

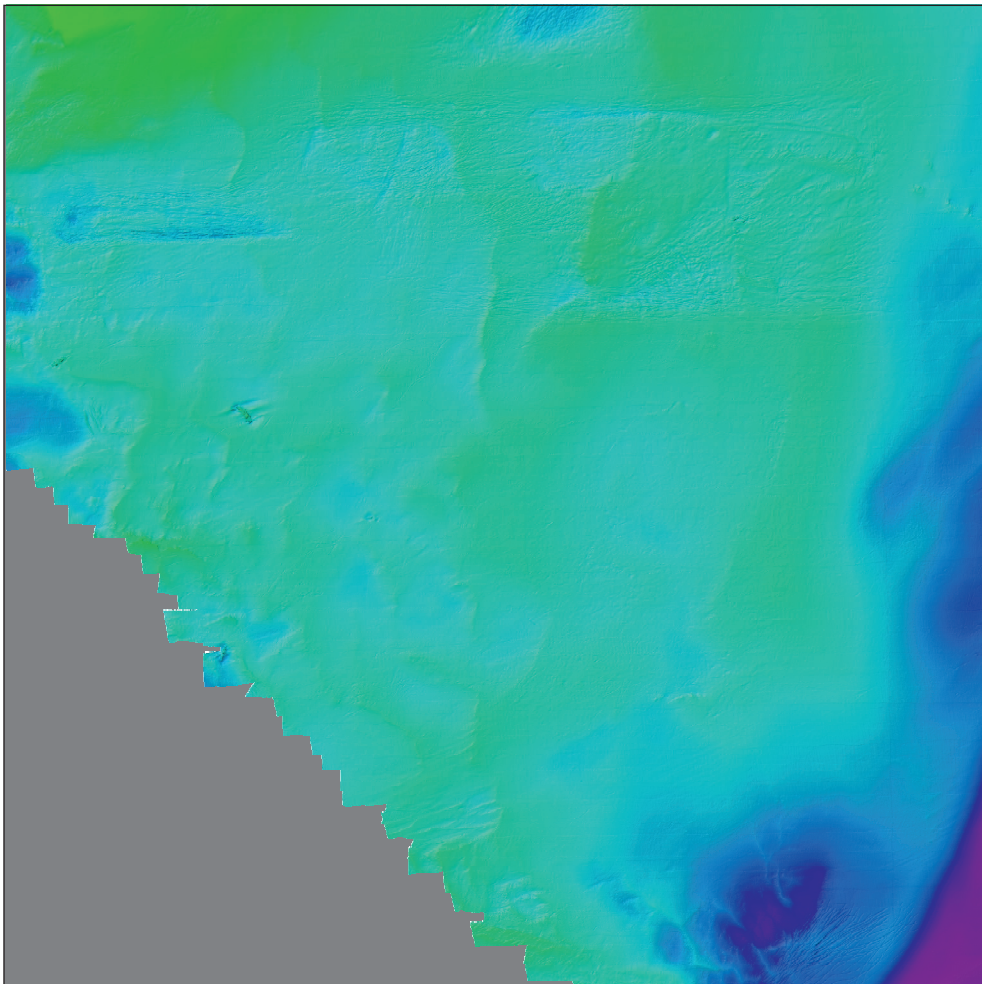


making sense of heritage

Area 340 Marine Aggregate Extraction

Archaeological Assessment of
2012 Geophysical Data

Archaeological Baseline Report



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AREA 340 MARINE AGGREGATE EXTRACTION

Archaeological Assessment of 2012 Geophysical Data Archaeological Baseline Report

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Summary

Wessex Archaeology was commissioned by CEMEX UK Marine Ltd. (Cemex) and Volker Dredging Ltd. (Volker) to undertake an archaeological assessment of geophysical survey data to inform the licence application for Area 340. The data consisted of sidescan sonar and multibeam bathymetry data acquired in 2012 by EMU Ltd. The review included an assessment of these data in addition to the results of the previous archaeological assessment carried out by EMU Ltd (EMU 2012a).

The chief aim of this report is to provide an archaeological baseline interpretation of known and potential archaeological sites; and to assess the area for any new sites and anomalies of potential archaeological interest identified within the Study Area and associated buffer zone.

In total 26 geophysical anomalies were identified within dredging Area 340, and a further 22 geophysical anomalies were identified within the 500m buffer zone. Five of the anomalies corresponded with anomalies identified in previous reports (EMU Ltd. 2012).

Of these anomalies two wrecks have been identified within the Area 340 Study Area and one wreck identified within the 500m buffer zone. As such they have each been assigned a 100m Archaeological Exclusion Zone as part of the mitigation strategy.

It is recommended that any artefacts recovered during dredging activities are reported using the established BMAPA *Protocol for Reporting Finds of Archaeological Interest* (BMAPA and English Heritage 2005).



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Abby Mynett carried out the assessment and compiled the report, with quality control provided by Dr Paul Baggaley and Dr Louise Tizzard. Kitty Foster prepared the illustrations and the project was managed for Wessex Archaeology by Dr Paul Baggaley.



AREA 340 MARINE AGGREGATE EXTRACTION

Archaeological Assessment of 2012 Geophysical Data Archaeological Baseline Report

1 INTRODUCTION

1.1 Project Background

- 1.1.1 Wessex Archaeology (WA) was commissioned by CEMEX UK Marine Ltd. and Volker Dredging Ltd. to undertake an archaeological assessment of geophysical survey data as part of the licence application for aggregate extraction in Area 340, which is located 9km east of Ventnor on the Isle of Wight and covers an area of 16.48km² (**Figure 1**).
- 1.1.2 The application area (hereafter the Study Area) is delimited by the following co-ordinates (WGS 84, UTM Zone 30N):

Easting	Northing
637166	5608025
640588	5608122
640849	5607248
641417	5607068
641530	5603605
639996	5603563
636919	5606619
636531	5607409

Table 1: Delimiting co-ordinates of Area 340

- 1.1.3 This assessment consists of a review of sidescan sonar and multibeam bathymetry data acquired by EMU Ltd. in 2012.
- 1.1.4 As part of the Marine Management Organisation (MMO) 15 year licence application review, English Heritage has requested sidescan sonar and multibeam bathymetry data be collected and archaeologically assessed to provide a baseline interpretation prior to dredging under the new licence. This report presents the archaeological assessment of the most recently collected geophysical data for the area which was acquired by EMU Ltd. in 2012.
- 1.1.5 The geophysical survey data assessed for this report cover the proposed dredging area and a 500m buffer zone, as depicted in **Figure 1**.
- #### 1.2 Previous Work
- 1.2.1 In 2012 ERM produced an Environmental Statement for Area 340 as part of the licence renewal process, for which EMU prepared an archaeological technical report (EMU Ltd. 2012a).
- 1.2.2 The archaeological technical report included an assessment of known and potential archaeological sites within the Study Area and the assessment of marine geophysical data for sites of archaeological interest.



- 1.2.3 The archaeological technical report (EMU Ltd. 2012a) compiled and reviewed documentary records of known archaeological sites and assessed the potential for new sites to be discovered. The reviewed material consisted of:
- *Records of wrecks and obstructions provided by SeaZone;*
 - *Records held the National Record of the Historic Environment (NRHE), which include reports of finds recovered as a result of aggregate extraction and reported under the BMAPA Protocol for Reporting Finds of Archaeological Interest;*
 - *Admiralty Charts 2045 (Outer Approaches to the Solent) and 2037 (Eastern Approaches to the Solent);*
 - *Secondary sources related to the maritime history, submerged prehistory and the archaeology of the south coast and Solent, including;*
 - *EMU Ltd's 2010 and 2011 multibeam bathymetry monitoring survey reports;*
 - *EMU Ltd's 2010 sidescan sonar monitoring survey data and report;*
 - *Andrews Survey resource assessment for Area 340. Survey date July 2000. Report Ref 0262/A340/RA(01) (Volker Dredging 2000);*
 - *Andrews Survey (2000) Area 340 Vibrocore Survey August 2000 (Factual Report). Report Ref 0262/340/lab(01); and*
 - *Cemex 2009 Area 340 geotechnical report (Ceme, 2009);*
- 1.2.4 Secondary sources related to the maritime history, submerged prehistory and the archaeology of the south coast and Solent were also reviewed, including:
- *The South Coast Regional Environmental Assessment (REA) (EMU Ltd. 2012b);*
 - *The South Coast Regional Environmental Characterisation (REC) (James et al. 2010);*
 - *Wessex Archaeology (2009) South Coast Dredging Association, Marine Aggregate Regional Environmental Assessment: Marine Archaeology.*
- 1.2.5 The geophysical datasets assessed for the archaeological technical report (Emu Ltd. 2012a) consisted of sidescan sonar and multibeam bathymetry data acquired in 2010. The archaeological interpretation of geophysical data aimed to identify, assess and report on the position, character and nature of known archaeological sites and unknown geophysical anomalies of archaeological potential.
- 1.2.6 The archaeological technical report identified the following UKHO records within Area 340:



EMU ID	SeaZone/ UKHO ID	Name	Description	Position UTMz30N		Location
				Easting	Northing	
S9	UKHO 19004	Unknown wreck	Submerged wreckage	641531	5603612	Proposed Licence Area
S15	UKHO 19021	G-ARLSs	Aircraft wreck of a Piper aircraft that lost power in both engines and ditched at sea on 29 July 1975. The pilot was not seriously injured	640647	5607234	Proposed Licence Area
S18	UKHO 19022	Obstruction	Obstruction	637408	5607766	Proposed Licence Area
S19	UKHO 19023	Unknown wreck	Wreck of a pontoon	640333	5607967	Proposed Licence Area
S20	UKHO 19486	Unknown wreck	Wreck of a coaster	638411	5605537	Proposed Licence Area
S21	UKHO 19541	<i>Camberwell</i>	The <i>Camberwell</i> was carrying general cargo and was struck by a mine laid by UC-36 on the 18th May 1917. Seven men were lost	637800	5606240	Proposed Licence Area
S23	UKHO 58545	Obstruction	Cable obstruction	639415	5607728	Proposed Licence Area
S24	UKHO 58546	Obstruction	Cable obstruction	640493	5607979	Proposed Licence Area

Table 2: UKHO records within the Study Area of Area 340

1.2.7 A further UKHO record was identified within the 500m buffer zone of Area 340.

EMU ID	SeaZone/ UKHO ID	Name	Description	Position UTMz30N		Location
				Easting	Northing	
S17	UKHO 19016	<i>Leon</i>	Steel ship built in 1895 by W Pickergill & Sons Ltd of Sunderland with a crew of 34. On passage from London for Tunis. The <i>Leon</i> was torpedoed and sunk by UC-75 on the 7th January 1918. Four crew members were lost when the boat capsized.	636750	5606500	500m Buffer

Table 3: UKHO records within the 500m buffer zone of Area 340



1.2.8 The archaeological technical report identified the following NHRE records within Area 340:

EMU ID	NHRE ID	Name	Description	Position UTMz30N		Location
				Easting	Northing	
N38	1164220	Unknown wreck	Remains of a pontoon	640329	5607971	Proposed Licence Area
N39	766526	Obstruction	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature	640341	5607811	Proposed Licence Area
N40	767306	Obstruction	Unidentified feature	638411	5605535	Proposed Licence Area
N42	1028090	Obstruction	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature	640651	5607075	Proposed Licence Area
N43	1028092	Obstruction	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature	640361	5607812	Proposed Licence Area
N44	766525	Obstruction	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature	639434	5607559	Proposed Licence Area
N45	1441281	<i>Camberwell</i>	Remains of 1917 wreck of British cargo vessel which foundered approximately 8.8 km east of Ventnor after being mined. If the <i>Camberwell</i> , she was en route from Middlesbrough and London for Colombo, Madras, and Calcutta with general cargo	637116	5606648	Proposed Licence Area
N46	804994	<i>Leon</i>	Remains thought to be those of the 1918 wreck of the French cargo vessel <i>Leon</i> , which foundered 8.8 km east of Ventnor after being torpedoed. En route from Spithead to Tunis with coal and coke, she was a steel screw-driven steamer	637724	5606106	Proposed Licence Area
N48	1499145	Isolated seabed find/s	Timber was found at the United Marine Aggregate's Bedhampton Quay during dredging operations in Licence Area 340. The exact position is unknown	640039	5607877	Proposed Licence Area
N49	1496799	Isolated seabed find/s	A brick and a paver were found in material dredged in Licence Area 340. The orange brick is a 'refractory brick' or	638935	5607402	Proposed Licence Area



