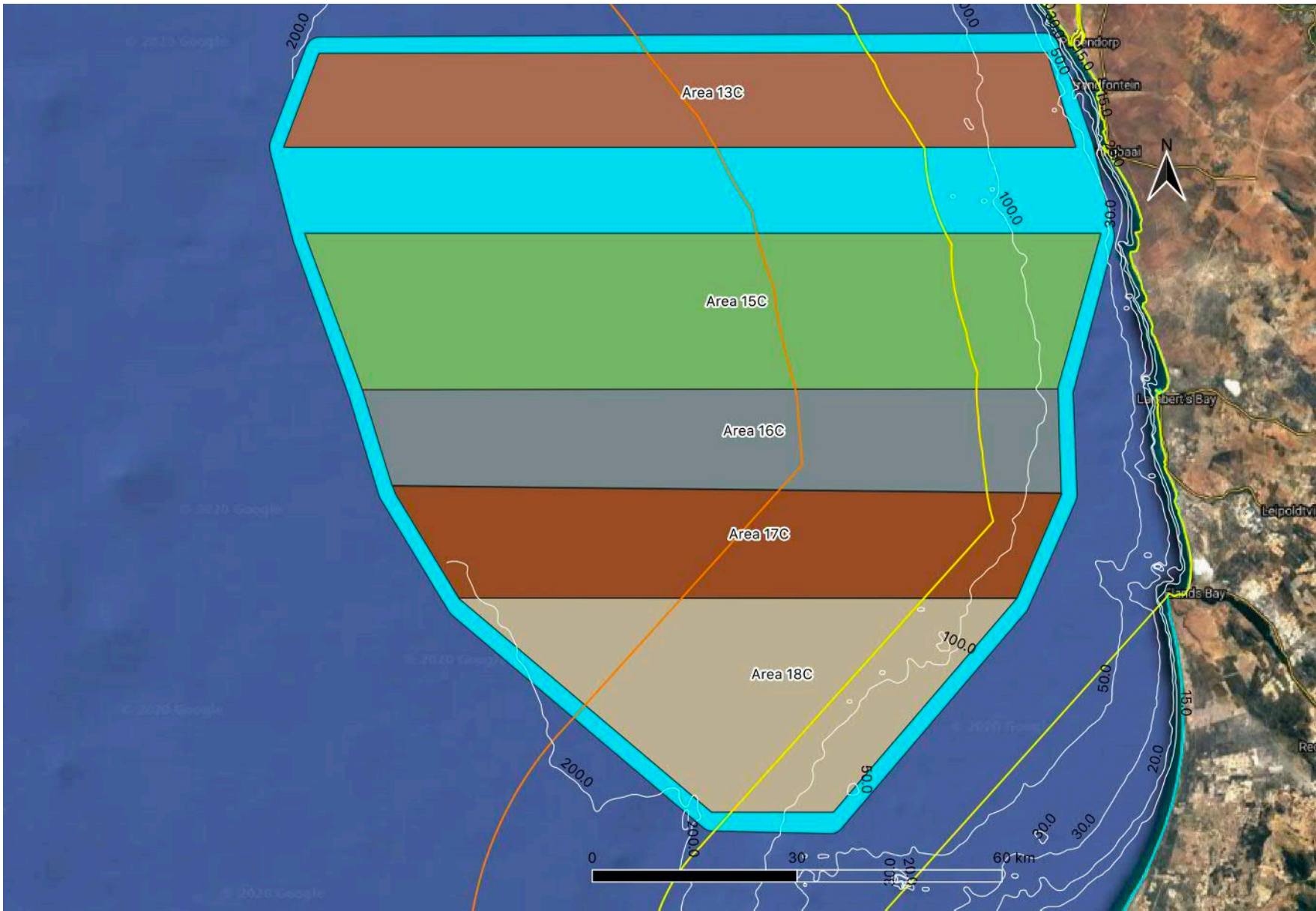


Figure 2: Study area used for this HIA report (Source: Google Earth).

4.2. Limitations

South Africa's record of maritime and underwater cultural heritage resources is based on a mix of information derived in the main from historical documents and other secondary sources and from very limited primary sources such as geophysical data and other field-based observations and site recordings.

While every effort has been made to ensure the accuracy of the information presented below, the reliance on secondary data sources means that there are considerable gaps and inaccuracies in this record and the locations of most of the wrecks referred to in the following sections are approximate. The potential also exists for currently unknown and/or unrecorded maritime heritage sites to be encountered within the concession areas in the course of prospecting activities.

5. UNDERWATER CULTURAL HERITAGE

South Africa has a rich and diverse underwater cultural heritage. Strategically located on the historical trade route between Europe and the East, South Africa's rugged and dangerous coastline has witnessed more than its fair share of shipwrecks and maritime dramas in the last 500 years.

At least 2400 vessels are known to have sunk, grounded, or been wrecked, abandoned or scuttled in South African waters since the early 1500s. This doesn't include the as yet unproven potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions along the South African east coast, or the potential for wrecks of vessels which disappeared between Europe and the East to be present in our waters.

In addition to historical shipwrecks, the record of South Africa's long association with the sea is much broader and extends far back into prehistory. This element of our maritime and underwater cultural heritage is represented around the South African coast by thousands of pre-colonial shell middens and large numbers of tidal fish traps, which reflect prehistoric human exploitation of marine resources since the Middle Stone Age, more than 150,000 years ago.

Another, until recently, largely unacknowledged and unexplored aspect of our maritime and underwater cultural heritage are pre-colonial terrestrial archaeological sites and palaeolandscapes which are now inundated by the sea.

This assessment considers the potential for both historical shipwrecks and submerged prehistoric archaeological resources to be present in concession areas 13C and 15C – 18C.

5.1. Submerged Prehistory

Since the start of the Quaternary, approximately 2.6 million years ago, the world has been subject to a series of cooling and warming climatic cycles in which sea level was mainly lower than it is today. During the last 900,000 years, global sea levels have fluctuated substantially on at least three occasions, the result of increased and decreased polar glaciation. The dropping of sea levels was caused by the locking up in the polar ice caps of huge quantities of seawater as global temperatures cooled. The most extreme recent sea level drop occurred between circa 20,000 and 17,000 years ago when at the height of the last glaciation (Marine Isotope Stage (MIS) 2) the sea was more than 120 m lower than it is today (Waelbroeck *et al*, 2002; Rohling *et al*, 2009).

