Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 4, Appendix 16.1: Marine archaeology technical report

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1. Introduction

1.1.1 This technical report identifies known and potential marine heritage receptors within the Rampion 2 Offshore Wind Farm and provides an assessment of the potential effects on the receptors likely to be impacted by the development. This technical report accompanies **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

1.1.2 This report has been produced for the purpose of presenting the technical aspects of the marine archaeology assessment in relation to the Rampion 2 Offshore Wind Farm. The information in this report is summarised in and appended to **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

1.2 Project background

1.2.1 Rampion Extension Development Limited (hereafter referred to as 'RED') is proposing to develop the Rampion 2 Offshore Wind Farm (Rampion 2). Rampion 2 will be located approximately 13km to 25km offshore, in the English Channel in the south of England, adjacent to the existing Rampion Offshore Wind Farm (for ease of reference hereafter referred to as Rampion 1). Rampion 2 will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (**Figure 7.1**).

1.2.2 Maritime Archaeology (MA) were commissioned to undertake this marine archaeological technical report encompassing the offshore part of the proposed DCO Order Limits of Rampion 2.

1.3 Aims and objectives

1.3.1 The aim of this technical report is to identify known or potential marine archaeological resources within the offshore part of the Proposed Development of the proposed DCO Order Limits and wider marine archaeology study area.

1.3.2 The key objectives of the marine archaeology assessment are to:

- undertake ongoing consultation with Historic England and other key stakeholders, as required, in order to develop all aspects of the approach and identity receptors and mitigate impacts;
- undertake a review of the known marine heritage receptors within the proposed development area and marine archaeology study area;
- summarise the environmental context and archaeological potential of the proposed development area;
- assess and review geophysical data to identify previously unknown sites of archaeological potential;

- provide recommendations for environmental measures (mitigation) for all identified heritage receptors;
- develop an agreed **Outline Marine Written Schemes of Investigation (WSI)** (Document Reference: 7.13), followed by a Draft WSI and final Agreed WSI. The WSI documents are setting out the archaeological requirements pre- and post-consent; and
- provide a Protocol for Archaeological Discoveries (PAD) outlining the protocol and reporting chain to be followed during the pre-construction, construction, operation and maintenance, and decommissioning phases in case of any unexpected archaeological finds.

2. Methodology

2.1 Introduction

2.1.1 MA is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA); all work conducted by MA is in accordance with the guidance and principles set out in CIfA's Code of Conduct (2014a) and Code of Professional Conduct (2019).

2.1.2 The following guidance and best practice documents, listed in alphabetical order, have also been consulted as part of this assessment:

- *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (The Crown Estate, 2021);
- *Commercial Renewable Energy Development and the Historic Environment* Historic Environment Advisory Note No 15 (Historic England, 2021);
- *Deposit Modelling and Archaeology Guidance for Mapping Buried Deposits* (Historic England, 2020);
- *England's Historic Seascape: Demonstrating the Method* (SeaZone Solutions Limited, 2009);
- *England's Historic Seascapes: HSC Method* Consolidation (Cornwall Council, 2008);
- Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation (Second Edition) (English Heritage, 2011);
- *Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record*. (Historic England, 2015);
- *Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy*, (COWRIE, 2008);
- *Historic Environment Guidance for the Offshore Renewables Energy Sector* (COWRIE, 2007);
- *JNAPC Code for Practice for Seabed Development* (Joint Nautical Archaeology Policy Committee, 2006);
- *Marine Geophysics Data Acquisition, Processing and Interpretation* Guidance Notes (English Heritage, 2013);
- *National Historic Seascape Characterisation* (NHSC) Technical Advice Document (Land Use Consultants, 2018);
- *Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate*, 2014);
- *South Inshore and South Offshore Marine Plan*, Heritage Policy S-HER-1 and S-SCP-1 (HM Government, 2018);

- *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (Chartered Institute for Archaeologists (CIfA), 2014b);
- *Standard and guidance for commissioning work on, or providing consultancy advice on, archaeology and the historic environment* (CifA, 2014c);
- *Standard and guidance for archaeological field evaluation* (CifA, 2014d);
- *Standard and guidance for nautical archaeological recording and reconstruction* (CifA, 2014e);
- *Standard and guidance for an archaeological watching brief* (CifA, 2014f);
- *Standard and guidance for historic environment desk-based assessment* (CifA, 2014g); and
- *The Role of the Human Osteologist in an Archaeological Fieldwork Project* (Historic England, 2018).

2.2 Marine archaeology study area

2.2.1 The marine archaeology assessment study area is defined as the Proposed DCO Order Limits area up to Mean High Water Spring (MHWS) tide level and surrounded by a 2km buffer. The extended area allows for the consideration of direct and indirect effects on marine heritage receptors and is to accommodate the potential imprecision of historic marine positioning. This is in line with the existing Rampion 1 project marine archaeology study area and has been agreed under the Evidence Plan process with Historic England (**Figure 7.1**). The area from MHWS landward is covered by the onshore archaeology chapter, **Chapter 25: Historic environment, Volume 2** of the ES (Document Reference 6.2.25). There is an overlap of the onshore archaeology and marine archaeology study areas and any heritage receptors within this overlap have been considered by both topics.

2.2.2 Following the Preliminary Environmental Impact Report (PEIR), the extent of the array area as well as the marine archaeology study area was slightly reduced, while no changes were made to the export cable route corridor (**Figure 7.1**). The study area may be further reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

2.3 Baseline assessment methodology

2.3.1 A baseline review of the heritage receptors located within the marine archaeology study area is presented within **Section 3: Baseline review**. The data sources used to collate the information for this technical report are detailed in **Table 2-1**.

Table 2-1 Key sources used for the marine archaeology assessment

Source	Date	Summary	Coverage of study area
United Kingdom Hydrographic Office (UKHO) via Emapsite	22/04/2020	Database of known wrecks and obstructions held and maintained by the UKHO.	Full coverage of the marine archaeology study area.
National Record of the Historic Environment (NRHE) (Historic England)	28/09/2020	Site based information on intertidal sites and known wrecks and reported losses offshore including designated and non-designated archaeological sites.	Full coverage of the marine archaeology study area.
West Sussex County Council (WSCC) Historic Environment Record (HER)	23/04/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and HLC studies.	Partial coverage of the marine archaeology study area (approximately 2/3^{rds} falls within WSCC jurisdiction).
East Sussex County Council (ESCC) HER	06/05/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and HLC studies.	Partial coverage of the marine archaeology study area (approximately 1/3rd falls within ESCC jurisdiction).

Source	Date	Summary	Coverage of study area
***Submerged Palaeo-Arun River Project* (Gupta *et al*., 2004; 2008)**	2004, 2008	A reconstruction of the prehistoric landscapes connected to the River Arun with an evaluation of the archaeological resource potential.	Partial coverage of the marine archaeology study area.
***The South Coast Regional Environmental Characterisation* (James *et al*., 2010)**	2010	A regional marine assessment, focusing on evaluating the geological, biological and archaeological resource.	Broadscale data with regional coverage.
***HSC: Hastings to Purbeck and Adjacent Waters* (Maritime Archaeology and SeaZone Solutions, 2011)**	2011	A regional marine assessment presenting the archaeological understanding of the historic cultural dimension of our coasts and seas, identifying and mapping areas whose present character has been shaped by similar dominant cultural processes.	Broadscale data with regional coverage.
***South East Rapid Coastal Zone Assessment* (Wessex Archaeology, 2011; 2013)**	2011, 2013	A regional assessment undertaken to enhance the knowledge of the coastal historic environment in order to inform Shoreline Management Plans.	Broadscale data with regional coverage.
***Rampion Offshore Wind Farm ES* (RSK Environment Ltd, 2012)**	2012	The ES for Rampion 1. Chapter 13: Marine Archaeology, (E.ON, 2012a) provides a review of the archaeological potential of the area directly adjacent to Rampion 2.	Partial coverage of the marine archaeology study area.
BMAPA Finds Protocol (Wessex	28/09/2020	Database of unexpected archaeological discoveries found and reported in material from	Full coverage of the marine archaeology study area.

Source	Date	Summary	Coverage of study area
Archaeology, 2017)		offshore aggregate areas. Data received as part of the NRHE dataset.	
Offshore Renewables Protocol for Archaeological Discoveries (Wessex Archaeology, 2014)	28/09/2020	Database of unexpected archaeological discoveries found and reported during offshore development activities. Received as part of the NRHE dataset.	Full coverage of the marine archaeology study area
Portable Antiquities Scheme	07/09/2020	Database containing records of terrestrial or intertidal archaeology found and reported by the public.	Partial coverage of the marine archaeology study area.
Marine Antiquities Scheme	Accessed September 2020	Database containing records of marine archaeology found and reported by the public.	No data within study area
Receiver of Wreck	30/09/2020	Database containing records of shipwrecks or archaeological sites of significance.	Full coverage of the marine archaeology study area.
National Historic Seascape Characterisation database (LUC, 2018)	24/11/2021	Database containing records of historic seascape character types and uses on a national and regional scale.	Full coverage of the marine archaeology study area and surrounding area.

2.3.2 Where there are discrepancies in the spatial data between different sources, the coordinates provided by United Kingdom Hydrographic Office (UKHO) are used (as per Dellino-Musgrave & Heamagi, 2010). Datasets that were provided in the British National Grid co-ordinate system were transformed to World Geodetic System 1984 (WGS84) using the OSTN02 v7 transformation, the most appropriate transformation for working with marine data (Dellino-Musgrave & Heamagi, 2010). The vertical datum for depths listed in the gazetteer is the lowest astronomical tide (LAT).

2.3.3 Known and identified features within the marine environment typically fall into two categories: wrecks and obstructions. Definitions of these terms, as used by the UKHO, are provided below:

- Wreck: The remains of a stranded or sunken vessel which has been rendered useless; and
- Obstruction: In marine navigation, anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel. The term is usually used to refer to an isolated danger to navigation. 'Fouls' (areas safe to navigate over but which should be avoided for anchoring, taking the ground, or ground fishing) listed by the UKHO are included within this category.

2.3.4 Wrecks and obstructions are further classified by the UKHO as:

- LIVE: Wreck considered to exist as a result of detection through survey;
- DEAD: Not detected over repeated surveys, therefore not considered to exist in that location;
- LIFT: Wreck has been salvaged;
- UNKNOWN: The state of the wreck is unknown or unconfirmed; and
- ABEY: Existence of wreck in doubt and therefore not shown on charts.

2.3.5 Protective legislation for heritage features includes the Protection of Wrecks Act 1973, which seeks to secure the protection of known wrecks and wreck sites in territorial waters from interference by unauthorised persons; and the Ancient Monuments and Archaeological Areas Act 1979 which seeks to protect monuments and sites of national importance and public interest due to their historic, architectural, traditional, artistic or archaeological significance. The significance of a site is not defined by the protection it is currently under, as knowledge and data of wrecks and sites is constantly evolving, see **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

2.3.6 The record of England's marine archaeological and architectural sites held by the National Record of the Historic Environment (NRHE) is currently being developed into the National Marine Heritage Record which at time of writing is not complete (September 2022).

2.3.7 The NRHE data, utilised for the assessment of known archaeological receptors for the purpose of the ES, contains data classified as:

- Wreck: Remains of vessels;
- Fishermen's fasteners: Unidentified obstructions reported by fishermen;
- Named locations: Locations where a wrecking event has been reported but not confirmed; and
- Site/find and event: Find spots and locations for historical events such as battles.

2.4 Geophysical data collection methodology

2.4.1 Gardline Limited was contracted by RWE Renewables UK Ltd to acquire shallow geophysical and Ultra-High Resolution Seismic (UHRS) data across areas being considered for development at the Rampion 2 and associated export cable route corridor.

2.4.2 The offshore portion of the survey was undertaken predominantly by MV *Vigilant*, mobilising in Hull on 30 June 2020 and demobilising in Hull on 19 August 2020, after completion of the shallow geophysical data acquisition. The MV *Ocean Observer* carried out the UHRS portion of the survey including acquiring sub-bottom profiles (SBP) and magnetometer (MAG) data infilling the planned gaps in the geophysical survey including all crosslines. The MV *Titan Discovery* and Titan owned Unmanned Aerial Vehicle covered the inshore survey on the export cable corridor.

2.4.3 The MV *Vigilant* is a 71.4m vessel with a beam of 11.7m which operates as a multi-discipline survey vessel and is classified as Lloyds Register 100A1/LMC/UMS.

2.4.4 The positioning system used was Oceaneering C-Nav DGNSS Sonardyne Ranger USBL onboard MV *Vigilant* and Fugro Starfix XP2 DGNSS Sonardyne Ranger 2 USBL onboard MV *Ocean Observer.* Both vessels used the Voyager5 navigation system.

2.4.5 The data quality, for archaeological purposes, across all shallow geophysical data sets has been defined by Maritime Archaeology as Good, as described below.

- **Good**: Clear data which has been unaffected or only slightly affected by conditions such as weather, sea state or background noise in which anomalies can be clearly identified and interpreted. Upstanding or partially buried wrecks, debris fields and small, isolated anomalies as well as subtle reflectors within the SBP data are clearly discernible. Data of this quality provide the highest probability for marine heritage receptors to be identified;
- **Adequate**: Data which has been moderately affected by conditions such as weather, sea state or background noise, in which anomalies can been seen but are difficult to identify and interpret. Upstanding wrecks and larger debris fields are discernible; however, the identification and interpretation of dispersed or partially buried wrecks, small, isolated anomalies, and continuous reflectors within SBP datasets may be difficult. Data of this quality is considered usable, but the clear identification of marine heritage receptors made be impaired;
- **Dissatisfactory**: Data which has been significantly affected by conditions such as weather, sea sate or background noise, in which only large anomalies such as relatively intact upstanding wrecks can be suitably identified and interpreted. The identification and interpretation of dispersed or partially buried wrecks, small, isolated anomalies and small palaeogeographic features will be impaired; and
- **Variable**: Where the quality of data between individual lines varied leading to a variation in confidence in the identification and interpretation of marine heritage receptors within the dataset.

2.4.6 The geophysical survey covered the entire Proposed DCO Order Limits and part of the marine archaeology study area. The extent of the survey coverage can be seen in **Figure 7.**. Examples of the data quality at the sites of identified marine heritage receptors is presented in **Annex E: High potential anomalies** and **F: Medium potential anomalies**.