EMU ID	NHRE ID	Name	Description	Position UTMz30N		Location
				Easting	Northing	
			'firebrick'. The name 'Bonnybridge' is stamped onto the surface			
N50	1497044	Isolated seabed find/s	A pottery sherd was found in material dredged from licence area 340, approximately 9 km southeast of Shanklin on the Isle of Wight. The sherd is approximately 8 cm by 4 cm in size. It is decorated on the front and on the back is a coded date stamp	638938	5607392	Proposed Licence Area
N51	1497019	Isolated seabed find/s	Bone fragments were found in material dredged from Area 340. The fragmentary and worn nature of these bones means conclusive identification of the fragments has not been possible	638935	5607402	Proposed Licence Area
N53	1499015	Isolated seabed find/s	Two cannon balls found at the United Marine Aggregate's Bedhampton Quay, Havant, within dredging material from Licence Area 340. The precise location is unknown	638955	5607403	Proposed Licence Area
N54	1496791	Isolated seabed find/s	Metal debris found in material dredged from Area 340. At least five pieces of metal debris have been recovered. The circular object has a diameter of 14 cm and has wires protruding from the front and sides	638935	5607402	Proposed Licence Area

Table 4: NHRE records within the Study Area of Area 340

1.2.9 One further wreck record was identified within the Study Area 500m buffer zone.

EMU ID	NHRE ID	Name	Description	Position UTMz30N		Location
				Easting	Northing	
N47	805024	<i>Polo</i>	Remains of English cargo vessel	636759	5606453	500m Buffer

Table 5: NHRE records within the 500m buffer zone of Area 340

1.2.10 Geophysical data analysed as part of the South Coast REC was assessed archaeologically by EMU Ltd., from which fourteen anomalies of potential archaeological interest were identified. Twelve targets were located within Area 340 and the other two were located within the 500m buffer zone:



EMU ID	Description	Position UTMz30N		Potential
		Easting	Northing	
Contact 001	Cluster of objects	640445	5608075	Low
Contact 002	Linear feature	641127	5607988	Medium
Contact 003	Linear feature	640590	5607329	Low
Contact 004	Wreck	636791	5606522	High
Contact 005	Possible debris	637801	5606188	Medium
Contact 006	Possible debris	638500	5605665	High
Contact 007	Possible debris	638535	5605654	Medium
Contact 008	Possible debris	638500	5605636	Medium
Contact 009	Seafloor disturbance	639877	5606148	Low
Contact 010	Linear feature	640405	5606137	Low
Contact 011	Possible debris	641235	5606169	Low
Contact 012	Circular feature	640738	5605157	Medium
Contact 013	Linear feature	637646	5607197	Low
Contact 014	Wreck	637811	5606238	High

Table 6: EMU Ltd. geophysical targets

1.2.11 The sidescan sonar data analysed by EMU Ltd. identified a total of fourteen anomalies that may be of archaeological potential within the Study Area, summarised below:

Location	Archaeological Interest			Total
	High	Medium	Low	
Within Area 340	2	4	6	12
Within 500m buffer	1	1	0	2

Table 7: EMU anomalies of archaeological potential

- 1.2.12 The three high potential targets correspond to the UKHO and NHRE records within the survey area and 500m buffer zone. EMU contact 006 has been identified in the western extent of the survey area and corresponds with UKHO record 19486 which is an unknown wreck identified to be a coaster first reported in 1983. Contact 014 again within the survey area corresponds to UKHO 19541 and NRHE 1441281 which is recorded as the *Camberwell* wreck sunk in 1917. One high potential contact 004 was identified within the 500m buffer zone which corresponds to UKHO 19016 and NRHE site 804994 identified to be the wreck of the *Leon* which was sunk in 1918. There are no designated wrecks in the survey area or 500m buffer zone.
- 1.2.13 There are five medium potential targets identified within the survey area. Two of these targets 007 and 008 are identified to be debris from unknown wreck 006. Target 005 is thought to be debris from the *Camberwell* wreck. The two other targets are identified to be a chain or cable and a possible seafloor disturbance.
- 1.2.14 Six low potential targets were identified as isolated anomalies on the seabed and do not correspond with any UKHO or NHRE records.
- 1.2.15 Additionally, in the *BMAPA Protocol for Reporting Finds of Archaeological Interest* records there are three cannonballs, a post medieval ship timber with tools marks, metal debris, refractory brick, bone fragments from Bovid species, post medieval decorated pottery fragments and action from a 20th century break-action air rifle that have been identified on the seabed.



1.3 Seabed Geology

- 1.3.1 The survey area is located within a palaeo-channel, thought to be part of an ancient river valley known as the Solent River. The palaeo-channel deposits are the source of the aggregate deposits on the site (EMU Ltd. 2012a; EMU Ltd. 2012b). The geotechnical assessment identified four principal sedimentary units within Area 340 comprising Cretaceous bedrock, Pleistocene fluvial gravels, estuarine alluvium and peat and seabed sediments (EMU Ltd. 2012a; EMU Ltd. 2012b).
- 1.3.2 The seabed sediments of the Study Area observed in the geophysical data is predominantly sandy, with the northern extent observed to be more gravelly sands. There are clear dredging scars visible in the multibeam bathymetry dataset, particularly in the northern extent of the site.

1.4 Aim

- 1.4.1 The aim of this report is to provide CEMEX UK Marine Ltd. and Volker Dredging Ltd. with a baseline archaeological interpretation prior to dredging under the new 15 year licence.

2 METHODOLOGY

2.1 Data Sources

- 2.1.1 The sidescan sonar data and multibeam bathymetry for this report were provided by EMU Ltd. and was collected in 2012. Further background information was obtained from the archaeological technical report by EMU Ltd. (2012a) and the South Coast REC report (James *et al.* 2010).
- 2.1.2 The geophysical data used for this report were assessed for quality and their suitability for archaeological purposes, and rated using the following criteria:

Data Quality	Description
Good	Data which are clear and unaffected by weather conditions or sea state. The dataset is suitable for the interpretation of standing and partially buried metal wrecks and their character and associated debris field. These data also provide the highest chance of identifying wooden wrecks and debris
Average	Data which are affected by weather conditions and sea state to a slight or moderate degree. The dataset is suitable for the identification and partial interpretation of standing and partially buried metal wrecks, and the larger elements of their debris fields. Wooden wrecks may be visible in the data, but their identification as such is likely to be difficult
Variable	This category contains datasets with the quality of individual lines ranging from good to average to below average. The dataset is suitable for the identification of standing and some partially buried metal wrecks. Detailed interpretation of the wrecks and debris field is likely to be problematic. Wooden wrecks are unlikely to be identified

Table 8: Criteria for assigning data quality rating

- 2.1.3 The sidescan sonar data have been rated as 'good' using the above criteria table.



2.2 Geophysical Data - Technical Specifications

- 2.2.1 The data assessed were obtained by EMU Ltd. during 2012. The dataset consisted of sidescan sonar and multibeam bathymetry data.
- 2.2.2 EMU Ltd. used an Edgetech 4200 dual frequency sidescan sonar system, operated at both low and high frequencies (100/420kHz) simultaneously at a range of 75m. The data were recorded digitally and provided to WA as .xtf files.
- 2.2.3 Multibeam bathymetry data were obtained using an R2Sonic 2024 operating at 400kHz. The data were recorded digitally and provided to WA as calibrated and processed .xyz files.
- 2.2.4 For this survey all positions were recorded and expressed in WGS 1984, UTM Zone 30N.
- 2.2.5 Sidescan sonar positioning for the survey was achieved using fixed layback rather than USBL, and as such is expected to be of lower accuracy than using a USBL system. However, processing of the data and comparison of the positions of anomalies indicates that any identified features can be positioned to $\pm 10\text{m}$.

2.3 Geophysical Data - Processing

- 2.3.1 The sidescan sonar data were processed by WA using Coda GeoSurvey software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were initially scanned to give an understanding of the geological nature of the area and were then interpreted for any objects of possible anthropogenic origin. This involves creating a database of anomalies within Coda by tagging individual features of possible archaeological potential, recording their positions and dimensions, and acquiring an image of each anomaly for future reference (**Appendix 1**).
- 2.3.2 A mosaic of the sidescan sonar data is produced during this process to assess the quality of the sonar towfish positioning. The survey lines are smoothed, however navigation could not be fully corrected as no navigation files were provided and laybacks varied from line to line and within each line. As such, lines were split into segments with appropriate laybacks applied manually to achieve the best positioning possible from the dataset. The corrected navigation within the mosaic allows the position of anomalies to be checked between different survey lines and for the layback values to be further refined.
- 2.3.3 The form, size, and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature, and therefore of its potential archaeological interest. A single, small, but prominent anomaly may be part of a much more extensive feature that is largely buried. Similarly, a scatter of minor anomalies may define the edges of a buried but intact feature, or it may be all that remains of a feature as a result of past impacts from, for example, dredging or fishing.
- 2.3.4 The multibeam bathymetry data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. This was correlated with the sidescan sonar interpretation. The data were gridded and analysed using Fledermaus software, which enables 3-D visualisation of the acquired data and geo-picking of seabed anomalies.

2.4 Geophysical Data - Anomaly Grouping and Discrimination

- 2.4.1 The previous section describes the initial interpretation of all available geophysical data sets, which were conducted independently of each other. This inevitably leads to the

possibility of any one object being the cause of numerous anomalies in different data sets and apparently overstating the number of archaeological features in the Study Area.

- 2.4.2 To address this fact, the anomalies were grouped together along with the results of the EMU Ltd. archaeological technical report. This allows one ID number to be assigned to a single object for which there may be, for example, a UKHO record and multiple sidescan sonar anomalies.
- 2.4.3 Once all the geophysical anomalies and desk-based information have been grouped, a discrimination flag is added to the record in order to discriminate against those which are not thought to be of an archaeological concern. These flags are ascribed as follows:

Non-Archaeological	U1	Not of anthropogenic origin
	U2	Known non-archaeological feature
	U3	Non-archaeological hazard
Archaeological	A1	Anthropogenic origin of archaeological interest
	A2	Uncertain origin of possible archaeological interest
	A3	Historic record of possible archaeological interest with no corresponding geophysical anomaly

Table 9: Criteria for discriminating archaeological importance of feature

- 2.4.4 All the sites that have been identified within the Study Area are presented in **Appendix I** and discussed in this report.
- 2.4.5 The grouping and discrimination of information at this stage is based on all available information and is not definitive. It allows for all features of potential archaeological interest to be highlighted, while retaining all the information produced during the course of the geophysical interpretation and desk-based assessment for further evaluation should more information become available.