As with the MIS 2 low sea level stand, those which corresponded with MIS 4 (~70,000 years ago), MIS 6 (~190,000 years ago), MIS 8 (~301,000 years ago) and MIS 12 (~478,000 years ago) would have "added a large coastal plain to the South African land mass" (Van Andel, 1989:133) where parts of the continental shelf were exposed as dry land (see Cawthra *et al*, 2016) (Figure 3).

The exposure of the continental shelf would have been most pronounced on the wide Agulhas Bank off the southern Cape coast, and it is estimated that a new area of land, as much as 80,000 km² in extent, was exposed during the successive glacial maxima (Fisher *et al*, 2010). Figure 4 below gives an indication of the extent of the continental shelf exposure on the south and west coasts during the second to last glaciation (MIS 6).

The exposed continental shelf was quickly populated by terrestrial flora and fauna, and also by our human ancestors who were dependant on these resources (Compton, 2011). As a result, for periods numbering in the tens of thousands of years on at least three occasions during the last 500,000 years our ancestors inhabited areas of what is now seabed around the South African coast. This means that a large part of the archaeological record of the later Earlier, Middle and early Late Stone Age is located on the continental shelf and is now “inundated and for all practical purposes absent from [that] record” (Van Andel, 1989:133-134).

Until relatively recently there was little or no access to the submerged prehistoric landscapes and sites on the continental shelf, although evidence from various parts of the world of drowned, formerly terrestrial landscapes hinted at the tantalising prospect of prehistoric archaeological sites on and within the current seabed.

Perhaps the best-known example of such evidence is archaeological material and late Pleistocene faunal remains recovered in the nets of fishing trawlers in the North Sea between the United Kingdom and the Netherlands throughout the 20th century (Peeters *et al*, 2009; Peeters, 2011) and the University of Birmingham’s recent archaeological interpretation of 3D seismic data, collected in the same area by the oil and gas industry, which has revealed well-preserved prehistoric landscape features across the southern North Sea (Fitch *et al*, 2005, Gaffney *et al*, 2010).

Closer to home, there is archaeological evidence for a prehistoric human presence in what is now Table Bay. In 1995 and 1996 during the excavation of two Dutch East India Company shipwrecks, the *Oosterland* and *Waddinxveen*, divers recovered three Early Stone Age handaxes from the seabed under the wrecks. The stone tools, which are between 300,000 and 1.4 million years old, were found at a depth of 7-8 m below mean sea level and were associated with Pleistocene sediments from an ancient submerged and infilled river channel. Their unrolled and unworn condition indicate that they had not been carried to their current position by the ancient river and suggests that they were found more or less where they were dropped by Early Stone Age hominins more than 300,000 years ago, when the sea level was at least 10 m lower than it is today (Werz and Flemming, 2001; Werz *et al*, 2014).

5.1.1. Submerged Prehistory of the Concession Areas

There have, to date, been no specific studies of the submerged prehistory of the west coast. However, the archaeological evidence for a hominin presence along the West Coast in the Earlier, Middle and Later Stone Ages is plentiful.

Diepkloof Rock Shelter, inland of Elands Bay for example, contains evidence of a nearly continuous human occupation for nearly 85 000 years (see for example, Parkington and Poggenpoel 1987; Texier *et al* 2010), while Elands Bay Cave, on the coast at the mouth of the Verloren Vlei, preserves archaeological evidence of the Pleistocene / Holocene transition during the Later Stone Age (Parkington 1988).

At Hoedjiespunt in Saldanha Bay, south of the study area, four hominid teeth, four or five small fragments of cranium, and two postcranial bones from one or two individuals have been found in an ancient hyena lair and are associated with uranium series dates on ostrich eggshell fragments which imply an age of 130,000 to 180,000 years for the hominids (Berger and Parkington 1996). Nearby, at Churchaven on the Langbaan Lagoon a set of fossilized human footprints were discovered in an aeolianite slab in 1995. They are thought to be those of a female human (hence their nickname “Eve’s footprints”) and have been dated to approximately 117,000 years ago, very close to the start of the last glaciation when sea levels would have been starting to drop (see <http://www.sawestcoast.com/fossileve.html>).

Later Stone Age coastal shell middens are ubiquitous along the West Coast, as are numerous Middle Stone Age shell middens; the latter being some of the earliest evidence in the world for the exploitation by our ancestors of marine resources. Older, Earlier Stone Age lithics are also commonly found along the West Coast (David Halkett pers. comm.).



Figure 3: Possible extent of the South African continental shelf c.137,000 years ago. The location of concession areas 14B, 15B and 17B is marked by the red box (Source: Franklin et al, 2015)



Figure 4: The south and west coast continental shelf showing the water depths of 45, 75, 120 and 400 m. The location of the concession areas is marked by the red box on the left of the image (Source: Compton, 2011 from Cawthra, 2014).

As discussed in the previous section, the maximum sea level lowstand during the Quaternary, when hominins would have been present in and on the South African landscape, was -120 m. Any areas of South Africa's current seabed shallower than -120 m thus have the potential to have been used by our ancestors and to preserve the archaeological evidence of that use.

Although no recent geophysical data are available for the B concession areas being assessed here, seabed sediment mapping by O'Shea (1971) further up the coast at Kleinzee indicates that a channel cut by the palaeo-Buffels River extends offshore to the west of Kleinzee. This channel has the potential for associated, now submerged, archaeological material and palaeoenvironmental evidence, and is illustrative of the likely situation with many of the other major rivers that feed into the Atlantic along the West Coast have submerged palaeo-channels extending offshore. These channels are an important mining target, particularly for diamond mining as they are the source of and contain diamondiferous gravel.

During times of lower sea level in the past, these rivers would have flowed across the exposed continental shelf and these ancient river courses, whose channels are today buried under modern seabed sediment, would have been an important focus for hominin activity on the exposed continental shelf in the past. As demonstrated in Table Bay, there is the potential for the occurrence of ancient, submerged archaeological material in association with palaeo-river channels. Where alluvial sediment within these channels has survived post-glacial marine transgressions there is also the potential to recover palaeoenvironmental data (pollens, foraminifera and diatoms, for example) which can contribute contextual information to our understanding of the ancient human occupation of South Africa.