Side scan sonar data

2.4.7 An EdgeTech 4200 dual channel side scan sonar (SSS) system using an EdgeTech 4200FS towfish was used to scan the seabed on either side of the ship's track. The data was recorded with Coda Octopus 760D. The beamwidth used was set to 1.26°/0.4° horizonal and 50˚ vertical. The frequency used was 120kHz/410kHz with a range of 100m per channel providing 100 percent - 300 percent coverage. The data was processed and analysed using Gardline's in-house GeoFusion software.

2.4.8 The raw data was received in Triton XTF format and post-processed in SonarWiz, imported with a 'threshold' value calculated for the specifics of the instrumentation and the environment, bottom tracked and normalised using the Empirical Gain Normalisation (EGN) function.

2.4.9 Following processing, the SSS data quality was considered Good (as defined above), and seabed anomalies could be clearly identified and interpreted.

2.4.10 The SSS data was reviewed on a line-by-line basis by a qualified marine archaeologist. All anomalies were identified and assessed for archaeological potential as per **Table 2-2**. Target reports were developed and exported as ESRI shapefiles into ArcGIS Pro for synthesis with other data sets.

2.4.11 All SSS anomalies were assigned feature IDs ranging between MA2000 – MA2999.

Echo sounder (multi-beam system) data

2.4.12 A Simrad EM2040D hull mounted multi-beam echo sounder is permanently installed on M.V. *Vigilant* and was used to provide swath bathymetry data. The transducer frequency was 200-400 kHz with 800 beams and data was recorded using the SIS acquisition software. The survey vessel maintained an average speed of 4 knots and the angular coverage was 60-76˚. The acquired data was processed using Caris HIPS and SIPS (version 10.4) software.

2.4.13 Multibeam swath bathymetry (MBES) data was received as ungridded ASCII files, and .asc grids reduced to LAT. The data was visualised using the Fledermaus 7 suite; DMagic to produce a digital terrain model (DTM) gridded at 1m according to the highest resolution xyz data received and hillshaded. These were exported for interpretation into Fledermaus with a 32-step colour map overlaid to aid interpretation and later into ArcGIS Pro for synthesis with other data.

2.4.14 Following processing, the MBES data quality was considered Good (as defined above) and seabed anomalies could be clearly identified and interpreted.

2.4.15 Backscatter (BS) data has also been recorded, measuring the intensity of the echo sounder pings which are assigned a grey-scale value and gridded. This provides

an acoustic intensity map that is similar in appearance to side scan sonar data, but without shadows to highlight relief. The data is useful for the interpretation of bathymetric anomalies and enables an understanding of material type for discrete features, and sediment classification of shallow deposits.

2.4.16 The MBES and BS data were reviewed by a qualified marine archaeologist for targets identified during the assessment of other datasets and information regarding the length, width and anomaly height above the seabed was cross-referenced with side scan and sub-bottom results where these features possessed a surface expression.

2.4.17 Target imagery was captured, and feature IDs were assigned, ranging between MA4000 – MA4999.

Magnetic data

2.4.18 A Geometrics G882 marine caesium vapour was soft towed 11m behind the side scan sonar and positioned using a USBL system. The regional field was set to 48550nT and the cycle time to 100ms. The data was processed using Gardline's GeoFusion software.

2.4.19 Magnetic data was assessed using GeoMetrics MagPick software package. Raw xyz profile text files were assessed on a line-by-line basis and only smoothed using low and/or high pass filters where necessary. Data was also gridded from the analytic signal to produce a spatial distribution map of anomalies. Interpreted magnetic targets were identified by combining a manual assessment of the magnetic profiles with a visual assessment of the gridded data.

2.4.20 Following processing, the magnetic data quality was considered Good (as defined above) and magnetic anomalies could be clearly identified and interpreted.

2.4.21 Magnetic anomalies greater than 5nT have been accepted as a standard for the smallest change in magnetic field reliably detected (Dix *et al.*, 2008). It has been argued that a minimum detectable deflection of 5nT may be on the conservative side and that, where the data is relatively noise free, 3 or even 2nT may be practical depending on noise levels, instrument type, data rate and purpose of investigation (Camidge *et al.*, 2010). The current filtering of 4nT as selected by Gardline is appropriate given the survey parameters used.

2.4.22 MA has retained Gardline's adoption of > 4nT for this assessment. Objects giving a 5nT return from a six-metre distance are likely to be ferrous objects of around 100kg (for example, a small anchor) (Camidge *et al*., 2009). Anomalies smaller than this are not likely to be discernible from signal noise unless passed over directly by the fish at extremely short range (c. 2m). Such signals are not expected to be of archaeological interest, constituting isolated debris or single instances of ferrous anthropogenic material.

2.4.23 These surveys, like most MAG surveys of large areas, are of variable sensitivity (Camidge *et al.*, 2009:62). At 6m range, run lines directly over targets are able to detect a target with a mass of around 100kg, whereas the line spacing for this survey varies with the average line spacing at 75 or 150m. At 150m line spacing the slant range can be up to 80m, which means that only objects of more than 100 tonnes will be discernible at 5nT deflection at this range. Benefiting the data

collection for this case is that the run lies were cross lined which can reduce the large differential sensitivity (Camidge *et al.*, 2009:63).

2.4.24 All magnetic targets over 4nT were exported into ArcGIS Pro for comparative analysis with other geophysical datasets and data identified during the baseline review.

2.4.25 Correlation between magnetic targets and other datasets were based on a 50m buffer due to the issues inherent in accurately positioning magnetic targets by their detectable magnetic field.

2.4.26 Target reports were developed for all magnetic anomalies correlating with high and medium potential side scan sonar anomalies. Feature IDs for all magnetic anomalies were assigned IDs ranging between MA5000 – MA7279.

Sub-bottom profiler data

2.4.27 A 16-element hull-mounted pinger monotrace seismic system was used to collect sub-bottom data. The digital recorder used was Octopus 760D. The energy power used was 4kW with a firing rate of 300ms and record length of 120ms. The band pass filter was set to 2.5-4.5kHz and swell filter on. The raw data was processed using Gardline's GeoFusion software.

2.4.28 Interpretation of SBP data was undertaken on a line-by-line basis by a qualified marine archaeologist.

2.4.29 The data were received in SEG-Y format and imported and visualised using SonarWiz. Lines were bottom tracked and gain corrected, and then reviewed in numerical order with features digitised continuously. Features were picked by digitising reflectors and horizons of potential archaeological interest. Discrete reflectors consist of point hyperbolae and blanking effects indicative of potential buried archaeological deposits, such as wreck and debris.

2.4.30 Following processing, the SBP data quality was considered Good (as defined above), and channels and sub seafloor features could be clearly identified and interpreted.

2.4.31 Feature IDs for all sub-bottom anomalies were assigned ID's ranging between MA3000 – MA3999.

2.5 Methodology geophysical data interpretation

2.5.1 The archaeological assessment of geophysical data has been undertaken by a qualified and experienced marine archaeologist. Following delivery of the survey data as specified above, the raw data has been processed and interpreted as per guidance in Marine Geophysics Data Acquisition, Processing and Interpretation (English Heritage, 2013).

2.5.2 All anomalies of archaeological potential were assessed against the criteria in **Table 2-2** and the results of the assessment of all datasets were further reviewed against the baseline data collated for the marine archaeology study area, as detailed in **Section 3**.

Table 2-2 Definition of archaeological potential

Archaeological potential	Archaeological definition
High	Anomalies considered to map material of archaeological interest such as wreck or crash sites, buried and confirmed palaeolandscapes, as well as potential outcropping palaeolandscapes and their margins.
Medium	Anomalies that consist of defined structural outlines or coherent material distributions with strong backscatter, or clearly upstanding objects with shadow, or pronounced scour features; or a combination of these, interpreted as of possible archaeological interest but where further investigation would be required for more detailed interpretation.
Low	Anomalies considered to be of anthropogenic origin but likely related to modern activity with little or no archaeological significance such as modern debris, ropes, chains or fishing gear.

2.6 Environmental measures methodology

The environmental measures for Rampion 2 are formulated where marine heritage receptors and anomalies are identified in the desk-based assessment and/or geophysical assessments. The environmental measures are based on guidance set out in Historic Environment Guidance for Offshore Renewable Energy Sector (COWRIE, 2007) and Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021).

Rampion 2 has approved several embedded environmental measures as part of the pre-application phase in order to reduce the potential for impacts on marine archaeology (see **Table 2-3**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

Table 2-3 Embedded environmental measures

ID	Environmental measure	When environmental measure was introduced	How the environmental measures will be secured
C-57	Marine Written Schemes of Investigation (WSI) will be developed in accordance with the **Outline Written Schemes of Investigation** (Document	Scoping – updated at PEIR and ES	DCO requirements or dML conditions.

ID	Environmental measure	When environmental measure was introduced	How the environmental measures will be secured
	Reference: 7.13). The Marine WSI will outline the archaeological exclusion zones (AEZ), the implementation of a Protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014) and future monitoring and assessment requirements.		
C-58	Offshore geophysical surveys (including Unexploded Ordnance (UXO) surveys) undertaken during the life of the project will be subject to full archaeological review where relevant in consultation with Historic England.	Scoping – updated at PEIR	DCO requirements or dML conditions.
C-59	Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England. Areas with geoarchaeological potential will be targeted during the geotechnical sampling campaigns and the results of the geoarchaeological assessment will be presented in staged geoarchaeological reports inclusive of publication. The published results will aim to enhance the palaeogeographic knowledge and understanding the area.	Scoping – updated at PEIR and ES	DCO requirements or dML conditions.
C-60	All intrusive activities undertaken during the life of the project will be routed and microsited to avoid any identified marine heritage receptors pre-construction, with Archaeological Exclusion Zones (AEZs) (buffers) as detailed in the **Outline Written Schemes of Investigation** (Document	Scoping – updated at PEIR and ES	DCO requirements or dML conditions.

ID	Environmental measure	When environmental measure was introduced	How the environmental measures will be secured
	Reference: 7.13) unless other mitigation is agreed with Historic England as per the Marine WSI. Micrositing and AEZs will further be applied to yet undiscovered marine archaeology receptors should they be located.		
C-111	A decommissioning plan will be prepared for the project in line with the latest relevant available guidance.	PEIR	**Outline Code of Construction Practice (CoCP)** (Document Reference: 7.2) and DCO requirements (Condition 13 (2)).
C-277	A post-construction monitoring plan as per Marine Written Schemes of Archaeological Investigation (WSI) will be produced. The post-construction monitoring plan will recommend areas or sites of high archaeological significance and outline how post-construction monitoring campaigns will collect, assess and report on changes to marine heritage receptors that may have occurred during the construction phase.	ES	DCO requirements or dML conditions.

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3. Baseline review

3.1 Environmental context

3.1.1 The area of seabed that the marine archaeology study area covers was previously a large swathe of dryland that was inhabited during the Pleistocene and early Holocene (Mesolithic). The dynamic processes of climate and landscape change throughout the Pleistocene as a result of warming and cooling cycles and fluctuations in sea-level resulted in repeat (re)colonisation and abandonment of these landscapes. These periods of (re)colonisation are typically associated with the retreat of icesheets following the last three lowland glaciations:

- Devensian: c. 115,000 to 11,000 Before Present (BP);
- Wolstonian: c. 350,000 to 130,000BP; and
- Anglian: c. 480,000 to 430,000BP [Marine Isotope Stage (MIS) 12].

3.1.2 However, despite these numerous glacial cycles during the Quaternary, there is currently no evidence to suggest that the glacial ice sheets reached as far south as the West Sussex Coastal Plains and English Channel (Farr *et al*., 2017). During these cold periods, the sea-level would have been significantly lower and large areas of the English Channel and southern North Sea would have been inhabitable dryland.

3.1.3 As the ice sheets did not extend into the south of Britain, there have been no adverse effects of ice scouring on earlier Palaeolithic deposits in this region, meaning that prehistoric material or deposits within the marine zone have the potential to range between the Lower Palaeolithic and Mesolithic. The rise in sea-level in the Holocene inundated these once-dry landscapes and rendered them un-inhabitable and thus any Neolithic (4000 to 2200BC) and later material found in the marine zone is likely to be of a maritime nature.

3.1.4 Understanding of the Pleistocene landscapes of West Sussex has increased significantly over the last 20 years or so, with multiple projects sampling deposits and mapping the landscape, including: the Boxgrove Raised Beach Mapping Project (Pope, 2004; Roberts & Pope, 2009; Roberts & Pope 2018), the Palaeolithic Archaeology of the Sussex/Hampshire Coastal Corridor (PASHCC) project (Bates *et al*., 2007); the Submerged Palaeo-Arun River project (Gupta *et al.*, 2004; 2008); and the Transition Zone Mapping for the Marine-Terrestrial Archaeological Continuity (Contiguous Palaeo-Landscape Reconstruction) project (Bates *et al.*, 2009).

3.1.5 Through this work, it was recognised that the Early to Middle Pleistocene deposits of the West Sussex Coastal Plain and wider Solent Basin were shaped by successive interglacial sea-level highstands during the last 500,000 years (Bates *et al*., 2010). At least four of these marine terraces have been identified from the deposits as follows (oldest to youngest):

- Goodwin-Slindon (Marine Isotope Stage (MIS) 13);

- Aldingbourne (early MIS 7);
- Brighton-Norton (late MIS 7); and
- Pagham-Selsey (MIS 5e).

3.1.6 Tectonic uplift has elevated these terraces thus protecting them from erosion by later sea-level rises (Roberts & Parfitt, 1999; Scourse & Preece, 2009).

3.1.7 The marine deposits recorded within the Goodwin-Slindon raised beach at Boxgrove (c. 500,000BP/MIS 13) are contemporaneous to a time when Britain was connected to mainland Europe by low chalk hills with extensive delta plains that bordered the southern shore of the North Sea embayment, giving way to the colonisation of Britain by hominins as there was no continuous seaway present (Bates *et al*., 2003; Preece & Parfitt, 2012; Whittaker & Parfitt, 2017). At this time of higher sea-level, the Goodwin-Slindon Raised Beach formation was situated within a large marine embayment that opened southwards into the main English Channel, whilst the eastern end of the channel was closed (Bates *et al.*, 2003). The point at which the embayment was created is not yet known, as there is no current evidence of deposits older than those at Boxgrove (Bates *et al.*, 2010).