3 RESULTS

3.1 Seabed Features

- 3.1.1 The results of this assessment are collated in gazetteer format and detailed in **Appendix I**. Below is a summary of the number and types of features identified for the entire surveyed area, this includes Area 340 and 500m buffer zone. The anomalies have then been divided into their classifications within the areas mentioned above and described accordingly:

Archaeological Discrimination	Number of anomalies	Interpretation
A1	3	Anthropogenic origin of archaeological interest
A2	45	Uncertain origin of possible archaeological interest
Total	48	

Table 10: Sites of archaeological potential

- 3.1.2 Furthermore, these sites of potential archaeological interest can be classified by probable type, which can further aid in assigning archaeological potential and importance:

Anomaly Classification	Number of Anomalies
Wreck	3
Debris	23
Debris Field	4

Anomaly Classification	Number of Anomalies
Seafloor Disturbance	1
Rope/Chain	3
Linear	6
Dark Reflector	5
Bright Reflector	3
Total	48

Table 11: Types of anomalies identified

- 3.1.3 The locations of these sites are available in **Appendix I** and are illustrated in **Figure 1**.
- 3.1.4 Interpretation of the geophysical data identified a total of 49 sidescan sonar anomalies of possible archaeological potential and one multibeam bathymetry target. Of these anomalies, 26 are situated within the Study Area and an additional 22 are within the 500m buffer zone (**Figure 1, Appendix I**). Among the identified anomalies three have been classified as A1 while the remaining 45 are classified as A2 as per the discrimination scheme outlined in **Table 9**.
- 3.1.5 Three wrecks have been identified within the sidescan sonar data; of these wrecks two are located within the Study Area while the remaining wreck is located within the 500m buffer zone. All of the wrecks are clearly visible in the bathymetry dataset.
- 3.1.6 Wreck **7033** is located in the central western extent of the Study Area and to the southeast of wreck **7036**. The wreck has geophysical dimensions of 38.2m x 9.4m and a height of 1.2m and is clearly visible in the sidescan data. The wrecks outer edges and possible deck debris are evident and a large scour mark from the wreck is distinct on the seafloor. This wreck corresponds to EMU target 006 and is located 150m from an unknown wreck UKHO No. 19486 which classes this as an unknown wreck of a coaster and NHRE No. 767306 which is classed as an obstruction in the dataset (**Figure 2**).
- 3.1.7 Wreck **7036** lies inside the central western extent of the Study Area and corresponds to EMU target 005. The wreck has geophysical dimensions of 112.0m length, 40.0m wide and a geophysical height of 2.1m and is in a good condition on the seabed. This anomaly corresponds to UKHO No. 19541 which is recorded to be the *Camberwell*. This vessel was struck by a mine in 1917 laid by the UC-36. NHRE No. 804994 is also located within 150m of this target and records the debris to be the remains of the *Leon* wreck. The UKHO records this wreck as 'live' (**Figure 3**).
- 3.1.8 Wreck **7037** is located in the central western 500m buffer zone and corresponds to EMU wreck 004. The wreck has geophysical dimensions of 124.6m long, 58.0m wide and a maximum height of 2.0m. The steamer shipwreck is made of metal, being slightly degraded and partially buried on the seabed with scour marks coming from either side of the debris. Corresponding UKHO No. 19016 cites this wreck as the *Leon*, a steel wreck that was sunk by a German U-boat in 1918. The NHRE No. 805024 also corresponds to this wrecks position located 75m from the wreck, however this is recorded as the *Polo*, an English cargo vessel. The UKHO records this wreck as 'live' (**Figure 4**).
- 3.1.9 The remaining 45 anomalies identified within the Study Area and 500m buffer zone have been classified as A2 - of uncertain origin and of possible archaeological interest (See **Appendix I**). The majority of these targets are located in the central and northern extents of the survey area which has been identified in parts to be highly disturbed by dredging and associated dredging activities as well as having a more gravelly seafloor. A number of possible debris fields have also been identified across the survey area.



- 3.1.10 Across the survey extent there are a number of anomalies of potential archaeological interest present. Of these the majority are isolated features visible on the seafloor. A number of targets also have associated bathymetry anomalies present in the dataset.
- 3.1.11 There are four areas of possible debris fields all identified to be A2's (**7000**, **7023**, **7025** and **7048**) located within the Study Area and 500m buffer zone. Debris fields are identified to be of possible archaeological interest because of the potential for them to be highly broken up wrecks or objects on the seabed. The debris fields range in size from relatively small areas (eg, **7048** - 7.9m x 6.6m and maximum height of 0.4m) to vast expanses on the seabed (eg, **7000**- 162.0m x 130.5m).
- 3.1.12 There are 23 pieces of debris recorded in the sidescan data which have all been assigned an A2 rating. The majority of these debris targets are recorded as objects with height and three of these are objects with no visible signs of height above the seabed but with some characteristics of anthropogenic origin. The debris pieces range in size from small objects (eg, **7027** - 1.3m x 0.4m and a height of 0.2m) to very large objects (eg, **7016** – 96.2m x 83.7m and height of 0.6m, see **Figure 5**). These debris pieces are distributed across the entire survey area.
- 3.1.13 There is one seafloor disturbance recorded in the sidescan data **7042** assigned an A2 rating. This is an area of the seabed where there is the potential for a buried or partially-buried wreck or debris of archaeological interest to be present. The seafloor disturbance has dimensions of 39.8m x 8.8m and a height of 0.2m and the appearance of three parallel linear features situated on a relatively flat and sandy area of the seabed.
- 3.1.14 Three possible ropes or chains have been identified on the seafloor in the sidescan sonar data (**7001** (**Figure 5**), **7029** and **7041**). Although these are difficult to distinguish between archaeological and modern origin there is the possibility that they may be of archaeological significance and as such have been assigned an A2 rating. The rope/chain anomalies vary in size from 65.4m length (**7041**) to 123.4m (**7029**).
- 3.1.15 Six linear-shaped pieces of debris have been identified as A2 targets across the survey area (**7015**, **7028**, **7034**, **7040**, **7043** and **7049**). The linears typically recorded very low height measurements above the seabed around 0.1m. Target **7049** was identified in the multibeam bathymetry dataset only and comprised three very large linear bank like features with two smaller linear features running parallel to them. This feature has dimensions of 139.0m x 86.0m and a height of 0.9m above the seabed.
- 3.1.16 There are five dark reflectors recorded in the dataset classified as A2 anomalies (**7006**, **7009** (**Figure 6**), **7010**, **7013** and **7014**). These are identified as being remains on the seabed with high reflectivity and solid edges of possible anthropogenic origin. The debris range in size from long, slightly curvilinear remains (**7010** – 20.6m x 0.2m with no height) to smaller dark reflectors (**7014** – 2.2m x 0.2m and 0.3m height).
- 3.1.17 Three bright reflectors are recorded in the survey area (**7026**, **7035**, and **7047**). These are areas of the seabed that have little to no reflectivity and as a result send no acoustic energy back to the sidescan towfish. The bright reflectors ranged in size from 3.4m x 2.6m (**7035**) up to 5.6m x 2.9m (**7026**).

4 MITIGATION

- 4.1.1 According to heritage agencies and the principles outlined in Marine Aggregate Dredging and the Historic Environment, the preferred approach to the presence of potential archaeological sites is 'to preserve in situ' or 'preservation by record' (BMAPA and English



Heritage 2003). The mitigation suggested for marine aggregate extraction is avoidance, reduction, or remedying and offsetting, and monitoring.

- 4.1.2 Three wrecks have been identified within this report, **7033, 7036 and 7037**,
- 4.1.3 One wreck **7037** lies outside of the Study Area in the 500m buffer zone and as such will not be directly impacted by dredging activities but may be impacted by secondary or indirect activities and as such a 100m Archaeological Exclusion Zone is recommended around the outside edge of the wreck as a precautionary measure.
- 4.1.4 The two wrecks within the Study Area **7033** and **7036** may be directly impacted upon by dredging and associated activities and as such an Archaeological Exclusion Zone of 100m from the outside extent of both wrecks is recommended.
- 4.1.5 It is recommended that if any objects of possible archaeological interest are recovered during dredging operations from Area 340, that they should be reported using the established *BMAPA Protocol for reporting finds of archaeological interest*.

REFERENCES

British Marine Aggregate Producers Association and English Heritage, 2005. *Protocol for Reporting Finds of Archaeological Interest*. Prepared by Wessex Archaeology.

EMU Ltd. 2012a. Marine Aggregate Area 340. Archaeological Technical Report. May 2012. EMU Ref: J/1/26/1802/1310.

EMU Ltd. 2012b. South Coast Marine Aggregate Regional Environmental Assessment Volume 1. Report for the South Coast Dredging Association.

James, J. W. C., Pearce, B., Coggan, R. A., Arnott, S H. L., Clark, R., Plim, J. F., Pinnion, J., Barrio Frójan, C., Gardiner, J. P., Morando, A., Baggaley, P. A., Scott, G., Bigourdan, N., 2010. The South Coast Regional Environmental Characterisation. British Geological Survey Open Report OR/09/51.

Maritime Coastguard Agency (MCA), 2012, <http://www.dft.gov.uk/mca/mcga07-home/emergencyresponse/mcga-receiverofwreck/mcga-protectedwrecks/mcga-protectedwrecks-military.htm>.

Wessex Archaeology, 2003. Marine Aggregate Dredging and the Historic Environment. Prepared by Wessex Archaeology on behalf of BMAPA & English Heritage.



APPENDIX I: ANOMALIES OF POSSIBLE ARCHAEOLOGICAL POTENTIAL

WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Description	External References	Area
7000	Debris Field	640002	5607347	A2	162.0	130.5	0.0	Large irregular area of the seabed with multiple curvilinear dark reflectors and smaller irregular shaped dark reflectors	-	Area 340
7001	Rope/Chain	640687	5607356	A2	88.9	0.2	0.2	Long curvilinear rope/chain dark reflector on a relatively flat/even area of the seafloor. Possibly partially buried	-	Area 340
7002	Debris	640929	5607255	A2	8.4	0.4	0.1	Irregular dark reflector with small shadow, possible piece of debris	-	500m Buffer Zone
7003	Debris	637868	5607173	A2	11.7	0.7	0.2	Short irregular shaped linear with small shadow, probable debris	-	Area 340
7004	Debris	638375	5607430	A2	12.9	0.1	0.1	Small linear dark reflector with small shadow, possible piece of debris	-	Area 340
7005	Debris	637209	5607293	A2	7.0	0.2	0.6	Three grouped pieces of possible debris with a large shadows.	-	Area 340
7006	Dark Reflector	636529	5607263	A2	8.1	0.7	0.0	Large linear dark reflector. Possible tight cluster of small boulders	-	500m Buffer Zone
7007	Debris	641727	5607411	A2	2.4	0.2	0.2	Dark reflector with shadow, possibly natural as on an area of the seabed with lots of boulders but looks unnatural	-	500m Buffer Zone
7008	Debris	640878	5607403	A2	36.7	0.2	0.4	Possible debris with scar/scour coming from it, small pieces with shadows	-	500m Buffer Zone
7009	Dark Reflector	636161	5607550	A2	17.3	0.9	0.6	Curvilinear dark reflector with large shadow	-	500m Buffer Zone



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Description	External References	Area
7010	Dark Reflector	636065	5607411	A2	20.6	0.2	0.0	Dark linear reflector, possibly geological	-	500m Buffer Zone
7011	Debris	637298	5607530	A2	5.6	0.4	0.4	Two small pieces of possible debris with shadow present, relatively even but disturbed part of the seabed	-	Area 340
7012	Debris	636426	5607687	A2	9.0	2.0	0.0	Small piece of debris on relatively flat and sandy/gravel area of the seabed	-	500m Buffer Zone
7013	Dark Reflector	640164	5607856	A2	2.4	0.3	0.4	Small dark reflector with shadow in disturbed area of the seabed, possibly natural	-	Area 340
7014	Dark Reflector	637246	5607883	A2	2.2	0.2	0.3	Small dark reflector with shadow, like natural feature/boulder	-	Area 340
7015	Linear	637702	5605155	A2	14.4	0.6	0.0	Curvilinear dark reflector with no visible shadow	-	500m Buffer Zone
7016	Debris	640423	5608075	A2	92.6	83.7	0.6	Area of debris/dragged debris. Dark reflectors with shadows and linear features	001 (EMU)	Area 340
7017	Debris	640073	5608151	A2	2.3	0.2	0.2	Thin linear dark reflector with a small shadow on sandy/gravelly area of the seabed	-	500m Buffer Zone
7018	Debris	640330	5608112	A2	7.5	5.6	0.0	Reflector possible debris with associated scour/dredging marks, corner shaped next to possible debris field	-	Area 340
7019	Debris	640327	5608139	A2	11.1	5.0	0.3	Small scatter of possible debris with scour marks from the dark reflectors with shadows.	-	500m Buffer Zone
7020	Debris	637804	5608083	A2	2.7	9.2	0.3	Dark reflectors, possibly one piece of partially buried debris	-	500m Buffer Zone