It is important to note here that most of concessions areas 13C and 15C – 18C are deeper than -120 m and will thus not contain prehistoric archaeological evidence. Seabed contour information from the South African Naval Hydrographers Office on Figure 2 shows the -100 m and -200 m contour lines, and suggests that the -120 m line corresponds roughly with the outer edge of the territorial waters.

This rough correlation has been assumed for this report and the assessment of impacts on submerged prehistoric archaeological resources below applies only within those portions of the concession areas within the territorial waters.

5.2. Maritime History of the South African coast

In 1498 the Portuguese explorer Vasco da Gama finally pioneered the long-sought sea route around Africa from Europe to the East. Since then, the southern tip of the African continent has played a vital role in global economic and maritime affairs, and until the opening of the Suez Canal in 1869, represented the most viable route between Europe and the markets of the East (Axelson, 1973; Turner, 1988; Gribble, 2002; Gribble and Sharfman, 2013).

The South African coast is rugged, and the long fetch and deep offshore waters mean that the force and size of seas around the South African coast are considerable, a situation exacerbated by prevailing seasonal winds.

The geographical position of the South African coast on the historical route to the East and the physical conditions mariners could expect to encounter in these waters have, in the last five centuries, been responsible for the large number of maritime casualties which today form the bulk of South Africa's maritime and underwater cultural heritage (Gribble, 2002).

At least 2500 vessels are known to have sunk, grounded, or been wrecked, abandoned or scuttled in South African waters since the early 1500s. More than 1900 of these wrecks are more than 60 years old and are thus protected by the NHRA as archaeological resources. This list is by no means complete and does not include the as yet unproven potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions along the South African east coast. It is, thus anticipated that further research in local and foreign archives, together with physical surveys to locate the remains of historical shipwrecks will produce a final tally of more than 3000.

For obvious historical reasons, the earliest known South African wrecks are Portuguese, dating to the sixteenth century when that country held sway over the route to the East. Due to the later, more prolonged ascendancy of first the Dutch and then the British in European trade with the East and control at the Cape, the majority of wrecks along the South African coast are Dutch and British. However, at least 36 other nationalities are represented amongst the other wrecks that litter the South African coast.

Da Gama's maritime incursion into the Indian Ocean laid the foundation for more than 500 years of subsequent European maritime activity in the waters off the South African coast. The Portuguese and other European nations who followed their lead around the Cape and into the Indian Ocean, however, joined a maritime trade network that was thousands of years old and in which east and south east Africa was an important partner.

This trade spanned the Indian Ocean and linked the Far East, South East Asia, India, the Indian Ocean islands and Africa. Archaeological evidence from Africa points to an ancient trade in African products – gold, skins, ivory and slaves – in exchange for beads, cloth, porcelain, iron and copper. The physical evidence for this trade includes Persian and Chinese ceramics excavated sites on African Iron Age like Khami, Mapungubwe and Great Zimbabwe (see Garlake, 1968, Huffman, 1972, Chirikure, 2014), glass trade beads found in huge numbers on archaeological sites across eastern and southern Africa (Wood, 2012).

There is shipwreck evidence on the East African coast for this pre-European Indian Ocean trade (see for example Pollard et al 2016) and clear archaeological and documentary evidence that this trade network extended at least as far south as Maputo in Mozambique. This suggests that there is the potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions to exist along the South African east coast and offshore waters.

The more than 2500 historical shipwrecks that make up the bulk of South Africa's underwater cultural heritage are a thus huge, cosmopolitan, repository of information about mainly global maritime trade during the last five centuries and potentially much further back into the past. These sites contain a wealth of cultural material associated with that trade and clues to the political, economic, social and cultural changes that accompanied this trade, and which contributed to the creation of the modern world.

5.2.1. Maritime History of the B Concession Areas

The maritime history of the West Coast dates back to almost the first days of the Dutch settlement in Table Bay. The Dutch settlers were quick to recognise and exploit the rich marine resources of the West Coast and fishing and sealing flourished, with the catches transported down the coast to supply Cape Town.

This industry led to the development of fishing villages at Saldanha Bay, Lamberts Bay, and at Laaiplek on the Berg River in St Helena Bay. Saldanha, together with places like Elands Bay, also later becoming ports for the export of grain and other produce from the Swartland and Cederberg (Ingpen 1979).

During the early nineteenth century the West Coast islands became the focus of an international 'white gold' rush to exploit their rich guano resources. The guano was soon depleted but the discovery of rich copper deposits in Namaqualand and the Richtersveld led to the use of Alexander Bay, Robbe Bay (now Port Nolloth) and Hondeklip Bay by the early 1850s and the development of local, coasting shipping services to support this new industry (The Nautical Magazine and Naval Chronicle 1855: 297-303; Ingpen 1979).

With the exception of Saldanha Bay, the West Coast historically lacked good harbours. Combined with the regular coastal fogs, a largely rocky shoreline and dangerous currents this took its toll on shipping over the years.

According to SAHRA's Maritime and Underwater Cultural Heritage database, the national record of underwater cultural heritage curated on the South African Heritage Resources Information System (SAHRIS) (<http://www.sahra.org.za/sahris>), there are at least 89 shipping casualties recorded between the Berg and Orange Rivers, many of which were vessels involved in coastal trade and fishing.

South of the study area there is a concentration of wrecks around the northern end of the Vredenburg Peninsula, but these sites are all more than 17 km south of the southern boundary of concession area 18C and are well outside the scope of this assessment. Similarly, within St Helena Bay, south-east of concession area 18C two wrecks are recorded: the Dutch East Indiaman *Gouden Buys* (1693) and the modern fishing vessel *Bella Theresa* (1977). Neither will be impacted by activities in the concession area.

There remain twelve maritime casualties located within or close to concession areas 13C and 15C – 18C (see Figure 5 and Figure 6). A gazetteer of these wrecks is provided in Appendix 1.