3.1.8 The coastline at the time of the Aldingbourne Raised Beach, seems to have had a broadly similar geomorphology than that of the Goodwin-Slindon Raised Beach, with a continuation of the marine embayment. However, the evidence appears to show that Aldingbourne was evolving and transitioning into an open coastline, as the mouth of the embayment widened (as recognised at the site of Pear Tree Knap) (Bates *et al.*, 2010).

3.1.9 Towards the later part of the MIS 7, the Brighton-Norton Raised Beach was formed. All evidence indicates that the embayed coastline from the previous highstands was now a fully open coastline, with sediments demonstrably extending from Brighton in the east to at least Havant in the west (Bates *et al.*, 2004).

3.1.10 The coastline continued to evolve more locally in the Ipswichian Interstadial and the Pagham-Selsey Raised Beach deposits were laid down, with dating of the gravels and sands across much of the Pagham/ Selsey/ Bognor area indicating MIS 5e. The evidence suggests that an offshore bar was created, known as the Selsey Ridge. The development of the ridge subsequently led to the formation of a protected coastal plain to the north, within which shallow harbours were formed (Bates *et al*., 2010).

3.1.11 The study area covers the site of the submerged Arun River extension and the Northern Palaeovalley, part of a larger confluence of submerged palaeo-river systems in the English Channel that would have comprised the combined drainage of the Rhine, Seine, Thames, Solent and other tributaries (Gupta *et al.*, 2004; Farr *et al*., 2017).

3.1.12 This river system is situated in an erosive landscape and strong tidal streams have led to scouring of sediment in some parts (Gupta *et al.*, 2008; Farr *et al.*, 2017). The marine archaeology study area does not appear to be significantly affected by these marine transgressive processes (Gupta *et al.*, 2004). This region of submerged palaeo-river systems was previously investigated by the Submerged

Palaeo-Arun Survey (Gupta *et al.*, 2004; 2008) with geophysical mapping of the landscapes and a programme of environmental sampling in the Owers Banks.

3.2 Maritime activity

Introduction

3.2.1 The following sections will provide a broad contextual overview of the past human activity within the region. This will enable an assessment of the potential for archaeology within the marine archaeology study area and an assessment of significance of any sites that may be within it.

3.2.2 The marine archaeological resource can be characterised into the following five main categories of sites and features:

- Submerged prehistoric landscapes related to fluctuations in past sea-level. Such landscapes may contain significant evidence of prehistoric human occupation and/or environmental change.
- Archaeological remains of vessels deposited after a wrecking event at sea or abandoned in an intertidal context.
- Remains of aircraft crash sites, either coherent assemblages or scattered material, typically the result of Second World War military conflict, but also numerous passenger casualties. This category includes aircraft, airships and other dirigibles dating to the First World War; however, these rarely survive the archaeological record.
- Structural remains other than watercraft, such as defensive structures, lighthouses or sites lost to the sea as a result of coastal erosion, may be found within the intertidal zone (between Mean Low Water Springs (MLWS) and MHWS).
- Historic Seascape Character: the historic cultural influences which shape present perception of seascape, its use and its ability to accommodate change.

3.2.3 There are a wide range of heritage sites without formal protection which have been identified and outlined below and in **Section 3.3: Known wrecks and their archaeological significance**. Of the sites with formal heritage protection measures assessment work has determined that:

- there are currently no protected wrecks or scheduled ancient monuments within the marine archaeology study area;
- there are currently no conservation areas within the marine archaeology study area; and
- there are currently no Marine Antiquities Scheme finds recorded within the marine archaeology study area.

Palaeolithic (c. 800,000 to 10,000BC)

3.2.4 The West Sussex coastal plains are home to a significant Lower Palaeolithic site known as Boxgrove (*c.* 500,000BP or MIS 13), situated some 10km inland of the

present coastline of the English Channel. Although it was initially considered to be the earliest Palaeolithic site in Britain, as evidenced by faunal remains with butchery marks and Homo heidelbergensis human remains (a tibia shaft and two incisor teeth from two individuals), an earlier site has now been found dating to *c.* 1,000,000BP at Happisburgh on the Norfolk coast. However, the Boxgrove human remains are the earliest to be found at present in England, dating to between 525,000 and 478,000 years before present (BP) (Whittaker & Parfitt, 2017). Boxgrove is situated in a former marine embayment and sits on a raised beach. At this point the Straits of Dover were closed and as a result there was reduced salinity in the embayment.

3.2.5 The archaeological and palaeoenvironmental potential of the offshore Palaeolithic deposits from the English Channel and Solent region is demonstrated by the wealth of artefacts, faunal remains and peat evidence that have been identified to date. However, *in situ* offshore finds are rare, with most artefacts within the marine zone being found on the seabed in a secondary context. It is unlikely that archaeological material from interglacial periods of the Palaeolithic will be found in the offshore zone of the study area as sea-level was much higher and further inland than the present-day coastline. However, the deposits laid down in the marine zone during these interstadials are of great importance for understanding the localised geomorphological changes of the Sussex coast.

3.2.6 As discussed above, there were numerous glacial cycles during the last 500,000 years, resulting in fluctuating sea-levels during different periods within this time. Large swathes of land that are now submerged, would have been inhabited and exploited by our human ancestors. Therefore, any archaeological finds from the Palaeolithic period in the offshore zone are more than likely from these periods of glaciation.

3.2.7 Further to this, an extensive survey of the Palaeo-Arun valley was carried out in 2004 by Gupta *et al.* (2004). Preliminary prospecting was carried out within the Palaeo-Arun River in the Owers Bank region, *c.* 18km south of Littlehampton, in the English Channel. This project collected 245km of seismic data over a 3.5km by 1km area of the seabed, as well as ground-truthing the survey with 20 vibrocores and 108 grab samples (Event number EWS1190 and Monument number MWS10387). The importance of the Palaeo-Arun valley is further discussed in **Section 4.3: Palaeogeographic assessment of geophysical data**.

3.2.8 The deposit sequences at Eartham pit, Boxgrove, are the most extensively studied and typically comprise the following units: 7. Soliflucted gravel; 6. Chalk gravel and calcareous silt beds (‘brickearth’); 5. Organic bed; 4. Palaeosoil and spring/pond deposits; 3. Slindon Silts; 2. Slindon Sands; and 1. Beach gravel; upper chalk (Cretaceous). The deposit sequence indicates that the site was essentially marine at the base of intertidal flats, followed by regression and a period of soil formation with freshwater pools. Interglacial deposits are then followed by a thick sequence of colluvium and mass-movement deposits that indicate change to colder and ultimately sub-arctic conditions (Whittaker & Parfitt, 2017).

3.2.9 Two Palaeolithic flint finds are recorded in the Portable Antiquities Scheme (PAS) database found within the marine archaeology study area: large flint flake, probably part of the debitage from a larger flint nodule (SUSS-8872F6) and a

possible unfinished roughout of a flint implement (SUSS-87FCF3), both of uncertain prehistoric dates.

Mesolithic (c. 10,000 to 4,000BC)

3.2.10 Most early prehistoric finds from the English Channel will be from the late Upper Palaeolithic and earlier Mesolithic, post-dating the Last Glacial Maximum (LGM) (Devensian) and representing the period of recolonisation of southern Britain by anatomically modern humans from *c.* 12,500BP, which followed a period of approximately 10,000 years of glaciation (of which there is no current evidence of habitation) (Jacobi, 2004).

3.2.11 The English Channel and Solent Basin has already produced important material from this period prior to the inundation, indicating the high potential for both *in situ* and secondary context archaeological material within the marine archaeology study area.

3.2.12 A submerged Mesolithic site (Monument no. 896563) was found approximately 700m offshore, *c.* 5.5km west of the Rampion 2 proposed DCO Order Limits Boundary. The site consisted of 30 blades and flakes of Mesolithic date, now housed in Bognor Museum. Although this site is not within the marine archaeology study area, it highlights the potential to find submerged prehistoric archaeology along this coastline.

3.2.13 Further to the west of the study area, within the Solent region, lies the submerged site of Bouldnor Cliff off the Isle of Wight (*c.* 6,200 to 6,000 cal. BC). The site is made up of five known loci with archaeological evidence along a 1km stretch (orientated east to west) and has yielded significant archaeological material, both *in situ* and in secondary contexts. Archaeological material includes worked flint, worked wood, the oldest piece of prepared string in the country and the presence of Einkorn wheat DNA, 2,000 years earlier than previously believed to have been in the UK (Momber *et al*., 2020; Smith *et al*., 2015).

3.2.14 Waterborne travel during the Mesolithic was likely to be carried out in logboats or skin/hide boats (as summarised in McGrail, 2001: 172-183). The vessels were able to operate in sheltered inshore waters, estuaries, and rivers but the extent to which Mesolithic vessels were capable of making repeated open sea voyages is less clear. However, Garrow and Sturt (2011) have proposed a viable model of significant maritime contact between and along the western coasts and islands of the British Isles during the Mesolithic and Neolithic. Remains of early vessels are likely to occur in areas of formerly sheltered inshore waters (now further inundated and lying offshore), estuaries or rivers. Associated artefacts, such as paddles or fishing equipment also have the potential to survive in the archaeological record from this period (for example, McGrail, 2001: 176).

Neolithic (c. 4,000 to 2,200BC)

3.2.15 By the Neolithic sea-level had risen to levels similar to the present-day coastline, and therefore the potential for submerged landscape deposits is significantly reduced in offshore environments, while remaining high in developing estuaries and harbours. However, current models of sea-level rise are fairly broad in their interpretations and are not always indicative of the localised nuances. For

example, there is increasing evidence in the southern North Sea for the existence of Neolithic islands (Gaffney *et al*., 2017). As no localised models have been created for the southeast coast, it remains true that there is some potential for *in situ* Neolithic remains, such as occupational material, structural remains and watercraft, to be found in the intertidal and marine zone. This can be seen in peat deposits lining estuaries and rivers dating to the Neolithic, particularly around the Solent coast. Furthermore, there is also potential for secondary context Neolithic material, originating from eroded deposits along the coast.

3.2.16 Neolithic watercraft, much like their Mesolithic counterparts, are likely to comprise of skin/hide boats or logboats (summary in McGrail, 2001, pg. 172-183). In general, the former craft are more likely to be capable of open water journeys, whereas the latter were likely restricted to shelters waters.

3.2.17 The scope for surviving watercraft in the offshore zone, although unlikely, must be considered as recent evidence of a Neolithic logboat was uncovered 1km offshore under two metres of sand during trenching for a pipeline making landfall at Gormanstown, Co. Meath (Brady, 2002), highlighting the potential for these craft to survive offshore. Furthermore, this logboat showed evidence of possible modification with outriggers to aid long-distance sea travel, indicating that logboats could be adapted for use from sheltered waters to open waters (Brady, 2002).

3.2.18 Onshore, Neolithic settlements at Whitehawk and Trundle, fortified by banks and ditches, overlook the coastal plains. The faunal evidence from these sites clearly indicates the exploitation of marine resources during occupation, in addition to the typical subsistence agriculture of the Neolithic - the cultivation of cereals and the rearing of stock (Gale & Fenwick, 1998). Further, the site of Bishopstone on the East Sussex coast is evidence of open agricultural settlement, whilst the supposition of seasonal and/or specialist use of marine resources is evidenced at the nearby site of Chidham (Gale & Fenwick, 1998), where the lithics assemblage seems to be specialised for the preparation of withies for fish traps. Thus, as with the Mesolithic, associated artefacts, such as fishing equipment, may also have the potential to survive in the archaeological record offshore, as in the examples found from Jaywick in Essex (Wilkinson & Murphy, 1995).

3.2.19 One Neolithic find is recorded in the PAS within the Study Area: a large, knapped flint scraper in a horseshoe shape (SUSS-608793).

Bronze Age (c. 2,600 to 700BC)

3.2.20 The potential for substantial submerged landscape deposits offshore is further reduced in the Bronze Age. However, with increasingly sedentary populations, both on the coast and inland, inevitably gave rise to increased communications along the coast and waterways of the region.

3.2.21 There is substantial potential for *in situ* archaeological remains in the intertidal zone, including: occupational material, ritual deposits, burials, and structures relating to coastal marine practices, such as jetties, causeways and fish traps. However, there is also potential for secondary context material from eroded deposits in the inshore and intertidal zone.

3.2.22 Along the south coast there are numerous examples of Bronze Age coastal activities, including the two Late Bronze Age structures found on the foreshore at

Wootton-Quarr, Isle of Wight (James *et al.*, 2010), and the Bronze Age remains and ancient river channel on the foreshore at Bognor Regis, to the west of the marine archaeology study area. The remains at Bognor Regis consisted of Bronze Age tree trunks, wooden stakes, 52 burnt flints and 193 struck flints (*in situ*), pottery fragments and a small fragment of human skull (Allen *et al.*, 2004).

3.2.23 Watercraft during this period still include skin/hide boats and logboats, however, there is a development of the later plank-built hull forms which were relatively complex in their construction, using large hewn planks fastened together with yew withies, as exemplified by the Dover Boat (Clark, 2004). Evidence of a Middle Bronze Age boat was found at Meadow Lake in Testwood, Hampshire, although only one piece, a cleat (used to fasten crossbeams to the hull), was recovered it drew similarities to the construction of the Dover Boat (Fitzpatrick *et al.*, 1996; and Van de Noort, 2006). Further evidence of Bronze Age maritime activity is represented by the Bronze Age cargo wrecks off the Devon coast (Needham *et al.*, 2013) and the Ferriby boats, specifically Ferriby 5, discovered in the Humber estuary (McGrail, 2001).

3.2.24 There are two Bronze Age finds recorded in the PAS database: metal working debris (SUSS-013803); and a Late Bronze Age cast copper-alloy chisel (SUSS-00F4D4).

Iron Age (c. 800BC to AD 43)

3.2.25 By the Iron Age, sea-level change no longer had a significant impact on the geomorphology of the coastline. Rather, coastal erosion became the key agent for that change.