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Description	External References	Area
7021	Debris	640414	5608158	A2	4.2	5.6	0.3	Medium sized circular dark reflector with strong shadow on sandy area of the seafloor.	-	500m Buffer Zone
7022	Debris	640692	5608483	A2	13.8	7.4	0.8	Possible wreck debris small vessel around 5m dark reflector with large shadow, can possibly make out individual, horizontal timbers/parts and bow, partially buried	-	500m Buffer Zone
7023	Debris Field	639410	5604767	A2	10.9	26.3	0.2	Dark reflector - debris field with small circular debris and linear debris on fairly sandy area of the sea floor	-	Area 340
7024	Debris	639310	5604719	A2	2.3	0.3	0.5	Isolated dark reflector with shadow possible natural feature	-	Area 340
7025	Debris Field	639198	5604749	A2	44.5	11.3	0.4	Large possible debris field with dark reflectors and shadows, approximately five pieces of debris on a sandy/gravelly patch of seabed	-	Area 340
7026	Bright Reflector	641907	5605030	A2	5.6	2.9	0.0	Isolated irregular-shaped bright reflector	-	500m Buffer Zone
7027	Debris	638340	5605009	A2	1.3	0.4	0.2	Small piece of debris, slightly right-angled shape	-	500m Buffer Zone
7028	Linear	638885	5605204	A2	3.8	0.1	0.1	Long, thin and very straight linear debris, dark reflector with small shadow isolated on the seafloor	-	Area 340
7029	Rope/Chain	639094	5605132	A2	123.4	0.5	0.3	Long, thin and weaving possible rope/chain remains, dark reflector with a small shadow	-	Area 340
7030	Debris	641905	5605511	A2	6.5	0.8	0.2	Possible object with thin edges and hollow centre, dark reflector with shadow	-	500m Buffer Zone
7031	Debris	640268	5605679	A2	8.3	1.1	0.3	Dark reflector with shadow, possibly partially buried long irregular shaped debris	-	Area 340



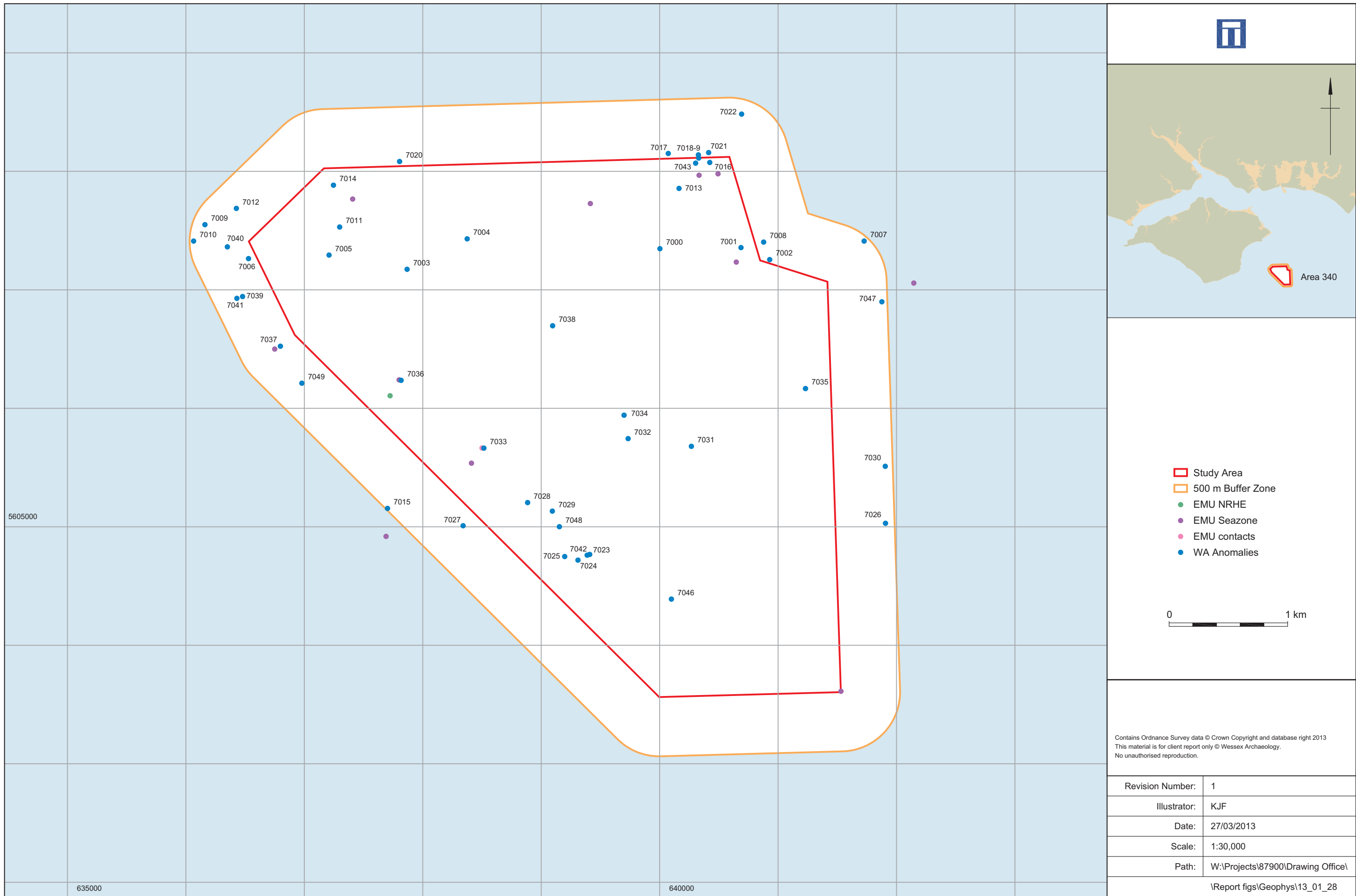
WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Description	External References	Area
7032	Debris	639734	5605744	A2	3.0	1.5	0.5	Partially buried debris dark reflector with shadow near to lots of seafloor/dredging disturbance	-	Area 340
7033	Wreck	638516	5605664	A1	38.2	9.4	1.2	Wreck with large shadow on edge of sidescan data with individual debris elements, possibly partially buried	006, 007, 008 (EMU); 19486 (UKHO); N40 (NHRE)	Area 340
7034	Linear	639699	5605942	A2	7.6	0.2	0.1	Small linear debris dark reflector with shadow in a sandy/gravel area of the seafloor	-	Area 340
7035	Bright Reflector	641231	5606167	A2	3.4	2.6	0.0	Bright reflector almost square shaped on a sandy area of the seafloor	11 (EMU)	Area 340
7036	Wreck	637817	5606236	A1	112.0	40.0	2.1	Large scatter of wreck debris on the seafloor, dark reflectors with large shadow, possible small fragments of timbers, bow to the sidescan sonar centreline	005, 014 (EMU); 19541 (UKHO); N46 (Possibly) (NHRE)	Area 340
7037	Wreck	636798	5606524	A1	124.6	58.0	2.0	Bright reflector wreck debris covering a large area of the seafloor, highly broken up. Possible decking and individual timbers visible	004 (EMU); 19016 (UKHO); N47, N45 (Possibly) (NHRE)	500m Buffer Zone
7038	Debris	639096	5606696	A2	2.9	1.6	0.0	Bright reflector circular object with linear attached	-	Area 340
7039	Debris	636478	5606943	A2	84.8	1.7	0.5	Piece of debris with long rope/chain coming off it. Dark reflector with shadow	-	500m Buffer Zone
7040	Linear	636350	5607362	A2	4.7	0.2	0.4	Linear debris dark reflector with shadow located on a sandy and slightly outcropping area of the seafloor	-	500m Buffer Zone



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Description	External References	Area
7041	Rope/Chain	636430	5606928	A2	65.4	3.4	0.0	Long length of rope/chain on a rocky and outcropping area of the seafloor, the centreline end has a bright reflecting circular anomaly.	-	500m Buffer Zone
7042	Seafloor Disturbance	639388	5604761	A2	39.8	8.8	0.2	Three parallel linear seafloor disturbance marks, slightly right angled at northern end. All dark reflectors with small shadows,	-	Area 340
7043	Linear	640304	5608069	A2	6.6	0.3	0.2	Long thin linear debris with a slight curve to it. Dark reflector with shadow in a fairly even and sandy area of the seafloor	-	Area 340
7046	Debris	640099	5604390	A2	7.2	0.7	0.1	Small piece of possible debris with two small and thin linear parallel lines. Dark reflector with shadow	-	Area 340
7047	Bright Reflector	641876	5606899	A2	5.5	3.4	0.0	Medium sized oval shaped bright reflector in a very even and sandy area of the seafloor	-	500m Buffer Zone
7048	Debris Field	639154	5605001	A2	7.9	6.6	0.4	Possible debris field dark reflectors with shadows on a sandy/gravelly area of the seafloor	-	Area 340
7049	Linear	636979	5606212	A2	139.0	86.0	0.9	Three large linear anomalies	-	500m Buffer Zone

Notes:

1. All coordinates are in WGS84 UTM Zone 30N
2. Positions are considered accurate to within approximately $\pm 10m$

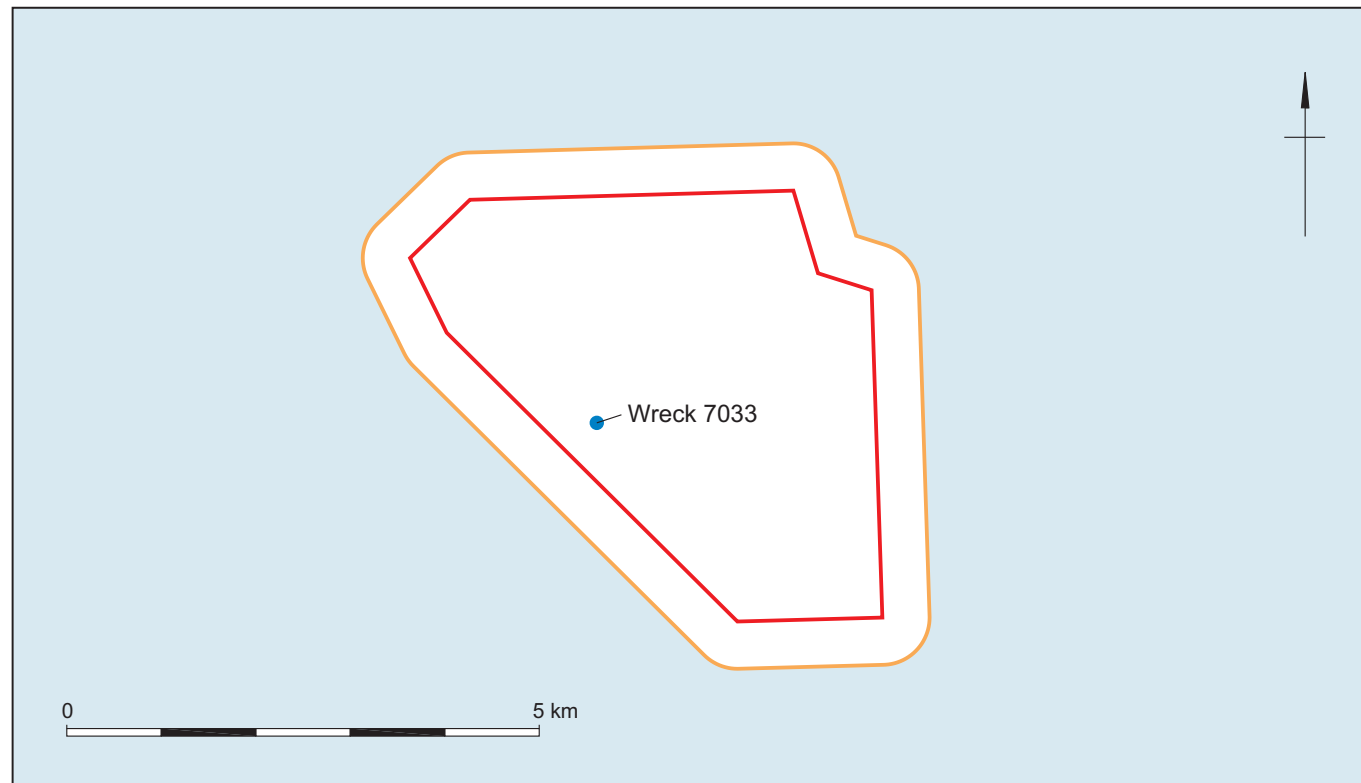


Site location and geophysical anomalies

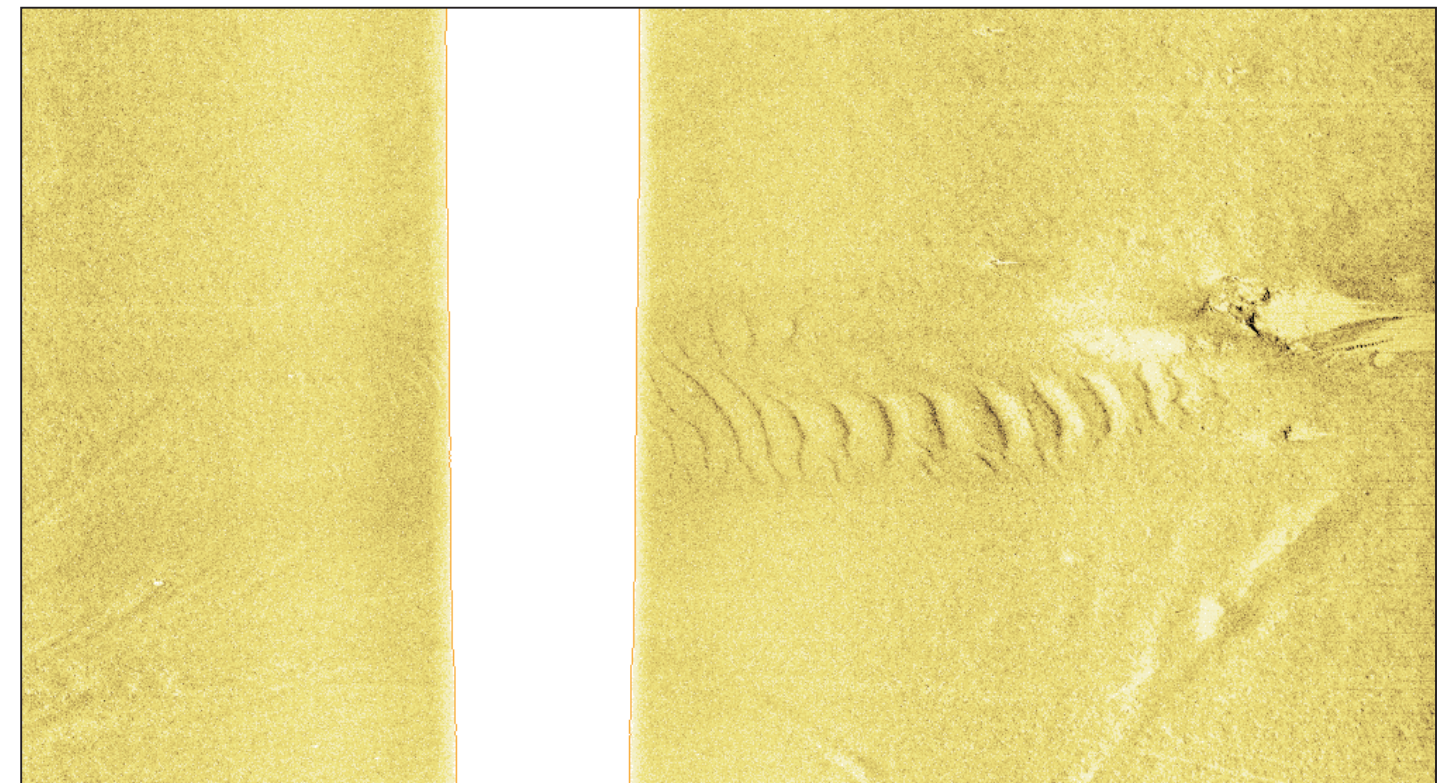
Figure 1

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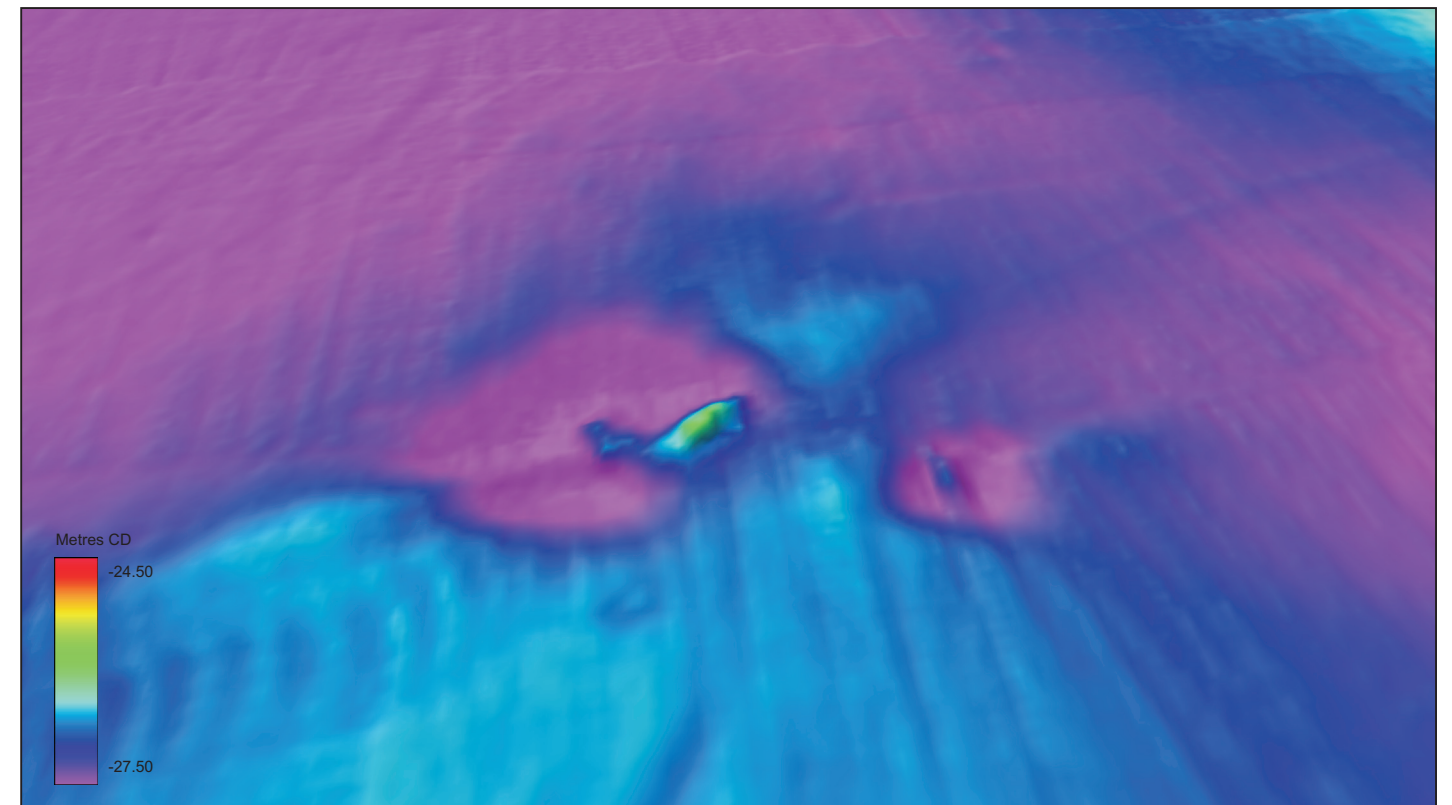


A: Wreck 7033 location within the Study Area




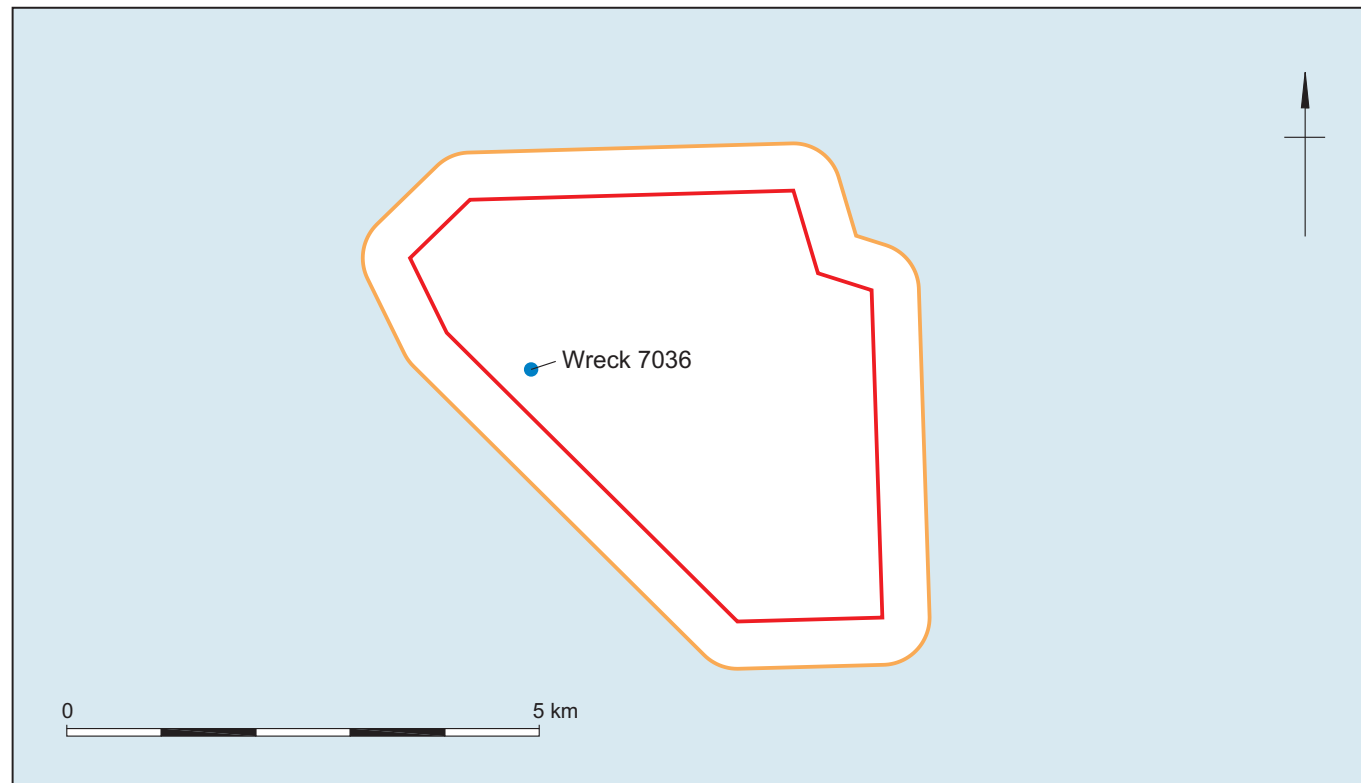
B: Wreck 7033 Sidescan Sonar image

WA ID 7033		Unknown	UKHO 19486
Location		638516 E, 5605664 N (UTM30N)	
Archaeological Importance		High	
Geophysical survey dimensions and notes		Dimensions: 38.2m x 9.4m x 1.2m. Large object with height, the debris appears to be broken up and partially buried with small scour marks coming from it. UKHO 19486 is located 150m from this wreck and states that it is an unknown coaster vessel.	
Build	Type	Coaster	
	Construction	Unknown	
	Dimensions	Unknown	
	Shipyards	Unknown	
Loss	Cause	Unknown	
Extent of Survival		Unknown	