Three of these wrecks, the *Girl Devon* (1971), *Boy Donald* (1983) and *Jenny-Lee* (1992) are currently less than 60 years of age and are thus not protected by the NHRA as heritage resources. Of the three, only the *Jenny-Lee*, which is recorded as having foundered 52 nautical miles west of Lamberts Bay, is likely to be within the concession areas (potentially Area 15C or 16C). Although these wrecks are not heritage resources, they can pose a risk to prospecting machinery and for that reason have been retained in the overall count of sites that may lie within the concession areas.

Of the remaining wrecks the following can be stated:

- The story of the wreck of HMS *Sybil* (1901) at Steenbokfontein south of Lamberts Bay is well known (see Gribble & Athiros 2008) and its position on the seabed accurately recorded. This site can be excluded from this assessment because it is well outside any of the concession areas;
- *Rosebud* (1859) was wrecked at Lamberts Bay. This implies that the vessel came ashore on the coast and the wreck is thus also well outside any of the concession areas;
- *Lamberts Bay Packet* (1859) and *Shamrock* (1959) are both recorded as having grounded in Lamberts Bay, which usually implies that they were subsequently refloated and didn't become wrecks. It is thus unlikely that the remains of either vessel will be located in the concession areas;
- *Eros* (1918) foundered at sea near Lamberts Bay while *en route* from Cape Town to Port Nolloth, which implies that the wreck could be present in any of the five concession areas being considered here; and
- Because there is no indication in the available records of how or where *Antoinette* (1854) and *Blue Bird* (1960) were lost, it must be assumed that either or both could potentially lie within concession areas 13C and 15C – 18C.

For the purposes of this impact assessment, therefore, it must be assumed that the remains of *Eros*, *Antoinette*, *Blue Bird* and *Jenny-Lee* could be present on the seabed in the concession areas. While *Blue Bird* and *Jenny-Lee* are of limited, current historical interest, *Eros* and *Antoinette* are older wrecks and hold greater potential archaeological interest.

Lastly, it must be stated that the possibility exists for the remains of currently unknown and unrecorded wrecks to be present in the concession areas. The historical records contain many references to vessels that were lost without trace between their points of departure and arrival. Where survivors of such events were subsequently rescued, the loss was recorded, but in many cases, vessels simply never arrived at their destination and could thus lie anywhere along their intended route. The potential for the occurrence of such unrecorded wrecks was illustrated in 2008 when a 16th century Portuguese wreck, since identified as the *Bom Jesus*, was unexpectedly found during the diamond mining south of Oranjemund in Namibia (see Alves 2011).

6. IMPACT ASSESSMENT

As stated in the Section 2 above, potential impacts on submerged prehistory and maritime and underwater cultural heritage resources from the prospecting activities in concession areas 13C and 15C – 18C will arise out of the drill and bulk sampling in the area landward of the limit of the territorial waters.

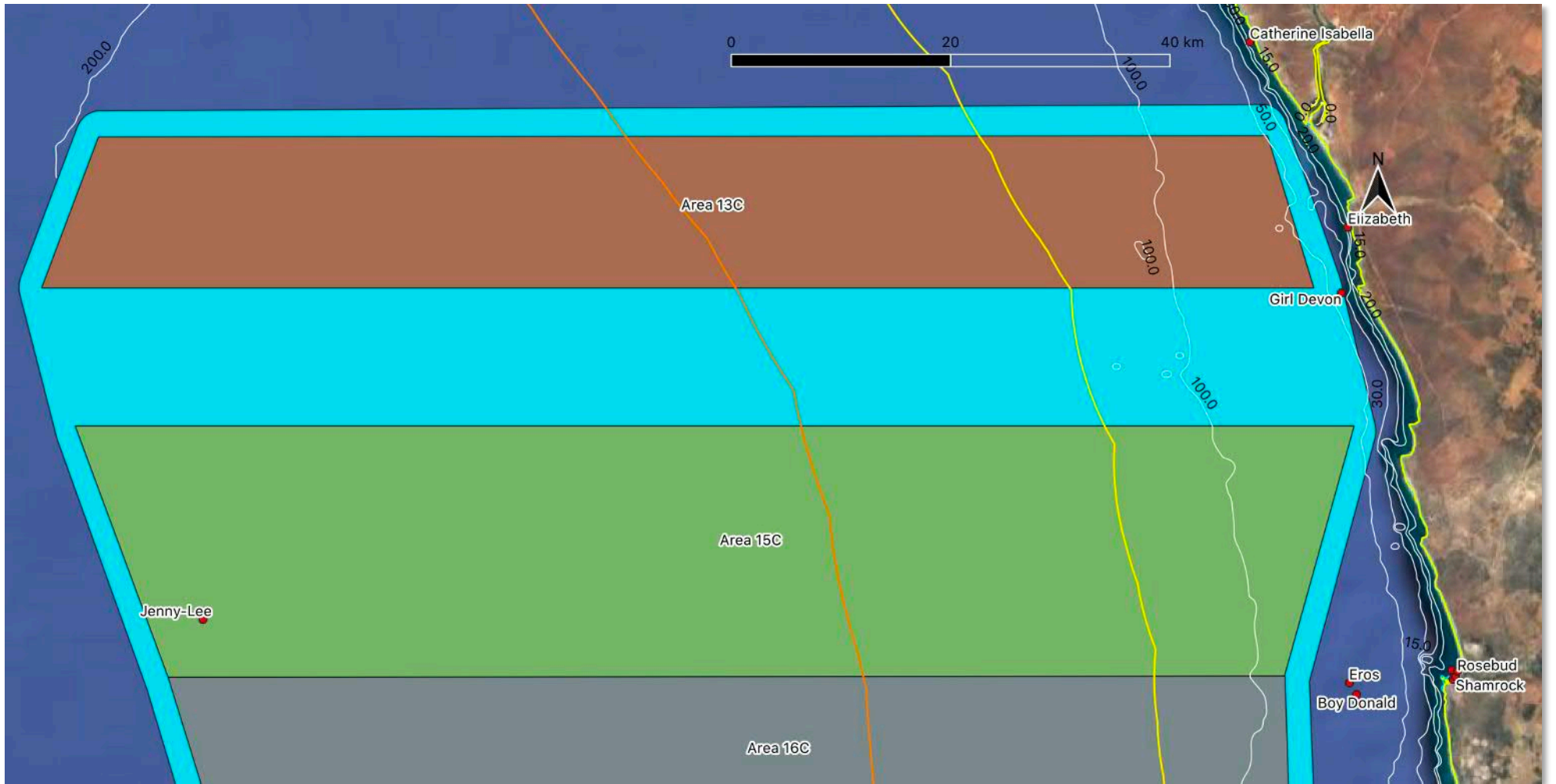


Figure 5: Wrecks recorded in and near concession area 13C, 15C and 16C (Source: Google Earth).