3.2.26 Maritime trade networks were further developed in the Iron Age with increasing evidence of not only coastal and inland trading, but also cross channel trade as indicated by the appearance Gallo-Belgic pottery and wheel-thrown ceramics in the archaeological record of Sussex and Hampshire (Champion, 2011). Trade with northern Europe is also evidenced by the ceramics, with a wide range of regionally distinct forms as well as Roman amphora and Samian ware found in Late Iron Age contexts along the Sussex coast (Hamilton & Manley, 2010). Despite the evidence of Bronze Age plank-built vessels, there is currently no archaeological evidence of Iron Age plank-built sea-going vessels. However, the above trading networks have some important implications for the types of watercrafts in use at the time, and remains of such have potential to be present within the marine archaeology study area.

3.2.27 There is substantial evidence for the continued use of logboats within this period, with the best example being the c. 13m long, complex logboat excavated from Hasholme and dated to c. 300BC (McGrail, 2001). Whilst it remains possible that skin/hide boats were also still in use, the organic nature of these craft mean that there is currently no archaeological evidence of this (McGrail, 2001).

Roman (c. AD 43 to 410)

3.2.28 During the Romano-British period, there is clear evidence for seaborne and coastal activity in the Solent region and parts of the Sussex coast (James *et al.*, 2010). Several important sites were established in Sussex following the Roman

invasion in AD 43, including the provincial settlements at Chichester (including Fishbourne Roman Palace), Southampton and the late Roman shore fort at Portchester.

3.2.29 The Roman territory was restricted in area in Sussex through the natural barrier of the Weald (Allen *et al.*, 2013). Known sites, finds and burials from this period are commonly found both on the coastal plain and in the hills, indicating occupation along the coastal areas with immediate access to the sea.

3.2.30 A range of vessel types would have been in use during the Romano-British period to facilitate activity along the South Coast. Watercraft used for less archaeologically visible pursuits such as fishing would have also been present.

3.2.31 The remains of vessels from this period range from large ocean-going merchant vessels (St Peter Port 1) to estuarine and riverine craft (Blackfriars 1 and Barlands Farm) and vessels more suited for inland navigation (Zwammerdam). These vessels were heavily framed, robustly built and it is clear could potentially have withstood the rigours of regular open water navigation. Alongside these vessels there would likely also have been continued use of log and skin boats.

3.2.32 There are 11 finds dated as Roman recorded in the PAS database, including: ten coins, from between 1-250AD (SUSS-2FE9D5, SUSS-149ED3, SUSS-1ABA34, SUSS-FDFDF4, SUSS-DDA343, SUSS-DD8844, SUSS-E2E936, SUSS-E2E091, SUSS-E2CFE7, SUSS-E2CAA7); and one spherical lead alloy weight, thought to be a fishing weight (SUSS-FE5867).

Medieval (c. 410 to 1540)

3.2.33 After the fall of the Roman Empire, there appeared to be a decline in maritime activity and trade in the Early Medieval period. However, there was an apparent resurgence in mercantile trade within continental Europe from the late 6th century, and the 8th and 9th centuries saw the greatest economic growth since the Roman period (James *et al.*, 2010). Most of this trade relied on water transport and as a result there was an increased focus on building urban settlements along rivers and coastlines to facilitate this (Clarke, 1985).

3.2.34 As with the Romano-British period, an extensive range of vessel types must have been in use to facilitate this surge in mercantile trade with continental Europe and Ireland in the Early Medieval period. Viking longships, such as the Skuldelev 2, are known to have been built in Dublin and most probably operated in the waters of the North Sea and English Channel (Crumlin-Pedersen, 2010).

3.2.35 The later Medieval period vessels increased both in size and complexity. This is evidenced by the increasing number of ship types that are recorded in historical and archaeological sources. One of the best-preserved examples in Britain is the large clinker-built vessel found in Newport, Gwent, dating to the latter half of the 15th century and measuring some 35m in length. It is also possible that cogs, flat bottomed, sharp-ended, trading vessels that originated in southern Denmark and the Baltic during the 13th century (Ellmers, 1994; Crumlin-Pedersen, 2010), would have visited the Sussex region as these vessels were used extensively across northern Europe and were known to have been built and operated by English merchants and shipowners as well as the English Crown (Runyan, 1994). No archaeological examples of cogs exist in British waters, but several, well-

preserved examples come from the Netherlands (for example, Weski, 1999) and the Baltic (for example, Adams & Rönnby, 2002) indicating the potential of such vessels to survive from this period. Towards the end of the period, ship types such as carracks and hulks were also in use and are likely to have been at least comparable in size to the Newport Ship and possibly larger (see Crumlin-Pedersen, 2010).

3.2.36 In addition to the large vessels discussed above, a range of much smaller craft would have been more common and would have been used to carry local trade along the coast. Wrecks such as the slate wreck at Pwll Fanog in the Menai Straits, a clinker-built vessel no more than 15m in length (Gale & Fenwick, 1998), suggest the nature of such trade. Furthermore, myriad of small vessels would have been used for fishing, lightering, and inshore activities.

3.2.37 There are two Medieval sites located on the foreshore of the marine archaeology study area, the Middleton Deserted Medieval Village (MWS3380) and the site of Middleton Church (MWS8612).

3.2.38 From the Early Medieval to Medieval period there are 22 finds recorded in the PAS. The majority of these are various containers (13) ranging from pitchers and cast copper alloy cooking vessels to sherds (SUSS-B35767, SUSS-F70B43, SUSS-AEAF87, SUSS-B4B1E4, SUSS-AB6A67, SUSS-AACAF7, SUSS-AD8915, SUSS-FE7843, SUSS-D7B4E8, SUSS-D74ED5, SUSS-D5FAD1, SUSS-137F41, SUSS-5A97A2). Other finds include building and domestic pieces such as a fire cover (SUSS-152A21) and ridge tile (SUSS-AB8E64); personal items including a cast copper alloy pendent (SUSS-1B2298), beads (SUSS-F119B8), a buckle (SUSS-151786), a coin (SUSS-F0B522) and the guard of a knife (SUSS-FEA155); as well as a pin (SUSS-B49AD3), and mount (SUSS-575B91).

Post Medieval (c. 1540 to 1901)

3.2.39 In the Post Medieval period, there is a drastic increase in historical sources with documents relating to trade and warfare providing detailed records. As a result, known maritime losses also began to be recorded, although these were fairly sparse from the 14th to 17th centuries and progressively became more comprehensive in the 18th and 19th centuries (Gale & Fenwick, 1998).

3.2.40 The expansion of the royal fleet under Henry VIII between 1536 to 1547, which continued under Elizabeth I, was the single greatest naval expansion ever seen at that time. This new focus on naval prowess continued into the 19th century (Historic England, 2016).

3.2.41 The establishment of the East India Company in 1600, and general expansion of international maritime trade not only greatly increased the tonnage of the English merchant fleet, but the trade and maritime activity along the English coastline. With this increased shipping and naval activity and traffic came increased wrecking events within the marine archaeology study area.

3.2.42 The construction and composition of ships also underwent a transition, especially from the 19th century when the main propulsion moved from wood and sail to iron and steam. Examples of this evolution from sail to steam and the hybrid use of propulsion methods are further detailed below in the descriptions of the SS *Quail*

(built 1870), SS *Vesuvio* (built 1879), SS *Algiers* (built 1882) and SS *Alert* (built 1897).

3.2.43 From the Post Medieval period there are 24 finds in PAS record. There are 11 finds of ceramic vessels with many showing evidence of coloured glazes (SUSS-F257D8, SUSS-F22836, SUSS-F20981, SUSS-B6E9E6, SUSS-B6A097, SUSS-B3FFF6, SUSS-AB3F05, SUSS-AAF532, SUSS-AAB527, SUSS-133735, SUSS-AB5547). Personal items recorded include three fragments of shoes (SUSS-8B0334), two coins (SUSS-713B44, SUSS-3382E2), two decorated buckles (SUSS-152553, SUSS-151EE3), and a seal matrix (SUSS-E29A42). Equestrian finds include one cattle hide saddle (SUSS-8ACDF1), a copper alloy strap mount in the shape of an acorn (SUSS-5878C4) and rowel spur (SUSS-F1D416). The remaining items include wooden furniture pieces (SUSS-9100F6), an embossed applied seal from a wine bottle (SUSS-B45DD3), a strap fitting (SUSS-150E47) and a collection of tile fragments (SUSS-F14B76). There are 26 recorded losses known to represent Post Medieval wrecks within the marine archaeology study area.

Modern (c. 1901 to present)

3.2.44 The rapid pace of technological development in the beginning of the 20th century had a great impact on the broad pattern of maritime activity. Wartime innovations led to the increase in use of new types of vessels and technologies, and a transformation of a growing global shipping trade. Globalisation also expanded into the leisure industry, with a decrease in the use of ocean liners in favour of cruise ships and newly developed passenger aircraft in the mid-1900s, and planes becoming the primary method of intercontinental travel.

3.2.45 Deriving from the Modern period (1900-present) there are a total of 34 known wrecks of ships or boats within the marine archaeology study area (10 of which are listed by the UKHO as DEAD), with two more strongly suspected to be of this era but not confirmed. Vessels from this period range hugely in type, size, and use, though there is a bias towards vessels lost in the World Wars due to the sheer number of losses resulting from these conflicts. Additionally, there are 17 recorded aircraft losses and sites of aircraft components, further described below, all from the Modern period.

Unknown

3.2.46 There are two records ascribed unknown status in PAS database, including an unidentified cast lead object (KENT-C2C6D1) and two small droplets of gold (SUSS-778185).

3.2.47 There are 39 recorded losses of unknown dates within the marine archaeology study area.

Aviation remains

3.2.48 Aviation remains include aircraft, airships, other dirigibles deriving from crash sites as either coherent assemblages or scattered material. Remains located in the offshore environment are often the result of Second World War or passenger air

casualties, particularly during the peak of seaplane activity during the inter-war period.

3.2.49 Despite the low number of known aviation remains located on the seabed, the east Sussex coastline and the English Channel have been identified as a region with high levels of aviation activity with Second World War losses clustered along the southern and eastern margins of England. as further detailed in, Aircraft Crash Sites at Sea (Wessex Archaeology, 2008).

3.2.50 There are 17 recorded losses of aircraft and sites of aircraft components within the study area. All are associated with the Second World War. One record has associated known remains: WP275, a British Supermarine Attacker which crashed in 1956, see below. Parts of this aircraft were dredged up in 2005 but appeared to comprise of isolated remains rather than a coherent crash site, and no potential crash site was identified on the seabed in the vicinity. The location is outside Rampion 2 geophysical survey area and was included in the Rampion 1 baseline assessment but not further investigated.

3.2.51 Where remains associated with any aviation losses are found, they will be archaeologically significant and protected under the Protection of Military Remains Act 1986.

3.3 Known wrecks and their archaeological significance

Introduction

3.3.1 Known wrecks, listed in order of their UKHO number, described in the following sections are illustrated in **Figure 7.1**. The significance assessment matrix used for each wreck is based on the criteria for the assessment of archaeological significance, as set out by the Department for Culture Media and Sport (DCMS, 2013). There are 41 LIVE wrecks, 25 DEAD wrecks, four UNKNOWN or unconfirmed, and two LIFTED wrecks within the study area. Unless otherwise indicated the size of each wreck is presented as: length x width x depth.

3.3.2 The orientation and depth of wrecks listed has been taken from the most recent survey information listed by UKHO, where available. Alternatively, NRHE or wrecksite.eu were used. The prefix used for wrecks is the one relevant at their time of wrecking, and previous prefixes have been included where relevant. There may be discrepancies on depth, orientation and prefix between the datasets used (UKHO, NRHE, Wrecksite.eu).

3.3.3 There are an additional 28 recorded losses within the study area whose location within the dataset is recorded as a general area or named location. These recorded losses have been cross referenced with datasets of UKHO and NRHE records and represent unique records. However, any seabed features possibly correlating with the recorded losses have been identified as anomalies during the archaeological assessment of geophysical data and are further discussed in **Section 4: Geophysical assessments** and **Annex D: Geophysical anomalies of archaeological potential**.

SS *Algiers*

3.3.4 The wreck of the SS *Algiers* (UKHO 19935) is listed as LIVE by the UKHO. Built in 1882 by Wigham Richardson & Sons Ltd., of Newcastle-Upon-Tyne, this defensively armed merchant vessel was owned at the time of loss by Franco-British S. S. Co. of Cardiff. The vessel also previously bore the names SS *Castle Eden* and SS *Lys*. It had a gross tonnage of 2361 and measured 91.5 x 11.34 x 8.17m. It had a triple expansion steam engine and two single boilers but was also schooner rigged. On 26 February 1917, while travelling from Calais to Barry Roads, the SS *Algiers* was torpedoed without warning by German U-boat *UC-65* and sank with the loss of eight lives.

3.3.5 The wreck now lies in 37m of water across a site 112m long and 15m wide on an orientation of 120/300 degrees. It has a large scour of approximately 500m at both the north and south ends. The vessel still sits upright, but the southeast end, presumed to be the bow, is broken up. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

Baseline Archaeological Potential

3.3.6 The SS *Algiers* was built in what is sometimes called the era of the merchant schooner, when these vessels had established themselves as efficient and economical in all kinds of work. As such, numerous other examples of this type of vessel exists, and their types and activities well documented. The SS *Algiers* has some archaeological potential to add to this record based on its partial completeness.

Table 3-1 Archaeological significance: SS Algiers

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS *Alert*

3.3.7 The wreck of the SS *Alert* (UKHO 19945) is listed as DEAD by the UKHO. Built in 1897, it was a schooner-rigged steamer which was scuttled by a German U-boat in 1916. The wreck site was not covered by the geophysical data.

SS *Afon Dulais*

3.3.8 The SS *Afon Dulais* (UKHO 19947) is listed by UKHO as a LIVE wreck. It was built in 1919 by the Dundee Shipbuilding Co. Ltd. Of Dundee for Afon SS Co. Ltd. (with Coombs & Sons) and owned at the time of loss by Coombs W. & Sons of Llanelli. It measured 63.4 x 10.1 x 4m with a gross tonnage of 988, a triple expansion engine and one single boiler. On 20 June 1942, while travelling from Seaham to Poole with a cargo of coal, the SS *Afon Dulais* struck a mine and sank.