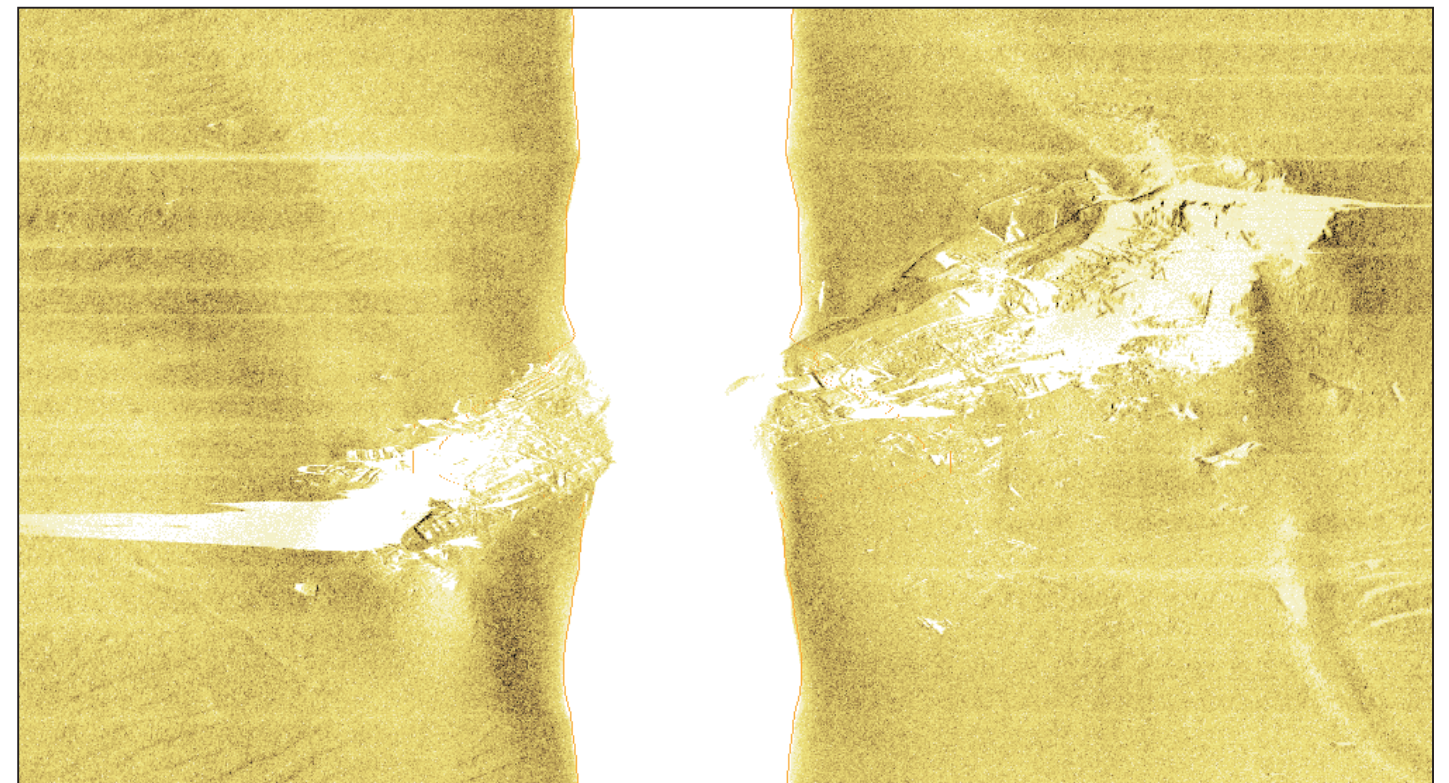


C: Wreck 7033 Multibeam bathymetry image (x1 vertical exaggeration, looking north)

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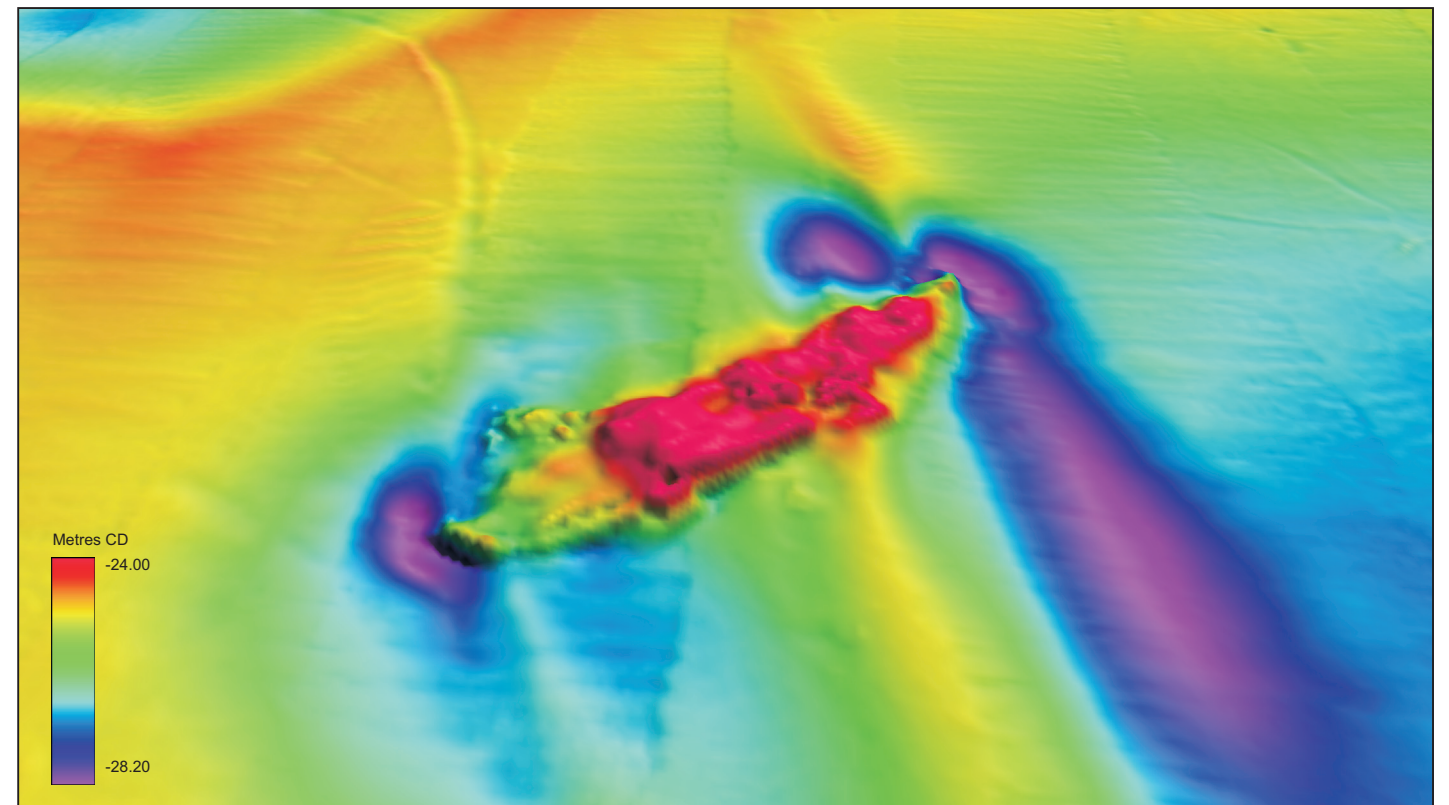


A: Wreck 7036 location within the Study Area




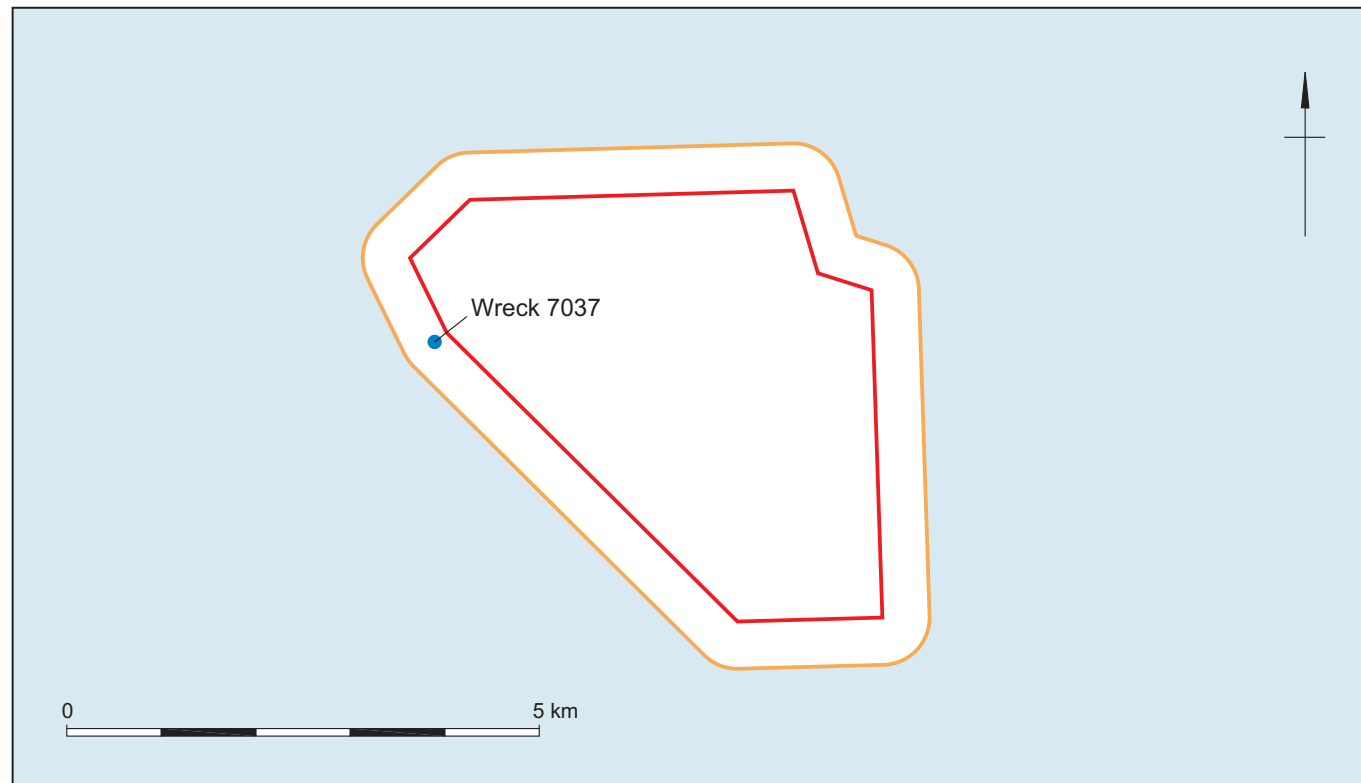
B: Wreck 7036 Sidescan Sonar image

WA ID 7036		SS <i>Camberwell</i>	UKHO 19541
Location		637817 E, 5606236 N (UTM30N)	
Archaeological Importance		High	
Geophysical survey dimensions and notes		Dimensions: 112.0m x 40.0m x 2.1m. Large metal shipwreck with upstanding deck structures visible and some surrounding debris. This is the wreck of the SS <i>Camberwell</i> which was a WWI cargo steamer that was struck by a mine laid by UC-36 and was lost in 1917.	
Build	Type	Cargo ship	
	Construction	Sunderland	
	Dimensions	112.2m x 15.2 x 5.8m	
	Shipyards	Unknown	
Loss	Cause	Mine	
Extent of Survival		The UKHO records this wreck as 'live'	