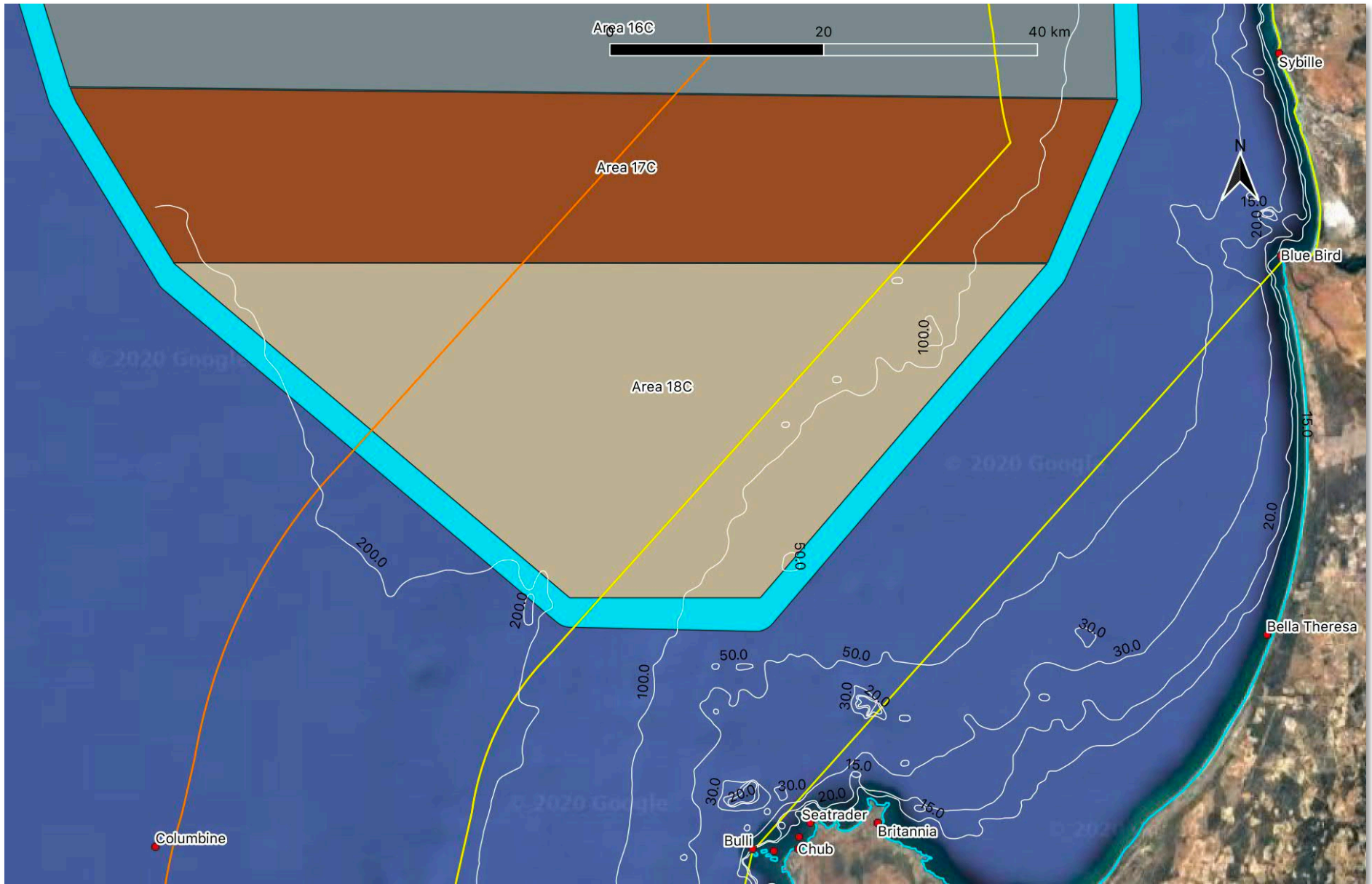


Figure 6: Wrecks recorded in and near to concession areas 16C-18C (Source: Google Earth).

It is difficult to quantify the impacts on cultural heritage resources of seabed activities such as prospecting because the locations and extent of these resources are generally poorly understood and the nature of the environment limits the potential for finding sites and monitoring the intrusive activities.

Recent studies, particularly work done in the UK between 2002 and 2011 under the aegis of the Marine Aggregate Levy Sustainability Fund, have demonstrated that the use of geophysical and geotechnical data generated for seabed development can create a better understanding of the marine historic environment, allowing far more informed predictions about where submerged prehistoric archaeological and shipwreck sites and material can be expected in and on the seabed (Firth 2013; see also Fitch et al 2005, Gaffney et al 2007, 2010 and the *Wrecks on the Seabed* and *Submerged Prehistory* projects conducted by Wessex Archaeology and archived at the Archaeological Data Service (<http://archaeologydataservice.ac.uk/archive/>)).

The potential impacts associated with seabed prospecting are assessed for the two heritage resources - submerged prehistory and shipwrecks/ maritime heritage - in the following sections. The assessment is based on the methodology set out in Appendix 4 below.

6.1. Submerged Prehistory – All Concession Areas

The past use by our hominin ancestors of the exposed continental shelf is beyond doubt and the evidence of this presence can be expected wherever archaeological material and palaeoenvironmental evidence, in water shallower than approximately -120 m, has survived post-glacial marine transgressions. There is the potential for this material to be found on palaeo-landsurfaces within seabed sediments and in association with now submerged palaeo-channels.

Although no geophysical data for the concession areas are available it is also likely that the rivers that presently debouch into the sea along the stretch of coastline adjacent to the concession areas will have palaeo-channels which extend offshore across the present seabed of the concession areas.