3.3.9 The wreck now lies in 26m of water on an orientation of 000/180 degrees. The site measures 73m long by 16.5m wide. It is quite broken up and partially buried. It correlates to the geophysical anomaly MA0030 (**Graphic 16.1.E-24**).

Baseline Archaeological Significance

3.3.10 As the wreck is quite broken up and buried, the archaeological significance is lower than other more intact and accessible sites; steam cargo ships from this era are common and better represented by examples elsewhere.

Table 3-2 Archaeological significance: SS Afon Dulais

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS *Lightfoot*

3.3.11 This wreck is listed as LIVE by the UKHO. A steel steam-powered cargo ship, the SS *Lightfoot* (UKHO 19948) was built in 1916 by John Crown & Sons Ltd. In Sunderland. The owner at the time of loss was Wandsworth & Putney Gas Light &

Coke Company, under whom the vessel operated as a collier. The SS *Lightfoot* measured 81.7 x 11.6m with a gross tonnage of 1875, one triple expansion engine and two boilers. On 16 March 1918, while travelling from London to Barry, the SS *Lightfoot* joined several other vessels as a victim of German U-boat *UB-30*. Though reportedly sinking within 3 minutes of being torpedoed, no lives were lost.

3.3.12 The SS *Lightfoot* now lies at a depth of 25m on an orientation of 128/308 degrees. The site measures 91m long and 14m wide. The wreck is heavily degraded, but with two boilers, the engine, and some sections of frame and hull plate still visible. It corresponds with geophysical anomaly MA0032 (**Graphic 16.1.E-25**).

Baseline Archaeological Significance

3.3.13 The SS *Lightfoot* forms part of a group of vessels sunk in January 1918 in the area by the *UB-30* (the others being the SS *Gartland*, SS *Glenarm Head*, SS *Whorlton*, and the SS *Jaffa*). Despite the condition of the wreck, the conditions of its loss form part of a narrative representative of the First World War, where U-boats often patrolled 'hunting grounds' and several losses in an area can be attributed to one enemy vessel, so based on this group value, it becomes of medium archaeological significance.

Table 3-3 Archaeological Significance: SS Lightfoot

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS *Vesuvio*

3.3.14 The wreck of the *Vesuvio* (UKHO 19952) is listed as LIVE by the UKHO. This iron steam and sail vessel was built in 1879 by Laing James & Sons Ltd in Sunderland and was originally named the SS *Czar*. It was purchased in 1898 by the Mossgiel Steamship Co. Ltd of Glasgow and renamed the SS *Vesuvio* but was then resold to the General Steam Navigation Company of London in 1901, who owned the vessel until its loss. The vessel measured 74.1 x 9.9 x 5.4m and had a compound expansion engine, two boilers, and a gross tonnage of 1,391. While on route from

Sicily to London the vessel hit a mine on 6 April 1916. Within 15 minutes the vessel had sunk with the loss of six crew.

3.3.15 The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

3.3.16 It is recorded to measure 30m long and 20m wide and lies in 37m water at 090/270 degrees, with a 40m scour. It is broken in three places and lies on its port side. Its 13pdr gun is still visible at the stern as of 1983.

Baseline Archaeological Significance

3.3.17 The SS *Vesuvio* shares similarities with the earlier SS *Quail* in that they are both northern-built, iron, dual-propulsion sail and steam ships. The SS *Vesuvio* was longer-lived, but its wreck is now in worse condition. As such, though still of archaeological potential, there are better preserved examples of this well-documented ship type available.

Table 3-4 Archaeological significance: SS Vesuvio

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS *Broadhurst*

3.3.18 The wreck of the SS *Broadhurst* has two reported locations, one listed as LIVE by the UKHO (UKHO 19959) and the second DEAD (UKHO 19951); this entry is for the LIVE wreck. Previously named the SS *Phylwood* the vessel was built in 1935 by Austin S. P. & Son Ltd. In Sunderland and was owned at the time of loss by Stephenson Clarke & Associated Companies Ltd. Of London, who renamed it the SS *Broadhurst*. It was a steel cargo vessel with a triple expansion engine, single boiler, and gross tonnage of 1,013. It measured 66.1 x 10.4 x 4m. On 26 July 1940, the SS *Broadhurst* was travelling in convoy but was attacked and sunk in the same incident as the SS *London Trader* with the loss of four crew.

3.3.19 The wreck now lies in 50.5m of water at 120/300 degrees. The site measures 37.8m long by 13.1m wide. As of 2014 the wreck is mostly buried. The wreck site corresponds with the geophysical anomaly MA0062 (**Graphic16.1. E-30**).

Baseline Archaeological Significance

3.3.20 Like the SS *London Trader*, the SS *Broadhurst* has some group value as part of a particular incident, but because it is mostly buried and its condition unknown, as well as being a common and otherwise well-documented ship type, its individual significance is slightly lower. Despite this, should the vessel be preserved in good condition under the sand, it does have the potential to add to the archaeological record.

Table 3-5 Archaeological significance: SS Broadhurst

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Unknown
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 19961

3.3.21 This wreck is listed as LIVE by the UKHO but does not have a confirmed identity. It lies in 57m of water, partially buried and broken in two, with the halves lying at roughly 90 degrees to each other and surround by a debris field. The bow and stern, although separated from each other are clearly defined and sit approximately 4m above the seabed, with an overall length of nearly 70m visible. It corresponds with geophysical anomaly MA0007 (**Graphic 16.1.E-3**).

Baseline Archaeological Significance

3.3.22 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Table 3-6 Archaeological significance: UKHO 19961

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19970

3.3.23 This wreck is LIVE. It lies in 50m of water and measures 60m long by 12m wide. It corresponds with geophysical anomaly MA0014 (**Graphic 16.1.E-10** MA0014). It is partially buried with some damage midships.

Baseline Archaeological Significance

3.3.24 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Table 3-7 Archaeological significance: UKHO 19970

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown

Criteria (DCMS 2013)	Archaeological significance
Potential	Medium
Overall	MEDIUM

SS *Gartland*

3.3.25 There are two locations listed for the SS *Gartland*, one LIVE (UKHO 19971) and one DEAD (UKHO 19980). This entry deals with the LIVE wreck. The SS *Gartland* was built in 1892 by Readhead John & Sons Ltd. Of South Shields and owned at the time of loss by Whimster & Co., of Glasgow. This vessel also bore the name SS *Trewidden* under a previous owner. The vessel measured 91 x 12.2 x 6.1m, had a triple expansion engine and two single boilers, and a gross tonnage of 2,613. It was employed during the war as a collier. On 3 January 1918, whilst *en route* from Newcastle to Gibraltar, the SS *Gartland* was torpedoed and sunk by German U-Boat *UB-30.* It is one of four sunk by this U-Boat within the ES Assessment Boundary.

3.3.26 The wreck now lies in 30m of water across a site 95.4m long and 30m wide on an orientation of 130/310 degrees. It is severely degraded, with debris scattered to the starboard side, but two boilers are still apparent amidships. It correlates with geophysical anomaly MA0033 (**Graphic 16.1.E-26** MA0033).

Baseline Archaeological Significance

3.3.27 The vessel itself is of a common type employed in a common role, and the remains are not coherent enough to be likely to contribute significantly to the archaeological record, but like the SS *Glenarm Head*, the SS *Jaffa*, and the SS *Lightfoot*, the SS *Gartland* forms part of a wider narrative of the First World War and U-boat activity.

Table 3-8 Archaeological significance: SS Gartland

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS London Trader

3.3.28 The wreck of the SS *London Trader* (UKHO 19972) is listed as LIVE by the UKHO. Built in 1934 by Hawthorn Leslie & Co. Ltd in Newcastle, it was owned at the time of loss by the Free Trade Wharf Co. of London. The vessel was made of steel with a triple expansion engine and two boilers and had a gross tonnage of 646. It measured 59.9 x 8.8 x 3.4m. On 26 July 1940, the SS *London Trader* was travelling in convoy to Shoreham-by-Sea when it was attacked by a German schnellboot-flottille consisting of *S-19, S-20*, and *S-27*. The SS *London Trader* was sunk alongside the SS *Broadhurst* and the SS *Lulonga*.

3.3.29 The wreck now lies in 58m of water on a 018/198-degree orientation. Intact, the site measures 69.4m long and 18.6m wide, with a 500m scour towards 045 degrees. The site corresponds with geophysical anomaly MA0012 (**Graphic 16.1.E-8** MA0012).

3.3.30 There is one record associated with the SS *London Trader* from within the marine study area that has been reported to the Receiver of Wreck: one porthole and one mug (101/02) (see **Annex C: Receiver of Wreck records** for full detail).

Baseline Archaeological Significance

3.3.31 The SS *London Trader* was built at a time when there was pressure to replace ships lost during the First World War; the design of vessels had not changed significantly from the preceding decades, and it is one of many lost in similar times and circumstances. It has some significance as part of a wider narrative of a particular enemy attack in which three ships were lost, and because it is quite intact, represents a good condition example of a common vessel type.

Table 3-9 Archaeological significance: SS London Trader

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SV *Marie Marguerite*

3.3.32 The UKHO lists this wreck (19973) as DEAD. It was a Norwegian schooner built in 1919 which previously bore the names SV *Martha Therese* and SV *Terneholmen.* It sunk in a collision. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 19975

3.3.33 UKHO 19975 is a LIVE wreck. It lies in 40m of water on its port side. It measures 60m long by 15m wide. There is a large coal mound amidships which appears to have spilled out of the hold. It has been dated to the Second World War from the degaussing wire coil which runs around the gunwale.

Baseline Archaeological Significance

3.3.34 As the identity of this wreck is unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

Table 3-10 Archaeological significance: UKHO 19975

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19979

3.3.35 This wreck is listed as DEAD. Originally reported in 1918 as two masts of a vessel sunk in 1917, nothing has been found at the site since. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

SS *War Helmet*

3.3.36 The SS *War Helmet* (UKHO 19984) is listed as LIVE by the UKHO. This War Lance class steel cargo ship was built by Asano Shipbuilding Company of Tsurumi, Japan, and owned at the time of loss by The Shipping Controller (Royal Mail) of London. It measured 135.6 x 17.7 x 12.2m, had two triple expansion engines, four boilers, and a gross tonnage of 8,184. Whilst travelling from London to Barry in ballast on 19 April 1918, the SS *War Helmet* was sunk by a torpedo from German U-Boat *UC-75.* All hands were saved.

3.3.37 The wreck now lies in 27m of water across a site measuring 141.5m long by 45m wide on an orientation of 000/180 degrees. It is fairly broken up. The four boilers are still in place towards the bow, and the two engines still prominent amidships. It corresponds with geophysical anomaly MA0029 (**Graphic 16.1.E-23** MA0029).

Baseline Archaeological Significance

3.3.38 The SS *War Helmet* is of a mass-produced design of which other examples are better preserved and better documented. Despite this and the dispersed condition of the wreck, it still represents a substantial amount of archaeological material.

Table 3-11 Archaeological significance: SS War Helmet

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Medium
Documentation	Medium
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

MFV Jenny

3.3.39 The wreck of the MFV *Jenny* (UKHO 19985) is listed as DEAD by the UKHO. This 16.2m long fishing trawler sank on 14 September 1979 after an on-board fire. Its position was reported at the time of sinking but has not been recorded since. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

SS *Cairndhu*

3.3.40 The wreck of the SS *Cairndhu* (UKHO 19987) is listed as LIVE by the UKHO. It was built in 1911 by Doxford W. & Sons of Sunderland, and was owned by Cairns, Young & Noble (Cairn Line) of Newcastle. A steel cargo vessel, it measured 112.8 x 15.5 x 7.5m and had a triple expansion engine and gross tonnage of 4,019. On 15 April 1917, the SS *Cairndhu* was travelling from South Shields to Gibraltar with a cargo of coal when it was torpedoed by German U-boat *UB-40.* The U-boat then surfaced and rammed one of the two lifeboats, killing 11 men.

3.3.41 The wreck now lies in 23m of water across a site measuring 120m long and 30m wide at 010/190 degrees. There is 15m of scour towards 005 degrees. In 1918, the masts were still visible above the water, so the wreck was dispersed. The site consists of a mass of debris in a general outline of hull; explosives were used to recover condenser copper and bronze bearings in the 1980s, which has further broken up the site. It corresponds with geophysical anomaly MA0022 (**Graphic 16.1.E-18** MA0022).

Baseline Archaeological Significance

3.3.42 The SS *Cairndhu* is not of an uncommon type of vessel, and while it served an important wartime role, as did many others, due to the condition of the wreck it is

certainly better served by other examples elsewhere. Despite this, it still remains a significant concentration of archaeological material.

Table 3-12 Archaeological significance: SS Cairndhu

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 19988

3.3.43 This wreck is LIVE and corresponds with geophysical anomaly MA0027 (**Graphic 16.1.E-22** MA0027). It is believed to comprise of British Mulberry Harbour bridge sections (Whales) and the dumb barges (Beetles) on which they were towed. It now lies in 27m of water in two halves, which lie at approximate right angles to each other.

Baseline Archaeological Significance

3.3.44 Mulberry Harbours were an important innovation and helped Allied forces to succeed during the Second World War: the pieces formed a portable harbour, allowing large quantities of vital equipment to be landed with speed during the Normandy invasions. They were used until major French ports could be captured and brought back into use. There are several other surviving examples which are both better preserved and more accessible, but this site is still of significant archaeological value, particularly when in context of the large Mulberry Harbour works.

Table 3-13 Archaeological significance: UKHO 19988

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	High
Documentation	Medium
Group Value	High
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	High
Overall	HIGH

UKHO 19990

3.3.45 This wreck is listed as DEAD. It was believed to be an early Admiralty destroyer. Last located in 1977, it was at the time mostly broken up. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 19991

3.3.46 This wreck is LIVE and corresponds with geophysical anomaly MA0015 (**Graphic 16.1.E-11** MA0015). It lies on its port side with the bow to the west-south-west in approximately 34m of water. It is broken amidships, with the mast lying horizontally across the wreck and engine still present. No cargo was found in the hold. A porthole was recovered from this wreck, but it did not offer any clues as to its identity.