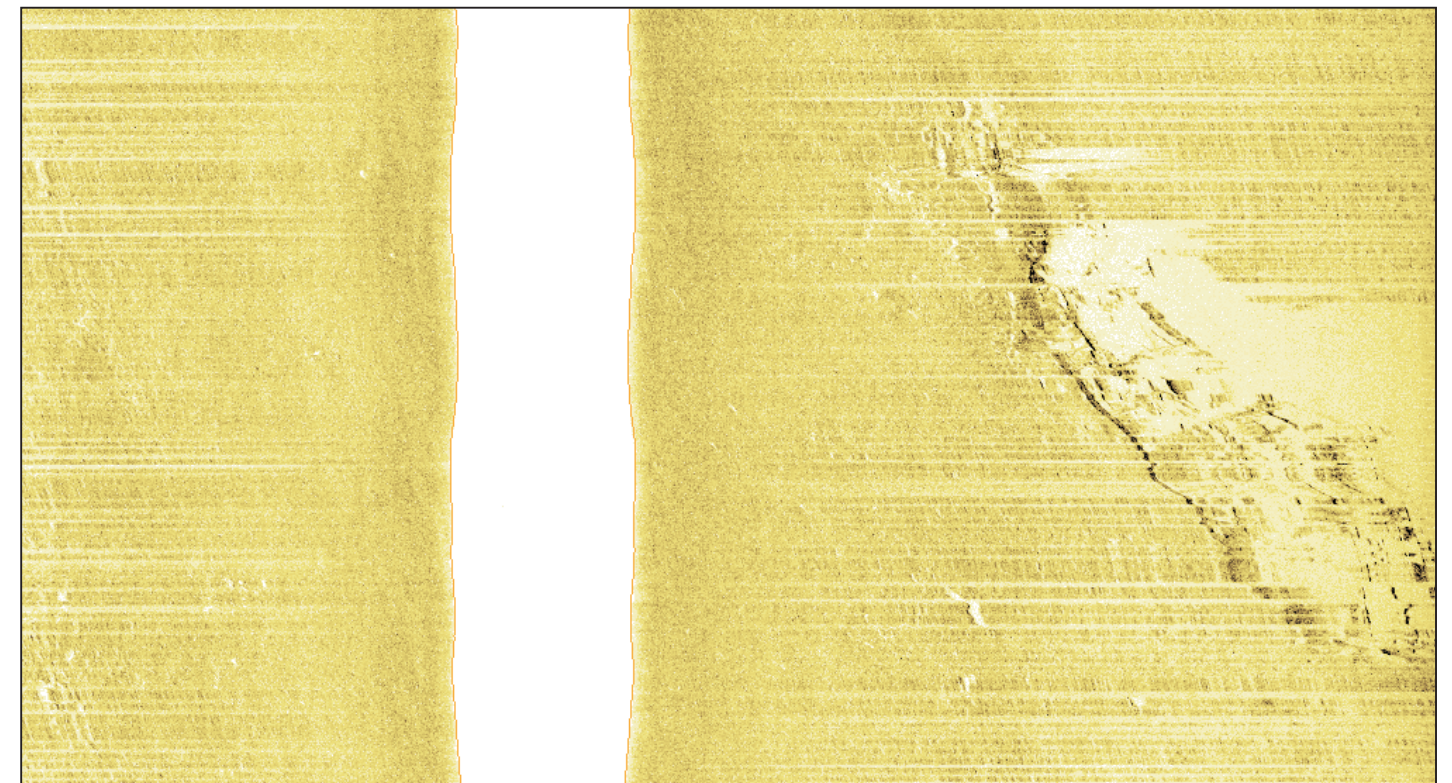


C: Wreck 7036 Multibeam bathymetry image (x1 vertical exaggeration, looking west)

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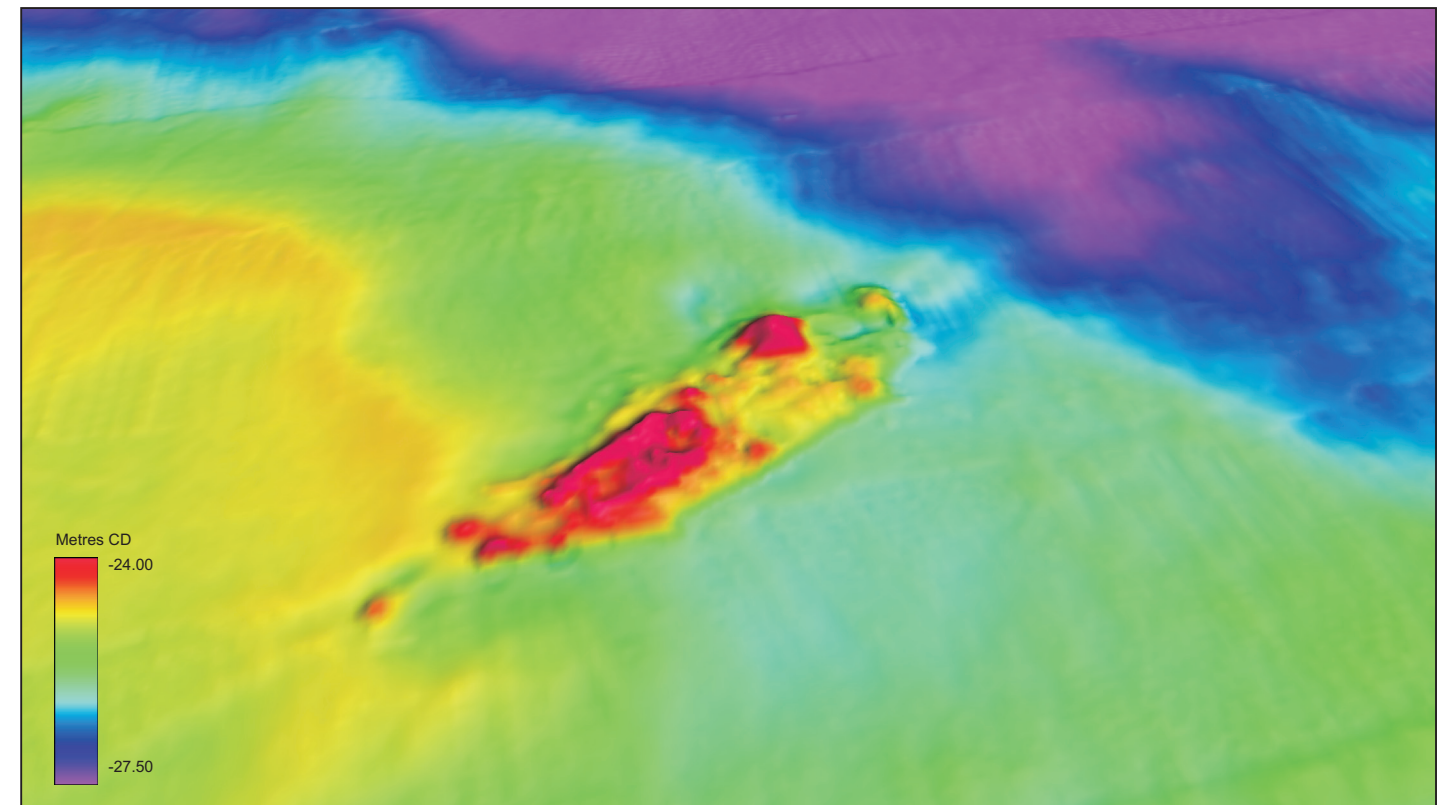


A: Wreck 7037 location within the Buffer Zone




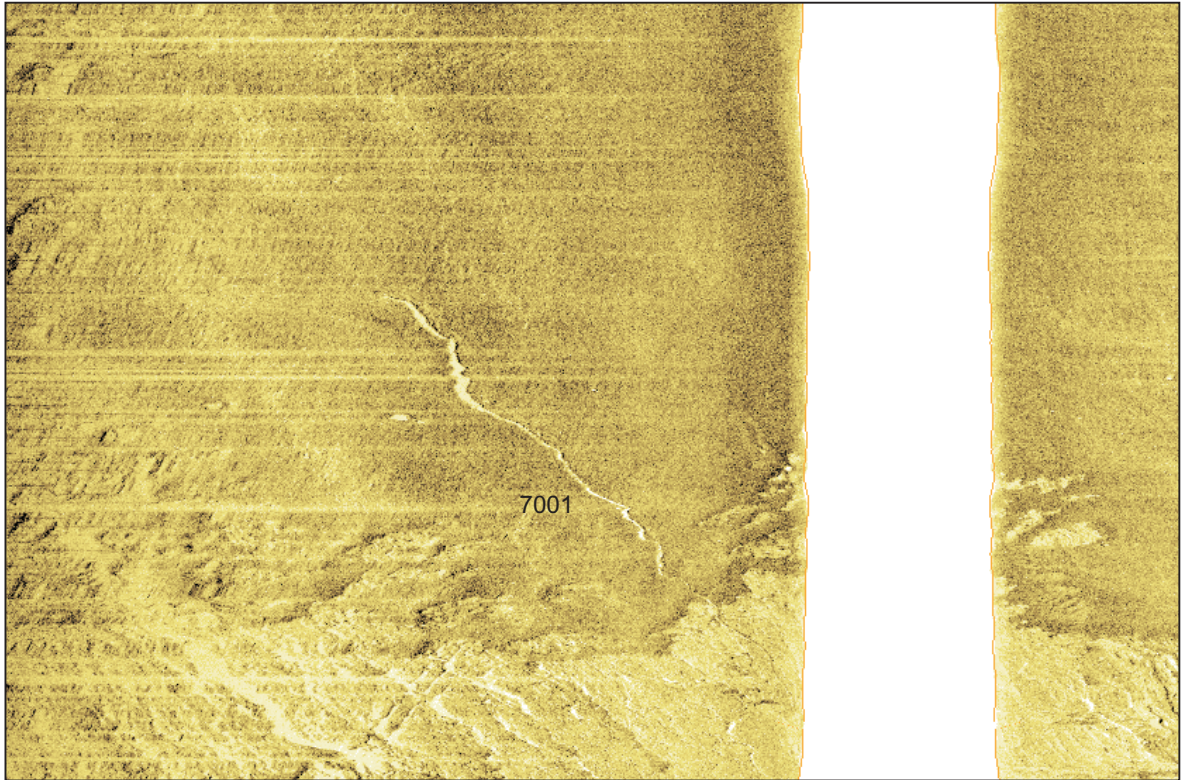
B: Wreck 7037 Sidescan Sonar image

WA ID 7037		SS Leon	UKHO 19016
Location		636798 E, 5606524 N (UTM30N)	
Archaeological Importance		High	
Geophysical survey dimensions and notes		Dimensions: 124.6m x 58.0m x 2.0m. This steel shipwreck lies in a fairly good state of preservation on the seabed; the wreck looks to be intact and is recorded by the UKHO as the SS <i>Leon</i> . This French wreck was torpedoed by a German U-boat (UC-75) in 1918.	
Build	Type	Cargo ship	
	Construction	Sunderland	
	Dimensions	89.9 x 13 x 5.2m	
	Shipyards	Unknown	
Loss	Cause	Torpedo	
Extent of Survival		The UKHO records this wreck as 'live'	