The relatively small footprint of the seabed interventions associated with prospecting means that the potential for interaction with or impact on submerged prehistoric archaeological material in the concession areas will be small, although the likelihood that prospecting will target seabed palaeo-channels, as a source particularly of diamondiferous gravels, raises the potential for impacts.

Were impacts on submerged prehistoric archaeological resources to occur, they will be negative because the finite and non-renewable nature of these resources means that they cannot recover if disturbed, damaged or destroyed.

6.1.1. Impacts of Drill Sampling

According to the Scoping Report (Arnott 2020) for concession areas 13C and 15C – 18C seabed drill sampling will be undertaken using a subsea sampling tool deployed from the dedicated sampling vessel, the MV *The Explorer*. The sampling tool comprises a 2.5 m diameter drill bit operated from a drill frame structure that is deployed on the seabed. The drill uses water jetting to fluidise sediments and can penetrate to a depth of 12 m above the bedrock. The fluidised sediments are airlifted to the support vessel where they are treated in the onboard mineral recovery plant. All oversized and undersized tailings are discharged back to the sea on site.

The physical intrusion of this seabed drill into the seabed is relatively small and the potential impacts of seabed drilling in the five concession areas on prehistoric heritage resources on, or in, the seabed will be localised. Where they occur, however, the impacts will be irreversible/permanent because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed.

The intensity of impact will be low, given the very limited physical intrusion into or disturbance of the seabed of the drilling and the probability of occurrence is very low.

The significance of the impact is thus assessed to be very low and the effect of the impact be negative.

The lack of information about the submerged prehistory of the concession areas means that the level of confidence in this assessment of impacts is low.

No mitigation is suggested for the seabed drilling. However, it is suggested that the possibility of the retention of samples of the tailings (particularly gravel and stone between c. 20 mm and 150 mm) for assessment by an archaeologist for the presence of prehistoric lithic material is explored with BPT127.

Access to such material for archaeological assessment may offset the potential impacts of seabed drilling and would result in the changing of the impact status from negative to positive because of a potential benefit to archaeological research and knowledge that could accrue from access to such seabed material.

The assessment of impact in respect of seabed drilling can be summarised as follows:

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Very low	VERY LOW	-ve	Low
Essential mitigation measures:								
No mitigation proposed but the release of core log information for inclusion in the archaeological research record could <u>offset</u> any potential impacts								
With mitigation	1	1	3	5	Very low	VERY LOW	+ve	Low

6.1.2. Impacts of Bulk Sampling

According to the Scoping Report (Arnett 2020) and the Prospecting Rights Applications, the bulk sampling will comprise of excavation of ten sampling trenches, per concession area, at different geological domains. Each will be trench will be up to 180 m long and 20 m wide with a maximum depth of 8 m.

Trenching would be undertaken by a seabed crawler, deployed off the dedicated mining vessel, the MV *Ya Toivo*. The crawler, which is equipped with an anterior suction system, is lowered to the seabed and is controlled remotely from the surface support vessel through power and signal umbilical cables. Water jets in the crawler's suction loosen seabed sediments, and sorting bars filter out oversize boulders. The remaining sampled sediments are pumped to the surface for shipboard processing.

The bulk sampling represents a substantial physical intrusion into the seabed which, depending on the nature of the seabed at sampling locations, can impact submerged prehistoric heritage resources. Where impacts do occur they will be localised but irreversible/permanent because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed.

The intensity of impact has been assessed to be low and the probability of occurrence is very low.

The significance of the impact is thus assessed to be very low and the effect of the impact be negative.

As for the drill sampling, the lack of information about the submerged prehistory of the concession areas means that the level of confidence in this assessment of impacts is low.

No mitigation is suggested for the bulk sampling although it is suggested that the retention of samples of the coarser fraction (i.e. gravel and stone between c. 20 mm and 150 mm) of sorted seabed sediment for assessment by an archaeologist for the presence of prehistoric lithic material be explored with BPT127. As in the case of the drill sampling this would result in the changing of the impact status from

negative to positive because of a potential benefit to archaeological research and knowledge that could accrue from access to such seabed material.

The assessment of impact in respect of bulk sampling can be summarised as follows:

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Very low	VERY LOW	-ve	Low
Essential mitigation measures:								
No mitigation proposed but the retention of samples of the coarser fraction of sorted seabed sediment for assessment by an archaeologist for the presence of prehistoric lithic material is suggested								
With mitigation	1	1	3	5	Very low	VERY LOW	+ve	Low

6.2. Maritime Archaeology

For the purposes of this impact assessment and based on the discussion of maritime heritage resources in Section 5.2.1 above, it is assumed that the remains of *Eros*, *Antoinette*, *Blue Bird* and *Jenny-Lee* could be in the concession areas and also that currently unknown historical wrecks or maritime debris could present on the seabed in the concession areas.

These wrecks may be subject to impacts from prospecting activities which will occur where drilling or dredging plant interacts with the physical remains of the wrecks. These impacts represent a risk to both the wrecks themselves and the seabed machinery being used.

In planning and conducting the drilling and bulk sampling operations it is assumed that the multibeam data to be collected as part of the prospecting programme will be used to identify seabed anomalies which will then be avoided during drilling and bulk sampling.

Where impacts to maritime heritage resources do occur during either drill sampling or bulk sampling they will be localised but irreversible/permanent because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed.

The intensity of impact is likely to be low and the probability of occurrence is improbable.

The significance of the impact is thus assessed to be very low and the effect of the impact be negative.

The lack of clear information about the presence or not of wrecks in the concession areas means that the level of confidence in this assessment of impacts is low.

Mitigation of impacts on maritime heritage resources is likely to be effected through avoidance of identifiable sites. A permit from SAHRA is required to disturb or damage and wreck older than 60 years.

Should a previously unknown or unrecorded shipwreck material be encountered during prospecting, work at that location must cease until the project archaeologist and SAHRA have been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it.