Baseline Archaeological Significance

3.3.47 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Table 3-14 Archaeological significance: UKHO 19991

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19993

3.3.48 This wreck is LIVE and corresponds with geophysical anomaly (MA0024, **Graphic 16.1.E-19** MA0024). It lies in 24m of water across a site 55m long by 8m wide, on an orientation of 120/300 degrees. It is broken into two parts approximately 15m apart. The south-eastern part has two boilers at its north-western end, while the other half is a mass of debris. It has been suggested this wreck may possibly be in four parts, with the other two boilers of the same dimensions as those found here forming UKHO obstruction 19992 some 130m away to the northeast. However, this is not known for certain, and it seems like it may be too small a vessel to typically host four boilers. A case of Howitzer shells dated 1914 was recovered from this wreck, thought to have been cargo.

Baseline Archaeological Significance

3.3.49 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

Table 3-15 Archaeological significance: UKHO 19993

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19994

3.3.50 This wreck is listed as DEAD. Originally reported as a wreck, this was later revised to a rocky pinnacle in 1971. However, a 2018 survey presumes it to be a man-made object but with little defined form. It appears to have cables or lines attached. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 19996

3.3.51 The wreck of UKHO 19996 is LIVE and has been noted to be a freighter, identity unknown. The wreck is very broken up and dispersed across a site approximately 105m by 31m. It corresponds with geophysical anomaly MA0016 (**Graphic 16.1.E-12** MA0016).

Baseline Archaeological Significance

3.3.52 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Table 3-16 Archaeological significance: UKHO 19996

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Low
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

SS *Stanwold*

3.3.53 The SS *Stanwold* (UKHO 19998) is listed as LIVE by the UKHO. It was built in 1909 by Osbourne, Graham & Co. Ltd. Of Sunderland. It was owned at the time of loss by the Stanhope Steamship Company. A steel steamship, the SS *Stanwold* measured 64.2 x 10.1 x 5.7m and was fitted with a triple expansion engine and two boilers and had a gross tonnage of 1,019. The vessel also previously bore the names SS *Alfred Kreglinger*, SS *Pervyse*, and SS *Easingwold*. On 22 February 1941, the SS *Stanwold* was carrying a cargo of coal from Southend to Cowes in convoy when it reported steering problems. The last reported sighting was on 27 February 1941 when the vessel appeared to be listing heavily. No further communication was received; several bodies washed ashore some days later.

3.3.54 The wreck site now lies in 34m of water and measures 80m long and 40m wide at 040/220 degrees. It lies upside down but is largely intact, and piles of coal have been found on the seabed nearby. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

Baseline Archaeological Significance

3.3.55 The SS *Stanwold* is a reasonably well-documented vessel, even if the specifics of its loss are unknown. Due to the refit, it underwent in 1916, it is possible it may have some diversity in fittings that may be of archaeological interest, and as a largely intact wreck, it represents a good collection of archaeological material and example of vessels of its kind.

Table 3-17 Archaeological significance: SS Stanwold

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Medium
Potential	Medium
Overall	MEDIUM

SS Quail

3.3.56 The UKHO lists the wreck of the Irish vessel SS *Quail* (UKHO 20000) as LIVE. Built in Newcastle-Upon-Tyne by Palmer's Shipbuilding & Iron Co. Ltd in 1870, the owner at the time of loss was the Cork Steamship Co. Ltd of Cork. Powered by both sail and a 2-cylinder compound steam engine, this iron vessel measured 68.3 x 8.6 x 5.3m and had a gross tonnage of 924. On 27 August 1886, while travelling from Antwerp to Glasgow carrying a cargo including glassware and potted foods, the SS *Quail* collided in the fog with the French vessel SS *San Martin*.

3.3.57 The wreck was last extensively surveyed in 1986, at which point it was found to lying in 42m of water mostly intact. Numerous artefacts have been found from the vessel including deadeyes, a sounding lead and the bell, which allowed positive identification. It corresponds with geophysical anomaly MA0013 (**Graphic 16.1.E-9** MA0013); the anomaly measures 73m long by 11m wide.

3.3.58 Two records from within the marine study area associated with the SS *Quail* have been reported to the Receiver of Wreck (see Annex C for full detail). Each record (droit) can include multiple artefacts. These records consist of five bottles (A/3692) and 13 wine glasses (A/4102).

Baseline Archaeological Significance

3.3.59 In the second half of the 1800s, centres of shipbuilding industry had shifted north to where coal and iron was more accessible, and by the 1870s the compound steam engine was revolutionising long-haul ocean-going travel. Though not of a rare type, as a mostly intact iron-hulled vessel, built in the north of England and from the transitional period between sail and steam, the SS *Quail* represents a good example of its kind.

Table 3-18 Archaeological significance: SS Quail

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Medium
Diversity	Medium
Potential	Medium
Overall	MEDIUM

SS Pagenturm

3.3.60 The SS *Pagenturm* has two locations listed, one LIVE (20001) and one DEAD (UKHO 20050). This entry is for the LIVE wreck. The vessel was built in 1909 by Tecklenborg J. C. of Geestemünde, Germany, but was requisitioned at the time of loss by the Admiralty. It measured 122.3 x 15.8 x 8.5m, had a quadruple expansion engine and three boilers, and a gross tonnage of 5,000. Whilst travelling from Sheerness to Barry on 16 May 1917 with a cargo of military stores, the SS *Pagenturm* was torpedoed and sunk by German U-boat *UB-40* with the loss of four hands.

3.3.61 The wreck now lies in 23m of water, with a deep scour on the eastern side, on an orientation of 015/195 degrees. Three guns are visible on the deck aft and on port and starboard quarters. It has been positively identified as the SS *Pagenturm* by the recovery of a maker's plate. It corresponds with geophysical anomaly MA0009 (**Graphic 16.1.E-5** MA0009), which records a site of 90m long by 45m wide.

3.3.62 Four records from within the marine study area have been reported to the Receiver of Wreck associated with the SS *Pagenturm* (see Annex C for full detail). Each record (droit) can include multiple artifacts. These records are represented by one china plate (A/0008), one porthole (A/2925), one compass, one ships gimble clock (A/4305), one brass ship's builders plate inscribed 'SS 233, JoH. C. Techlenborg A-G, Shiffswerft und Machinenfabrik, Brememhaven, Geestmunde 1909' and one brass twin lever telegraph with pedestal (243/07).

Baseline Archaeological Significance

3.3.63 The SS *Pagenturm* is one of five of its class known to have been lost, but the only one in UK waters. It is not known to carry any extraordinary features or to be of note in any other way but does represent a substantial archaeological feature.

Table 3-19 Archaeological significance: SS Pagenturm

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20003

3.3.64 This wreck is listed as DEAD. Originally reported as a wreck in 1973, it was later suggested to be a dredging scour filled in by tidal action. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

MV *Gerlen*

3.3.65 The wreck of the MV *Gerlen* (UKHO 20005) is listed as LIVE by the UKHO. It was built in the 1950s by Schulte & Bruns of Emden, Germany, and was originally named the MV *Antonius*. Its name was change by its last owner, G. Gerdes of Haren, Germany. It measured 45.6 x 7 x 2.4m and was powered by a diesel engine. It was lost in a collision with the Cypriot vessel MV *Gotland* on 19 June 1972 while sailing from Par to Utersen.

3.3.66 The wreck lies in 48m of water and covers an area 32m long by 12m wide. It is largely intact but partially buried. It corresponds with geophysical anomaly MA0004 (**Graphic 16.1.E-1 MA0004**).

Baseline Archaeological Significance

3.3.67 As a modern vessel of no particular note, this vessel is not deemed to be archaeologically significant.

Table 3-20 Archaeological significance: MV Gerlen

Criteria (DCMS 2013)	Archaeological significance
Period	Low
Rarity	Low
Documentation	Low
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Low
Overall	LOW

SS *Jaffa*

3.3.68 The wreck of the SS *Jaffa* is listed as LIVE by the UKHO. This steel cargo vessel (UKHO 20010) was built in 1897 by Scott J. & Co. of Kinghorn and owned at the time of loss by the Ellerman Wilson Line Ltd. Of Hull. It measured 79.3 x 10.7 x 4.9m, had a triple expansion engine and two boilers, and a gross tonnage of 1,383. It was also defensively armed. On 2 February 1918, whilst *en route* from Boulogne-sur-Mer to Southampton, the SS *Jaffa* was torpedoed by German U-boat *UB-30* and sank with the loss of ten lives.

3.3.69 The wreck now lies in 23m of water across a site measuring 80m long by 16m wide on an angle of 015/195 degrees. It lies almost upside down and is broken into two main sections, lying 30m apart, with the aft section the larger part at 40m long and debris spread between the two halves. It correlates to geophysical anomaly MA0025 (**Graphic 16.1.E-20** MA0025).

Baseline Archaeological Significance

3.3.70 The SS *Jaffa* was one of four vessels within the study area sunk by *UB-30* in the first quarter of 1918 (the others being the SS *Lightfoot*, SS *Glenarm Head,* and the SS *Gartland*). Though the wreck itself is quite broken up, and so is not as useful as a representative of its kind, its group value alongside the other victims of the *UB-30* as part of the wider narrative of the First World War is significant.

Table 3-21 Archaeological significance: SS Jaffa

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS Glenarm Head

3.3.71 There are two possible wreck sites for the SS *Glenarm Head:* UKHO 20012 and UKHO 20169. Both are listed as LIVE by the UKHO and are within the ES Assessment Boundary.

3.3.72 The SS *Glenarm Head* was built in 1897 by Workman, Clark & Co. Ltd of Belfast and owned by the Ulster Steamship Company as part of their Head line, also of Belfast. It measured 109.7 x 14 x 6.1m, had a single triple expansion engine and a gross tonnage of 3,908. On 5 January 1918, it was travelling between Southampton and Boulogne with a cargo of ammunition when it was sunk by German U-boat *UB-30* (which also sunk the SS *Gartland*, the SS *Jaffa*, and the SS *Lightfoot* within the ES Assessment Boundary).

3.3.73 UKHO 20012 now lies at 36m and is noted to be a large wreck. The geophysical anomaly corresponding with this site (MA0008, **Graphic 16.1.E-4** MA0008) measures approximately 93m long and 19m wide, with some scour. The remains are coherent, with the bow lying to the southwest. Ammunition rounds, both boxed and expended, were found on site.

3.3.74 UKHO 20169, the second candidate for the *Glenarm Head*, now lies in 44m of water. The geophysical anomaly corresponding with this site (MA0011, **Graphic 16.1.E-7** MA0011) records a length of 60m and width of 17m but appears to be more broken up than UKHO 20012. It appears to be upright though partially buried and lies on 104/284 degrees.

Baseline Archaeological Significance

3.3.75 The *Glenarm Head* is one of many wartime merchant vessel losses in the area and of the era and does not in of itself warrant special interest. However, both potential sites of the *Glenarm Head* are substantial and broadly intact, and

therefore represent significant archaeological remains which main add to the archaeological record on the basis of their good condition. It also holds some significance as part of the narrative of an individual U-Boat hunting spree. Due to their similarity, the table below applies to both sites.

Table 3-22 Archaeological significance: SS Glenarm Head

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20013

3.3.76 This wreck is listed as DEAD. In 1979 it was reported to be a fairly broken up and well buried, lying on its port side, though with forecastle still mostly intact. It had chain steering and appeared to be broken in two. It has not been found in later surveys. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

HMS *Minion*

3.3.77 The wreck of the HMS *Minion* (UKHO 20014) is listed as LIVE by the UKHO. This Admiralty M class steam-powered destroyer was built in 1915 by Thornycroft & Co. Ltd in Hampshire and was owned by the Royal Navy at the time of loss. It measured 84 x 8 x 3m with a tonnage of 1,025. The vessel was sold for breaking in Germany but was lost while under tow to the breakers yard some time in 1921; the exact date has not been recorded.

3.3.78 The wreck was positively identified in 1992 by the recovery of the ship builder's plate. The vessel now lies in 46m of water, and the wreck site measures 92m by 14.5m and lies at 090/270 degrees. As of the 1980s, the vessel is broken amidships, and the stern almost buried by a sand wave. It corresponds with the geophysical anomaly MA0010 (**Graphic 16.1.E-6** MA0010).

3.3.79 There is one record associated with the HMS *Minion* from within the marine study area that has been reported to the Receiver of Wreck: two pressure gauges, one brass wheel and one electric fuse box (385/07) (see Annex C for full detail).

Baseline Archaeological Significance

3.3.80 The HMS *Minion* is one of 85 ships of its class that saw service during the First World War; most of those that survived their service were sold for breaking in 1921. Two other vessels from the HMS *Minion's* order were lost, the SS *Marmion* and the SS *Mary Rose*, but the status of these wrecks is unknown. Other later vessels of the class were lost at the key sites of the Battle of Jutland and Scapa Flow. As there are few examples of this class of vessel still in existence, the wreck the HMS *Minion* has a good level archaeological potential.

Table 3-23 Archaeological significance: HMS Minion

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Medium
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20020

3.3.81 This wreck is LIVE. It is the remains of a landing craft tank (LCT) lying in 20m of water on an orientation of 018/198 degrees. Though upright, the wheelhouse and stern structures have collapsed, as well as part of the hull near the bow. The tank ramp is in the open position. The date of the wreck is unknown, and it correlates with geophysical anomaly MA0026 (**Graphic 16.1.E-21** MA0026).

Baseline Archaeological Significance

3.3.82 Landing craft wrecks are uncommon when compared to other vessel types such as fishing trawlers or cargo ships, but as the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have. If future investigations confirm it as a Second World War landing craft sunk during conflict, then its potential would be more significant and move from medium to high.

Table 3-24 Archaeological significance: UKHO20020

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Medium
Documentation	Unknown
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Medium
Diversity	Unknown
Potential	High
Overall	MEDIUM

SS Ariel

3.3.83 The SS *Ariel* (UKHO 20023) is listed as a LIVE wreck by the UKHO. Built in 1885 by Earle's Shipbuilding & Engineering Co. Ltd. of Hull, it was owned by Edward Leetham, also of Hull. Made of steel, it measured 91.44 x 12.86 x 6.07m and was driven by a triple expansion engine. It has a gross tonnage of 2,220. On 10 June 1892, the SS *Ariel* was sailing from Varna to Hamburg with a cargo of wheat when it collided in foggy conditions with the SS *Lancashire* and sank.