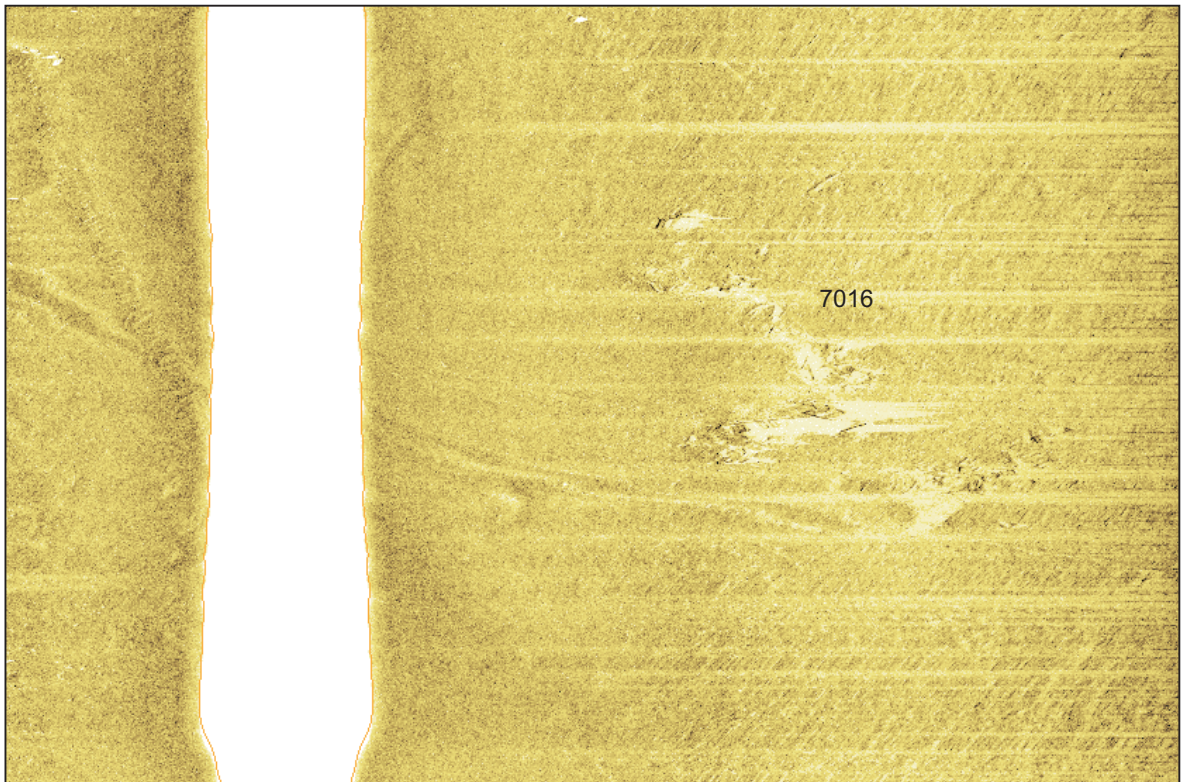


C: Wreck 7037 Multibeam bathymetry image (x1 vertical exaggeration, looking south)

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A: Sidescan Sonar image (7001) 88.9m x 0.2m x 0.2m

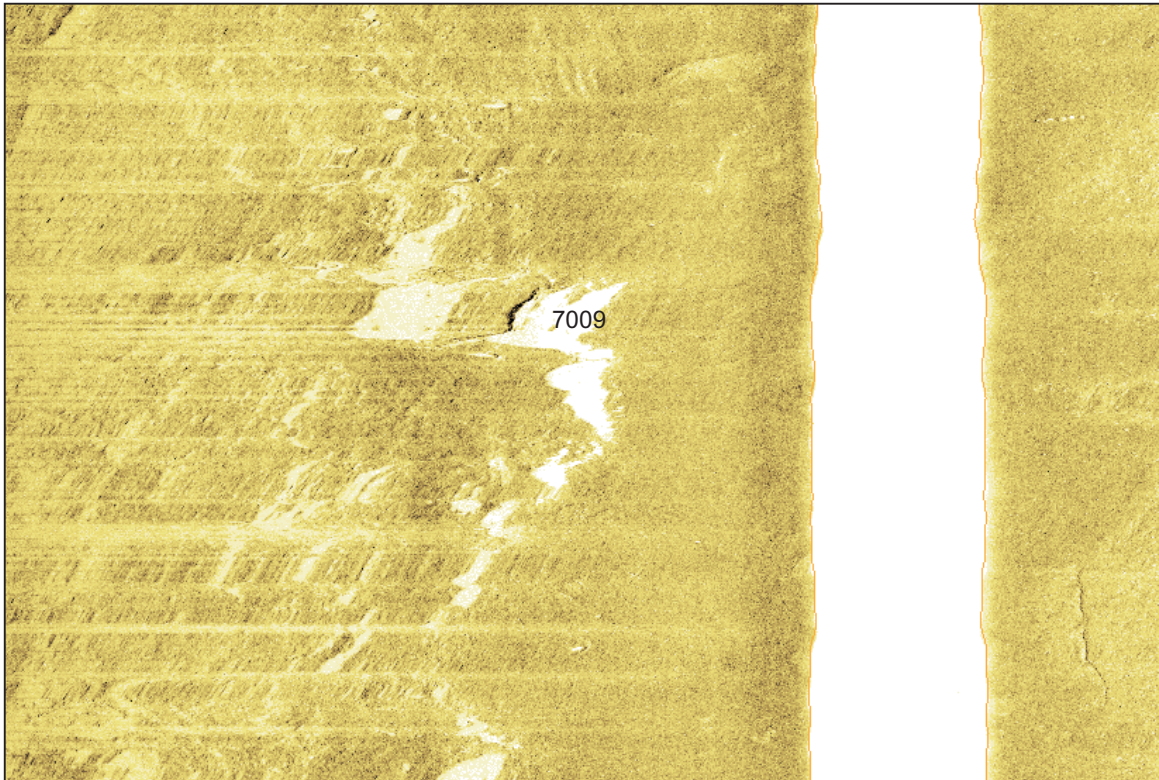


B: 7016: Sidescan Sonar image (7016) 92.6m x 83.7m x 0.6m

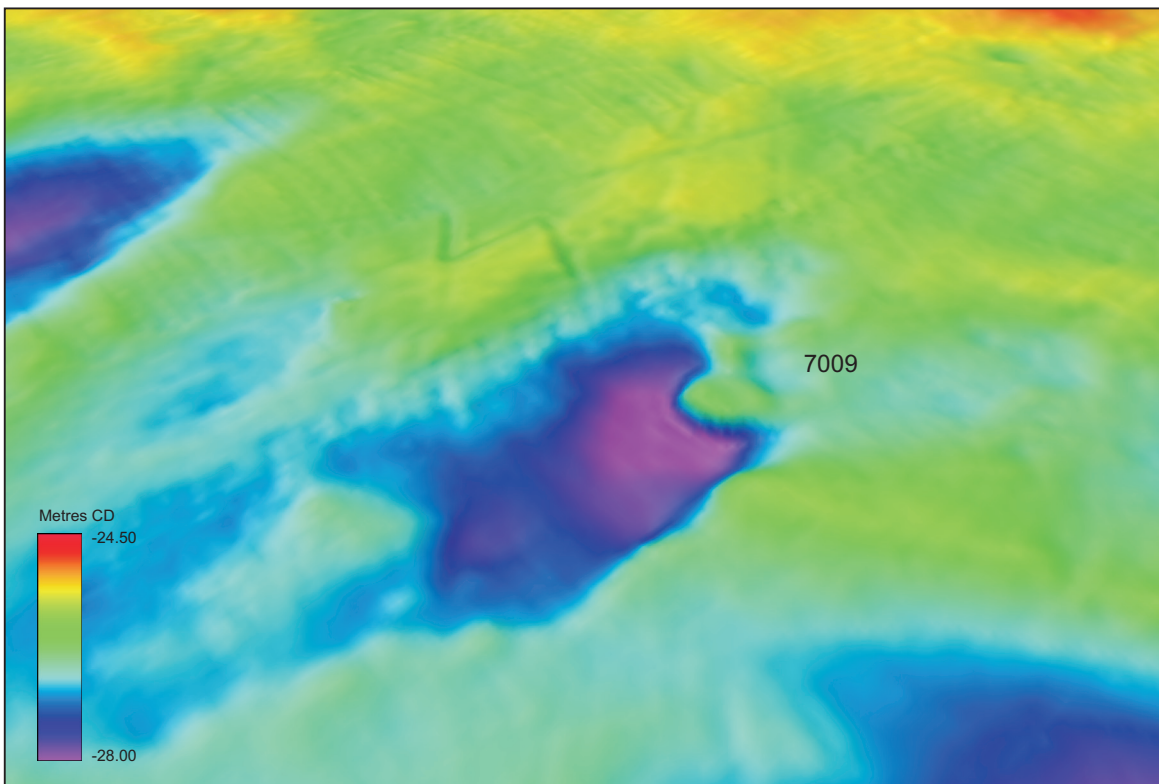


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A: Sidescan sonar image (7009) 17.3m x 0.9m x 0.6m



B: 7009 Multibeam bathymetry image (x1 vertical exaggeration, looking north east)



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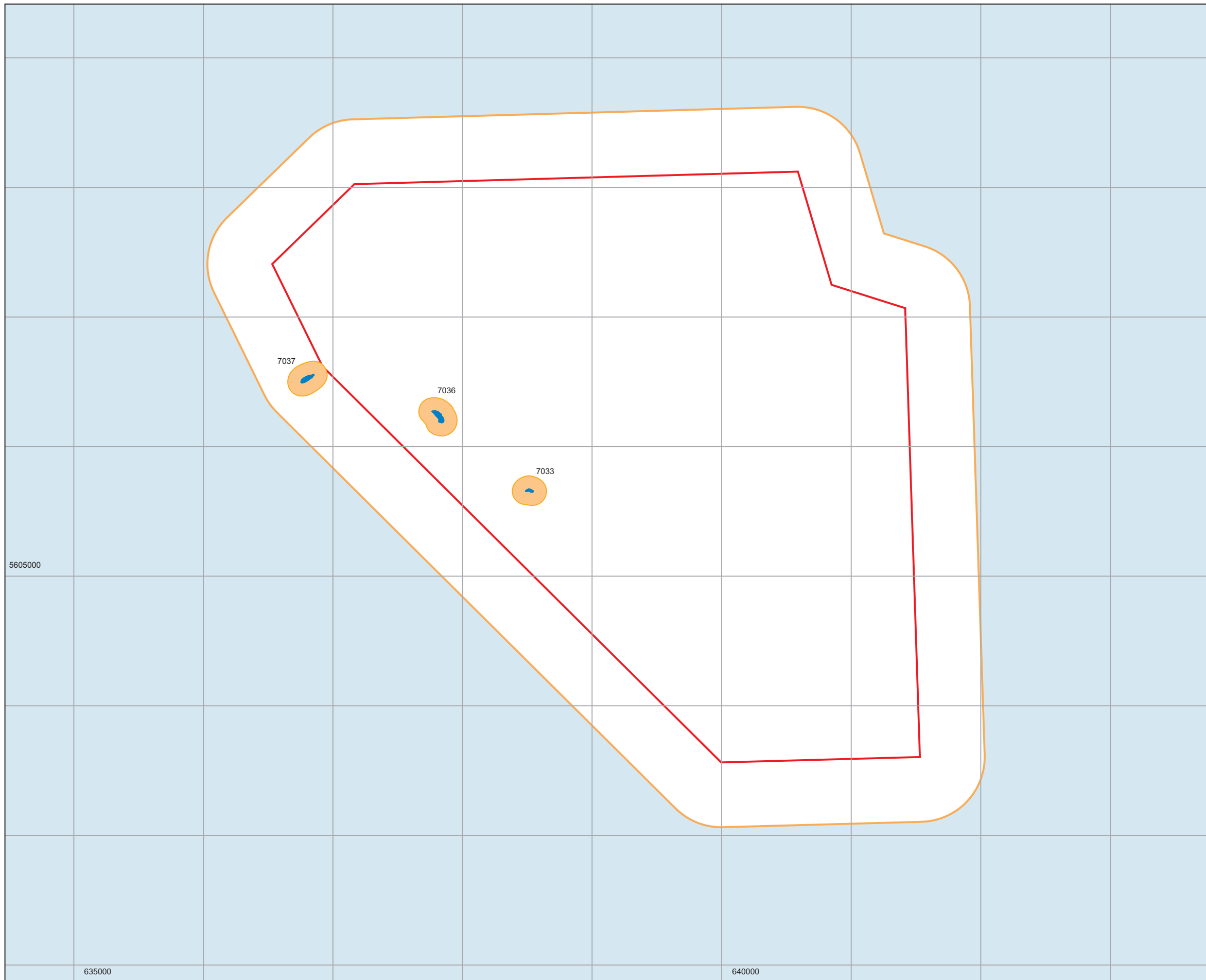
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- Study Area
- 500 m Buffer Zone
- Wreck
- Archaeological Exclusion Zone



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Archaeological Exclusion Zones

Figure 7



salisbury rochester sheffield edinburgh



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