The potential impacts of prospecting in the three concession areas on maritime heritage resources can be summarised as follows:

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Improbable	VERY LOW	-ve	Low
Essential mitigation measures:								
<p>Avoidance and exclusion from prospecting activities of identifiable wrecks or maritime debris Should a previously unknown or unrecorded shipwreck material be encountered during prospecting, work at that location must cease until the project archaeologist and SAHRA have been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it</p>								
With mitigation	1	1	3	5	Improbable	VERY LOW	-ve	Low

6.3. Summary of Impact Significance Ratings for Heritage Receptors

The results of the impact assessment for the heritage receptors in the concession areas can be summarised as follows:

Impact	Consequence	Probability	Significance	Status	Confidence
Impacts on Submerged Prehistoric Heritage Resources – Drill Sampling	Low 5	Improbable	VERY LOW	-ve	Low
With Mitigation	5	Very low	VERY LOW	+ve	Low
Impacts on Submerged Prehistoric Heritage Resources – Bulk Sampling	Low 5	Very low	VERY LOW	-ve	Low
With Mitigation	5	Very low	VERY LOW	+ve	Low
Impacts on Maritime Archaeological Resources: Drill & Bulk Sampling	Low 5	Improbable	VERY LOW	-ve	Low
With Mitigation	5	Improbable	VERY LOW	-ve	Low

7. CONCLUSIONS

This assessment of the maritime heritage resources of concession areas 13C and 15C – 18C indicates that there is the potential for the presence of submerged prehistoric archaeological material in sediments to be affected by prospecting in areas of the seabed less than about -120 m in depth. There is also the potential for the presence of historical shipwrecks in one or more of the areas, although this potential appears to be low.

The significance of impacts from drill and bulk sampling on submerged prehistoric resources, where they occur, has been assessed to be very low. The application of measures to mitigate impacts is not practical given the uncertainty over the presence and distribution of these resources and the nature of prospecting activities being undertaken. However, this assessment has suggested for both the drill and bulk sampling, consideration be given by BPT127 to the retention of samples of the tailings and coarser fraction of sorted seabed material (particularly gravel and stone between c. 20 mm and 150 mm) for assessment by an archaeologist for the presence of prehistoric lithic material.

The implementation of these measures would result in a potential benefit to archaeological research and knowledge from the prospecting programme and it is suggested that the feasibility and mechanics of these suggestions are explored by BPT127 and the project archaeologist prior to the commencement of the prospecting programme.

In respect of historical shipwrecks and maritime heritage resources, this assessment found that the significance of likely impacts will be very low and that impacts can be mitigated through the avoidance of identifiable sites. Should a previously unknown or unrecorded shipwreck material be encountered during prospecting, work at that location must cease until the project archaeologist and SAHRA have

been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it.

Lastly, it is recommended that the processing of multibeam and sub-bottom profiler data collected to inform prospecting activities includes the noting of and reporting to the project archaeologist of any seabed anomalies that could represent shipwrecks or maritime heritage resources, and the presence in the seismic data of any sediment horizons with pre-colonial archaeological potential.

7.1. Acceptability of the Proposed Activity with Respect to Heritage Resources

It is our reasoned opinion that the proposed prospecting activities in concession areas 13C and 15C – 18C are likely to have a very low impact on submerged prehistoric and maritime and underwater cultural heritage resources and provided the recommendations and suggestions to mitigate and offset potential impacts are implemented, can be considered to be archaeologically acceptable.

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APPENDIX 1: RECORDED WRECKS AND SHIPPING CASUALTIES WITHIN AND IN THE VICINITY OF THE MARITIME ARCHAEOLOGICAL STUDY AREA

Ship Name	Area	Place	Event Type	Vessel Category	Type	Nationality	Year	Notes
<i>Antoinette</i>	Lamberts Bay	-	Unknown				1854	
<i>Lamberts Bay Packet</i>	Lamberts Bay	Lamberts Bay	Grounded	Sailing Vessel	Schooner		1859	Grounded. No lives lost.
<i>Rosebud</i>	Lamberts Bay	Lamberts Bay	Wrecked	Wooden Sailing Vessel	Schooner		1859	Marsh lists a vessel of this name lost in the same year, but between East London and Table Bay.
<i>Sybille</i>	Lamberts Bay	Grootrif near Steenboksfontein	Wrecked	Twin Screw Steel Motor Vessel	Light Cruiser (2nd Class)	British	1901	Vessel wrecked near the farm of Steenboksfontein, 6 miles south of Lamberts Bay. She was the only vessel to fire a shot in anger during the South African War. Members of General Hertzog's Commando rode down to the coast to make contact with a ship carrying supplies for the Boer forces, but found the light cruiser, HMS Sybille there instead. She promptly opened fire on them, although they all got away. Shortly thereafter she ran aground in a heavy sea and became a total wreck. One crewman was lost. 2nd class cruiser built 1890 by R. Stephenson & Co. 3400 tons, 300x42x16.5 ft, 9496 Hp, 20 knots, triple expansion engines Vessel foundered somewhere near Lamberts Bay between 26 - 28 May, while en route from Cape Town to Port Nolloth. All 14 hands lost. A Court of Inquiry was held by the magistrate in Clanwilliam on 7 June 1918. Tonnage may be 74 tons net - Marsh.
<i>Eros</i>	Lamberts Bay	Near	Foundered	Steamship	Two masted coaster	British	1918	Vessel foundered somewhere near Lamberts Bay between 26 - 28 May, while en route from Cape Town to Port Nolloth. All 14 hands lost. A Court of Inquiry was held by the magistrate in Clanwilliam on 7 June 1918. Tonnage may be 74 tons net - Marsh.
<i>Shamrock</i>	Lamberts Bay	Lamberts Bay	Grounded	Motor Vessel	Fishing	South African	1958	
<i>Blue Bird</i>	Elands Bay	Elands Bay		Motor Vessel			1960	Date may be 1960/01/11.
<i>Girl Devon</i>	Doring Bay	Doring Bay	Foundered	Sailing Vessel	Cutter	South African	1971	Sank 19 lives lost.
<i>Boy Donald</i>	Lamberts Bay	Lamberts Bay (off)	Foundered	Motor Vessel	Fishing Vessel	South African	1983	Foundered. 4 lives lost.
<i>Jenny-Lee</i>	Lamberts Bay	52 nautical miles west of	Foundered	Motor Vessel	Fishing Vessel (Tuna boat)	South African	1992	Sunk after being struck by a giant wave. No lives lost.
<i>Catherine Isabella</i>	Oliphants River	Elephants Rock (north of river)	Wrecked	Wooden Sailing Vessel	Schooner		1845	Wrecked when cables parted in a heavy north-westerly gale
<i>Elizabeth</i>	Oliphants River	Mietjie Frans se Baai		Wooden Sailing Vessel		British	1817/8	Presumed wrecked