3.3.84 The wreck now lies in 28m of water across as site 94.7m long by 18m wide on an orientation of 132/312 degrees. A 3m deep scour extends towards 140 degrees for 8m. Though it sits upright, it is heavily decayed, with only the base of the hull and some parts of the bow and stern visible alongside the single boiler and engine. The identity of this wreck was confirmed by the recovery of the ship's bell in 1981. It correlates with the geophysical anomaly MA0020 (**Graphic 16.1.E-16** MA0020).

Baseline Archaeological Significance

3.3.85 Steel-hulled, steam-powered vessels of the late 19th century, like the SS *Ariel*, provide a well-documented record of the development maritime steam engines. However, as this wreck is quite decayed, it is better represented in the archaeological record by other examples of its kind.

Table 3-25 Archaeological significance: SS Ariel

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20026

3.3.86 This wreck is listed as DEAD. Originally reported to be a small wooden wreck, partially buried, across a site measuring 10m wide and 10m long at a depth of 23m. It was identified in a 2018 survey as a rock outcrop. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

SS *Zaanstroom*

3.3.87 The wreck of the SS *Zaanstroom* is listed as LIVE by the UKHO. It was a Dutch vessel built by Huygens & Van Gelder in Amsterdam in 1895 and owned by Hollandsche Stoomboot Maatschappij (Holland Steamship Company), also of Amsterdam. It measured 65.1 x 9.8 x 5m, was made of steel with a wooden wheelhouse, and had a single boiler and gross tonnage of 899. On 21 December 1911, the SS *Zaanstroom* (UKHO 20028) was travelling from Fowey to Amsterdam with a cargo of china clay when it was caught in a storm and developed a leak near the tail shaft before sinking with the loss of one life.

3.3.88 The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

3.3.89 SS *Zaanstroom* is recorded as lying upright in 28m of water on a sandy seabed. The wreck site measures 30m long by 15m wide at 082/262 degrees. It is now severely degraded, with only the lower part of the hull present. The four cargo-handling cranes are still visible on either side of the holds, and some of the clay cargo remains in the hold. Regular surveys since 1975 have demonstrated this wreck has degraded substantially over the years.

Baseline Archaeological Significance

3.3.90 Though heavily degraded, the wreck of the SS *Zaanstroom* still represents a good concentration of archaeological material and a popular spot for sports divers. As a Dutch vessel, it may house different features to the British wrecks more commonly found in the area.

Table 3-26 Archaeological significance: SS Zaanstroom

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Medium
Diversity	Low
Potential	Medium
Overall	MEDIUM

HMT *Northcoates*

3.3.91 The wreck of the HMT *Northcoates (*UKHO 20036) is listed as LIVE by the UKHO. It was built in 1918 by Cox & Co. Engineering Company of Falmouth, and previously bore the names HMT *George Corton*, FV *Zencon*, and FV *Zircon.* Though originally built for and owned by the Royal Navy, it passed through several owners before it was requisitioned for use as a minesweeper in 1939 and once again came under Naval ownership. This steel steam-powered trawler measured 38 x 8 x 3.84m, had a single triple expansion engine, and a gross tonnage of 277. On 2 December 1939, the vessel suffered engine failure and was brought under tow but sank in heavy weather.

3.3.92 The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

3.3.93 HMT *Northcoates* is recorded as lying in 26m of water on an orientation of 122/302 degrees. The site measures 42m long by 8.5m wide. There is shallow scour to the bow and stern. It is upright but with a slight list to the port side. A 12pdr gun still stands prominently towards the bow, pointing off the starboard side. The A-frame for the minesweeping electro-magnetic coil is also still visible, as well as the single boiler and rudder at the stern.

Baseline Archaeological Significance

3.3.94 The HMT *Northcoates* is a good example of wartime minesweeper trawlers and archaeologically significant; most of its minesweeping equipment is still present, including diesel generators for creating the magnetic field and mounds of sweeping cables. It is unusual to have this level of preservation, especially for a vessel used in both the First World War and Second World War.

Table 3-27 Archaeological significance: HMT Northcoates

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	High
Group Value	High
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	HIGH

SS *St Anne*

3.3.95 The UKHO lists this wreck (20044) as DEAD. Lost when foundered *en route* from Tyne to Bordeux on 7 April 1924. Location is as reported at time of loss, it was not found when searched for. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

UKHO 20046

3.3.96 This wreck is listed as DEAD. Originally reported as two masts visible in 1917, it was last confirmed by survey in 1971 but has not been found since. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

SS *Ramsgarth*

3.3.97 The wreck of the SS *Ramsgarth* (UKHO 20049) is listed as LIVE by the UKHO. This steel cargo vessel was built in 1910 by Sir Raylton Dixon & Co. Ltd., of Middlesbrough. It was owned by the South Metropolitan Gas Company of London

at the time of loss. It measured 74.7 x 11 x 5.8m, had a triple expansion engine and two boilers, and a gross tonnage of 1,553. On 28 November 1916, the SS *Ramsgarth* was travelling from Cardiff and Brixham to Tune in ballast when it was captured and scuttled by German U-boat *UB-39.*

3.3.98 The wreck is reasonably intact, lying in 22m of water over a site 78m long by 26m wide on an orientation of 045/225 degrees. It is partially buried, lying on its starboard side, though some of the hull has collapsed. The two main boilers are still visible amidships alongside an auxiliary boiler and the triple expansion engine. It corresponds to geophysical anomaly MA0018 (**Graphic 16.1.E-14** MA0018).

Baseline Archaeological Significance

3.3.99 The SS *Ramsgarth* is another wartime merchant vessel loss, one of thousands during the First World War alone. As it is reasonably intact, it represents a better example of its kind than some others in the area such as the SS *Glenlee* and SS *Cairndhu.*

Table 3-28 Archaeological significance: SS Ramsgarth

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS *Glenlee*

3.3.100 The wreck of the SS *Glenlee* (UKHO 20055) is listed as LIVE by the UKHO. Built in 1918 by Charles Connell & Co. Ltd. of Scotstoun, it was owned by the Rio Cape Line of Glasgow. It measured 122.01 x 16.15 x 7.39m, was built of steel, and had a triple expansion engine and gross tonnage of 4,915. It was also defensively armed. On 9 August 1918, the SS *Glenlee* was voyaging from Dunkirk to Portland with a cargo of government stores when it was torpedoed by German U-boat *UB-57* and sank with the loss of one life.

3.3.101 The wreck now lies in 20m of water across a site measuring 122m long and 63m wide on an orientation of 095/275 degrees. It is well broken up, but the three main boilers are still arranged in a row with an auxiliary boiler to the west. It correlates to geophysical anomaly MA0036 (**Graphic 16.1.E-28** MA0036).

Baseline Archaeological Significance

3.3.102 Like many others in the area, the SS *Glenlee* is a wartime wreck involved in the vital transport of wartime goods, in this instance for the British Expeditionary Force. Its short life was well documented, but given the wreck is mostly flattened and broken, it does not hold as much significance as other examples of its kind.

Table 3-29 Archaeological significance: SS Glenlee

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20058

3.3.103 This wreck is listed as DEAD by the UKHO. Originally reported to be a 12.1m wooden hull of a vessel which sank on 12 August 1955 close to Worthing Pier, it has not been located on subsequent surveys. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 20064

3.3.104 This wreck is LIVE. It lies in 10.3m of water across a site 71m long by 13m wide on an orientation of 133/313 degrees. It is heavily degraded and broken up, but a single boiler and steam engine are still identifiable. Their positioning indicates the bow is to the southeast. Piles of iron ore were found to mark the positions of the cargo holds. A discovery of rigging deadeyes attached to the top plating on the port side in 2004 suggest it could have been a sailing vessel that was later

converted to a steam ship. This in turn suggests it may date to somewhere between the 1880s and the Second World War.

Baseline Archaeological Significance

3.3.105 As the identity and a more exact age for this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

Table 3-30 Archaeological significance: UKHO 20064

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20067

3.3.106 This wreck is LIVE. It lies in 21m of water and comprises of a site 12m long by 9m wide on an orientation of 018/198 degrees. In 1985 it was found to be the remains of a wooden sailing barge with a cargo of cast iron pipes with a badly degraded hull, and associated wine and beer bottles dating to approximately 1845. As of 2018, it was poorly defined, with debris on all sides.

Baseline Archaeological Significance

3.3.107 If the approximate date of 1845 is correct, it does raise the significance of this site based on age, but the lack of identity and poor condition of this wreck mean that it may otherwise be able to make only limited contributions to the archaeological record. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

Table 3-31 Archaeological significance: UKHO 20067

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Low
Fragility/Vulnerability	High
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

SS Shirala

3.3.108 The wreck of the SS *Shirala* (UKHO 20069) is listed as LIVE by the UKHO. The vessel was built in 1901 by Inglis A. & J. Ltd. of Glasgow and was owned by the British India Steam Navigation Co. Ltd. of London. Measuring 125 x 15 x 8.8m, the SS *Shirala* was built from steel and had a triple expansion engine, two boilers, and a gross tonnage of 5,306. On 2 July 1918, the vessel was travelling from London to Bombay with 213 passengers and 5,000 tons of cargo when it was torpedoed by German U-boat *UB-57* with the loss of 8 lives. Cargo included binoculars, telescopes, marmalade, wine, ivory, vehicle parts, and munitions, among other things.

3.3.109 The wreck now lies in 21m of water across a site measuring 138m long by 34m wide on an orientation of 165/345 degrees. Salvage operations in the 1970s appear to have moved the boilers (UKHO 20068) some 200m to the east and used explosives to open up the hull. The wreck is broken up, but the triple expansion engine and smaller auxiliary engine are still identifiable. There is debris strewn to both sides of the wreck. Numerous artefacts have been recovered from this wreck. The two boilers of UKHO 20069 correlate with the geophysical anomaly MA0037 (**Graphic 16.1.E-29** MA0037).

3.3.110 There is one record associated with the *Shirala* from within the marine study area that has been reported to the Receiver of Wreck: a trumpet (A/2343) (see **Annex C** for full detail).

Baseline Archaeological Significance

3.3.111 The wreck of the *Shirala* is of particular note due to its varied cargo: it has the potential to inform on many areas outside of the vessel itself including fashion, medicine, engineering, and day to day life. Finds are often in good condition, too:

intact paper rupee notes have been recovered, and are now housed in Littlehampton Museum. Due to this, the archaeological significance of the wreck of the *Shirala* is deemed to be high.

Table 3-32 Archaeological significance: Shirala

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	High
Potential	Medium
Overall	HIGH

HMT *Pine*

3.3.112 The wreck of the HMT *Pine* (UKHO 20091) is listed as LIVE by the UKHO. This steel trawler was built in 1940 by Hall, Russell & Co. Ltd., of Aberdeen, and was owned by the Royal Navy. It measured 46 x 8.3 x 3.2m, was powered by a reciprocating triple expansion engine, and had one boiler and a gross tonnage of 530. It was also armed with one 12pdr gun and two 5 inch 4-M L.G. guns. On 31 January 1944, the HMT *Pine* was torpedoed and sunk by German E-Boat *S-142* with the loss of ten crew.

3.3.113 The wreck now lies in 14m of water across a site measuring 38.2m long by 20.9m wide, at 090/270 degrees. It is very broken up and partially covered by sand, though part of one of the engines is still visible. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the proposed DCO Order Limits, and was not covered by the geophysical data.

Baseline Archaeological Significance

3.3.114 The HMT *Pine* is a tree-class trawler, of which five others sank during the Second World War. The tree-class vessels were near identical to the Isles-class trawlers, of which the tree-class is considered a subset. Both classes are better represented by other wrecks, such as the HMT *Chestnut* and the HMT *Ash* (both in the Thames Estuary) and the HMT *Colsay* (off Oostende).

Table 3-33 Archaeological significance: HMT Pine

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

SS Clan Macmillan

3.3.115 The wreck of the SS *Clan Macmillan* (UKHO 20168) is listed as LIVE by the UKHO. It was a steel steamship, built in 1901 by McMillan A. & Son Ltd of Dumbarton and owned at the time of loss by Clan Line Steamers Ltd. of London. The vessel measured 120.7 x 14.6 x 8.2m and had a triple expansion engine and a gross tonnage of 4,525. On 23 March 1917, while travelling from Chittagong to Clyde via London, the SS *Clan Macmillan* was sunk by two torpedoes from German U-boat *UB-39*. All crew survived.

3.3.116 The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

3.3.117 SS *Clan Macmillan* is recorded to measure 132.4m long by 28.9m wide and lies at 104/284 degrees in 63m of water. It was positively identified from the name still visible on the stern. The vessel remains upright but is broken in half, with the bow in the east.

Baseline Archaeological Significance

3.3.118 The SS *Clan Macmillan* was the second-built of four ships constructed by McMillan A. & Son for the Clan Line that were subsequently lost, and one of many lost by the line during the First and Second World Wars. As such, the vessel type and story are well represented and documented across both wartime eras, though the wreck itself still represents substantial archaeological remains.

Table 3-34 Archaeological significance: SS Clan Macmillan

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 20170

3.3.119 UKHO 20170 is a LIVE wreck. It lies at 60m and the site measures 98.4m long by 21m wide, on an orientation of 013/193 degrees. It is upright and mostly intact but has some damage towards the bow.

Baseline Archaeological Significance

3.3.120 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

Table 3-35 Archaeological significance: UKHO 20170

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown

Criteria (DCMS 2013)	Archaeological significance
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

NY-Eeasteyr

3.3.121 This wreck is listed as LIVE by the UKHO. This wooden vessel (UKHO 20186) measured 24.1 x 6.4 x 2.4m, with a gross tonnage of 61, and was built in Germany in 1970. Not much is known about this vessel, other than it sank on 12 August 1980 while travelling from Yarmouth to the Isle of Man. It now lies in 23m of water, and is mostly intact, with the stern shoved in. It correlates to the geophysical anomaly MA0017 (**Graphic 16.1.E-13** MA0017). The site measures 23m long by 6m wide.