APPENDIX 2: SPECIALIST CV

Name: John Gribble
Profession: Archaeologist
Date of Birth: 15 November 1965
Parent Firm: ACO Associates cc
Position in Firm: Senior Archaeologist
Years with Firm: >2
Years of experience: >30
Nationality: South African
HDI Status: n/a

Education:

1979-1983 Wynberg Boys' High School (1979-1983)
1986 BA (Archaeology), University of Cape Town
1987 BA (Hons) (Archaeology), University of Cape Town
1990 Master of Arts, (Archaeology) University of Cape Town

Employment:

- ACO Associates, Senior Archaeologist and Consultant, September 2017 – present
- South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit, 2014 – 2017 / Acting Manager: Archaeology, Palaeontology and Meteorites Unit, 2016-2017
- Sea Change Heritage Consultants Limited, Director, 2012 – present
- TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology, 2011-2012
- EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology, 2009-2011
- Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine, 2005-2009
- National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist, 1996-2005
- National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office, 1994-1996

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (No. 043)
- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:

I have more than 30 years of combined archaeological and heritage management experience. After completing my postgraduate studies, which were focussed on the vernacular architecture of the West Coast, and a period of freelance archaeological work in South Africa and abroad, I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. As the Heritage Officer: the Boland I was involved in day to day historical building control and heritage resources management across the region. In 1996 I became the NMC's first full-time maritime archaeologist in which role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU

Limited, a marine geosurvey company based in Southampton to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy based in Romsey, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I set up Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change provides archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy. It also actively pursues opportunities to raise public awareness and understanding of underwater cultural heritage through educational and research projects and programmes, including some projects being developed in South Africa.

Projects include specialist archaeological consultancy for more than 15 offshore renewable energy projects and more than a dozen offshore aggregate extraction licence areas.

In addition to managing numerous UK development-driven archaeological projects, I have also been involved in important strategic work which developed guidance and best practice for the offshore industry with respect to the marine historic environment. This has included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector, and the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry. In 2013-14 I was lead author and project co-ordinator on the Impact Review for the United Kingdom of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. In 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South Africa in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was also appointed Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant. I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and have served as a member of its Bureau since 2009. I am currently the secretary of the Committee.

I have been a member of the Association of Southern African Professional Archaeologists for more than twenty years and am accredited by ASAPA's CRM section. I have been a member of the UK's Chartered Institute for Archaeologists (CIfA) since 2005, and served on the committee of its Maritime Affairs Group between 2008 and 2010. Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am currently a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project' and serve on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee.

Books and Publications:

Gribble, J. and Scott, G., 2017, *We Die Like Brothers: The sinking of the SS Mendi*, Historic England, Swindon

Lloyd Jones, D., Langman, R., Reach, I., Gribble, J., and Griffiths, N., 2016, Using Multibeam and Sidescan Sonar to Monitor Aggregate Dredging, in C.W. Finkl and C. Makowski (eds) *Seafloor Mapping along Continental Shelves: Research and Techniques for Visualizing Benthic Environments*, Coastal Research Library 13, Springer International Publishing, Switzerland, pp 245-259.

Athiros, G. and Gribble, J., 2015, *Wrecked at the Cape Part 2*, The Cape Odyssey 105, Historical Media, Cape Town.

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- Gribble, J., Parham, D. and Scott-Ireton, D., 2009, Historic Wrecks: Risks or Resources? In *Conservation and Management of Archaeological Sites*, Vol. 11 No. 1, March, 2009, 16–28.
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- Gribble, J., 2008, The shocking story of the ss Mendi, in *British Archaeology*, March/April 2008.
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APPENDIX 3: SPECIALIST DECLARATION

I, John Gribble, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- There are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24(F) of the Act.



Signature of the specialist

ACO Associates cc

Name of company (if applicable):

13 August 2020

Date

APPENDIX 4: IMPACT ASSESSMENT METHODOLOGY

The significance of all potential impacts that would result from the proposed project is determined in order to assist decision-makers. The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact was thus rated according to the methodology set out below:

Step 1 – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Rating	Definition of Rating	Score
A. Extent – the area over which the impact will be experienced		
Local	Confined to project or study area or part thereof (e.g. limits of the concession area)	1
Regional	The region (e.g. the whole of Namaqualand coast)	2
(Inter) national	Significantly beyond Saldanha Bay and adjacent land areas	3
B. Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration – the time frame for which the impact will be experienced and its reversibility		
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years (state whether impact is irreversible)	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Step 2 – Assess the **probability** of the impact occurring according to the following definitions:

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

Step 3 – Determine the overall **significance** of the impact as a combination of the **consequence** and **probability** ratings, as set out below:

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Step 4 – Note the **status** of the impact (i.e. will the effect of the impact be negative or positive?)

Step 5 – State the level of **confidence** in the assessment of the impact (high, medium or low).

Impacts are also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below. Depending on the data available, a higher level of confidence may be attached to the assessment of some impacts than others. For example, if the assessment is based on extrapolated data, this may reduce the confidence level to low, noting that further ground-truthing is required to improve this.

Confidence rating	
Status of impact	+ ve (beneficial) or – ve (cost)
Confidence of assessment	Low, Medium or High

The significance rating of impacts is considered by decision-makers, as shown below. Note, this method does not apply to minor impacts which can be logically grouped into a single assessment.

- **INSIGNIFICANT:** the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity.
- **VERY LOW:** the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW:** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM:** the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH:** the potential impact **will** affect a decision regarding the proposed activity.
- **VERY HIGH:** The proposed activity should only be approved under special circumstances.

Step 6 – Identify and describe practical **mitigation** and **optimisation** measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential:** must be implemented and are non-negotiable; and
- **Best Practice:** must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Essential mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures.

Step 7 – Prepare a **summary table** of all impact significance ratings.

Finally, indicate whether the proposed development alternatives are environmentally suitable or unsuitable in terms of the respective impacts assessed by the relevant specialist and the environmentally preferred alternative.