Baseline Archaeological Significance

3.3.122 As a modern vessel without much documentation, this site does not hold much archaeological significance.

Table 3-36 Archaeological significance: NY-Eeasteyr

Criteria (DCMS 2013)	Archaeological significance
Period	Low
Rarity	Low
Documentation	Low
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Low
Overall	LOW

SS *Eden*

3.3.123 The UKHO lists this wreck (20227) as DEAD. The SS *Eden* was built in 1879 and torpedoed by a German U-boat in 1917. Location is as reported at time of loss, but it has not been traced in subsequent surveys. The recorded location of this wreck

site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

SS *Porthkerry*

3.3.124 There are two records for SS *Porthkerry* listed by the UKHO: one LIVE (UKHO 20238), one DEAD (UKHO 19978). This entry is for the LIVE listing, for which Wrecksite.eu agrees with the position. This steamship was built in 1911 by John Crown & Sons Ltd. Of Sunderland and was owned by Thomas & Stephens of Cardiff. It measured 85 x 12.2 x 5.5m and had a gross tonnage of 1920. On 20 May 1917 while travelling from Cardiff to Sheerness with a cargo of coal, the SS *Porthkerry* stopped to help the vessel SS *Tycho*, which has been torpedoed by German U-boat *UB-40*. While coming alongside the stricken vessel, the SS *Porthkerry* was also torpedoed, and both vessels were sunk with the loss of 22 men between them.

3.3.125 The wreck of the SS *Porthkerry* is reported to lie near that of the SS *Tycho* in 45m of water. It was last located in 1988, when the ships bell was recovered and offered positive identification of the vessel, but it was not spotted in a 2009 survey. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

Baseline Archaeological Significance

3.3.126 The SS *Porthkerry* is one of many ships that served in essential merchant roles during the First World War, and one of many that were torpedoed by German U-boats, so as an individual vessel does not have much to add to the archaeological record. However, the events surrounding its sinking and proximity to the wreck of the SS *Tycho*, should it ever be rediscovered, represent a good concentration of archaeological material. Due to the recovery of the ships bell, identification of the wreck at this position, rather than the secondary UKHO listing of a DEAD wreck, is confident.

Table 3-37 Archaeological significance: SS Porthkerry

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Low

Criteria (DCMS 2013)	Archaeological significance
Potential	Medium
Overall	MEDIUM

UKHO 20261

3.3.127 This wreck is listed as DEAD. It was originally reported in 1990 to be an outline of a wreck about 75m long and 23m wide, lying on a north-south alignment and partially buried. It has not been found in later surveys. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 58308

3.3.128 This wreck is listed as DEAD. Beyond initial reporting, there is no further information available. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 58365

3.3.129 This wreck is listed as DEAD. Originally reported as possible wreck, it was later found to be bottom contact. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data..

UKHO 58366

3.3.130 This wreck is listed as DEAD. Originally reported as possible wreck, it was later found to be a bottom contact. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 58393

3.3.131 This wreck is listed as DEAD. Originally reported as possible wreck, it has been identified as a steep sided shingle mound. The recorded location of this wreck site was within the geophysical survey extent; however, the wreck was not identified in the geophysical data.

UKHO 82762

3.3.132 UKHO 82762 is listed as of UKNOWN status by the UKHO but has been identified as geophysical anomaly MA0019 (**Graphic 16.1.E-15** MA0019). It is the wreck of a small vessel, possibly a fishing boat. It is 11m long by 4m wide, lying at 120/300 degrees. There is an A-frame near the stern and wheelhouse towards the bow. It had been previously listed as an obstruction.

Baseline Archaeological Significance

3.3.133 As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Table 3-38 Archaeological significance: UKHO 82762

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 85937

3.3.134 The UKHO lists the status of this site as UNKNOWN. It lies in just 0.63m of water, measures 12.3m long by 4.3m and is accompanied by a 5m scour towards 059 degrees. It is not clear what this feature is, but it is described in the UKHO data as having a strong magnetic return. The recorded location of the wreck site lies within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and was not covered by the geophysical data.

LIFTED wrecks

3.3.135 There are two wrecks listed as LIFTED by the UKHO within the ES Assessment Boundary: both are LCM (Landing Craft Mechanised - a tank that was used as a landing craft) UKHO 58349 and 20149. The recorded locations of these sites lie within the marine archaeology study area, but outside of the Proposed DCO Order Limits, and were not covered by the geophysical data.

Recorded Losses

3.3.136 There are 24 additional recorded losses within the boundary for which there are no corresponding UKHO records or seabed remains, and for which only a general position is given. These are listed in **Annex B: Recorded losses**.

Fishermen's fasteners

3.3.137 There are 20 records classed as fishermen's fasteners recorded by the NRHE. Records classed as fishermen's fasteners, or which otherwise remain unidentified and are not associated with vessel or structural remains (including records classified as DEAD by the UKHO). They are unidentified obstructions reported by fishermen, possibly indicative of a wreck or submerged feature. No other baseline information is available for any of these obstructions, while they may well represent archaeological remains, this is not possible to ascertain from the existing sources.

3.4 Receiver of Wreck records

3.4.1 Sixty-five records from within the marine archaeology study area have been reported to the Receiver of Wreck, see **Annex C** for full detail. Each record (droit) can include multiple artefacts. None of the wrecks associated with these records are protected under the Protection of Wrecks Act, 1973.

3.4.2 There are 41 finds which include timbers, bottles and brass fittings found within the marine archaeology study area, but which are not associated with a known wreck (see **Annex C** for further detail).

3.4.3 Receiver of Wreck records from within the marine archaeology study area but associated with known wrecks located outside the marine archaeology study area or where the wreck position is not known (**Section 3.3**) include:

- *City of Waterford* (1921), one brass casting, possible a flange (A/1267);
- *HMS Inverclyde* (1942), one brass shelf with holes in it, one small brass valve, one wheel and handle from a telegraph and one brass box lid (A/2711);
- *Candia*, one bottle with cork in the bottom and one brass object resembling a propeller blade (A/4098);
- *Ariston*, one 9in porthole (A/0996);
- *HMS Brazen*, one cannon (A/2341);
- 3 Mile Wreck, one three-way brass valve (A/1613);
- *Celtic*, one porthole (A/0506);
- *Indiana*, one compass bowl and one tureen lid (249/07) are associated*;*
- *Seaford Ferry*, one china plate and one brass plate inscribed 'engine room' (457/00);
- *SS Bessell*, two earthenware gin bottles, two 2oz medicine bottles, one complete toothpaste pot and two bases of toothpaste pots (310/17);
- *Thompson*, two portholes, two empty shell cases, one bell and one lead sounding weight (A/0157); and
- Unknown U-boat, one U-boat toilet (A/0398).

3.5 Historic seascapes characterisation

3.5.1 Historic Seascape Characterisation (HSC) has been used as a measure in this assessment to provide a contextual and regional approach to the marine archaeology study area. Historic seascapes cannot be destroyed or damaged but impacts to them can change their historical character and the perception surrounding them.

3.5.2 Changes to the character of the sea surface and the perception of the historic seascape as a direct result of the construction, operation, maintenance and decommissioning of Rampion 2 will result from the addition of new infrastructure such as foundations and turbines as well as ongoing activity from installation and maintenance vessels.

3.5.3 The historic character of a seascape can be defined by its dynamic nature and ability to accommodate change. Perceptions of the seascape are also dynamic and subjective to the public and time. The intertidal and marine zones are ever changing due to physical processes such as currents, tidal range and sediment mobility, as well as cultural influences. Considering this dynamism and the multiple dimensions defined by HSC, people create complex spatial relationships within and across all marine levels, reflected within the sites of cultural activity and their material imprints.

3.5.4 It should be noted that changes to the visible elements of the shore and the sea surface have been assessed further in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15) and therefore this section only considers the historic aspects of seascape characterisation.

3.5.5 The HSC assessment draws on National Historic Seascape Characterisation Consolidation (LUC, 2018), England's Historic Seascapes: HSC Method Consolidation (Cornwall Council, 2008); and England’s Historic Seascape: Demonstrating the Method (SeaZone Solutions Limited, 2009), along with the Historic England’s National Database (LUC, 2018).

3.5.6 The marine environment presents some characteristic differences in comparison with the land for historic character assessment. HSC considers the multi-dimensional aspects of the marine environment which is broken down by levels as detailed in Cornwall Council, 2008:

- sub-sea floor HSC: identifying the historic character beneath the sea floor;
- sea floor HSC: identifying the historic character within or directly on the sea floor;
- water column HSC: identifying the historic character across the vertical height of the water column;
- sea surface HSC: identifying the historic character of the surface of the water;
- coastal land HSC: identifying those areas of coastal land above Mean Low Water (MLW) which have a distinctly maritime historic character; and
- previous HSC (where information is available).

3.5.7 The sub-sea floor, sea floor and water column have been assessed for archaeological potential and significance in detail in this report, using a wide suite of geophysical datasets and historical resources.

3.5.8 This HSC uses the marine archaeology study area plus an additional 45km buffer to define the maximum extent of significant visual effect. The extent has been applied as recommended in the Visual Representation of Wind Farms: Guidance (Scottish Natural Heritage 2017) for turbines with a total height above 150m.

3.5.9 Further anthropogenic studies have the potential to contribute to our understanding of how people have used and perceived the landscape/seascape in a variety of dynamic ways in the past.

3.5.10 Historic Seascape Characterisation in nearby areas has been undertaken by SeaZone Solutions and Maritime Archaeology on behalf of English Heritage (SeaZone Solutions & Maritime Archaeology, 2011). The HSC: Hastings to Purbeck and Adjacent Waters includes Rampion 2 and extends to the UK Controlled Waters following the Median Line with French waters. A consolidated national database with regional data was completed on behalf of Historic England in 2018 (LUC, 2018). These have been used to inform the assessment below.

3.5.11 The HSC considers the added impact of Rampion 2 within the multiple dimensions of the marine environment (sub-sea floor, sea floor, water column, sea surface, coastal land and previous historic character) in combination with the existing activity within the Broad Historic Character Types as further detailed below.

3.5.12 Here impact is defined as any change to the HSC caused by Rampion 2; this may be ephemeral or sustained. Perception is defined as the public's awareness of the character types and how they interact with it, and change is defined as a sustained alteration to the perception of the HSC.

3.5.13 Potential changes to the HSC are expressed as a narrative description of the seascape character, how it is perceived by the public, and how those perceptions could be affected by the proposed Rampion 2 wind farm, the perception of which may or may not be considered important from an historic perspective.

3.5.14 The existing Rampion 2 marine archaeology study area is known for its marine and intertidal historic character utilised mainly for navigation, industry, fishing, ports and docks, coastal infrastructure, military, settlements and recreation.

3.5.15 The study identifies the area as holding the Broad Historic Character Types as summarised below.

Navigation

3.5.16 English waters have been used for navigation since prehistoric times and such activity contributes considerably to the character of the seascape. Even though craft themselves leave no permanent mark on the sea surface, watercraft have a diversity of associated features on and offshore and are responsible for the wrecks and related materials such as debris surviving on the seabed as further discussed in **Section 3**.

3.5.17 People perceiving the sea from land are unlikely to be aware of the scale of navigation and shipping activities that occur offshore but are often aware of the source of goods, income and employment it provides.

Navigation activities

3.5.18 Characterised by activities directly relating to the passage of shipping traffic, including navigation routes or ferry crossings, anchorages and buoyage. There is not always physical demarcation of these areas, and their definition may be largely by legal designation or custom and use. Navigation activities are seen in the sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.19 This area along the south coast and out towards the English Channel has historically been an area of much of England's navigation activities and as such has demonstrated its capacity to accommodate change and growth over time.

3.5.20 Examples of changes to the historic seascape throughout time can be the result of mobile sandbanks, prompting the need for abandoning navigational channels or active management to maintain navigation. Further change to navigational routes can be the need for port developments suitable for commercial shipping which need to maintain navigational accessibility. Historic wrecks can be used as an indication of previous navigation routes.

3.5.21 The current historical seascape perception of navigation activities as an area of high and continued use for shipping traffic is assessed not to change during the construction, operation and maintenance and decommissioning of Rampion 2. The impact of Rampion 2 will instead contribute to this existing perception of an area of high use of navigation activities. The impact on HSC of the development is therefore assessed as neutral.

Navigation hazards

3.5.22 Navigational hazards are an integral part of the cultural seascape character of many areas, expressed directly through their records on charts and highly visible maritime safety installations. They are also present culturally in the vast store of myths, legends, traditions and stories of the sea and its dangers that pertain to most coastal communities. The use of landmarks and navigation aids facilitated the development of surveying techniques and the drafting of maritime charts and coast profiles. Navigation hazards are seen in the sea floor, water column and sea surface levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.23 Navigation hazards include areas which contain serious risks to watercraft which may lead to their damage or loss, often in the form of wreck hazards or maritime debris, and rock outcrops.

3.5.24 Drying hazards (areas that become exposed at various states of the tide) and hazardous waters caused by submerged wrecks can be seen across the marine archaeology study area and beyond, with the south coast of England being one of the densest areas for shipwrecks in the United Kingdom.

3.5.25 However, as with buried heritage assets on land which may not be readily appreciated by a casual observer, but retain a presence in the landscape, submerged heritage such as wreck sites are not part of the popular seascape perception

3.5.26 The increased infrastructure built within the seascape as a result of Rampion 2 may contribute to safer navigation because of the lights affixed to the turbines. This new infrastructure will be referred to in new nautical and maritime charts, along with any newly identified wrecks or updated positions of known wrecks, which may contribute to increased awareness of potential navigation hazards.

3.5.27 The current historical seascape perception of navigation hazards as areas associated with potential navigational danger is assessed to positively change during the construction, operation and maintenance and decommissioning of Rampion 2 as the potential increase in publicly available data following geophysical surveys and any potential unexpected discoveries reported through the PAD may enhance the perception of local heritage and stories relating to wrecking events, more accurate locations of dangerous wrecks and obstructions, recreational diving and wrecks as habitats. Rampion 2 may therefore have a potentially beneficial impact on the historical seascape character through this increase in accurate mapping of potential hazards and increase in safety infrastructure associated with the wind farm construction and operation. The impact on HSC of the development is therefore assessed as positive. The current and potential future visual perception of the seascape is discussed further in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15).

Industry

3.5.28 Industry has been and continues to be the dominant influence on the character across coastal, intertidal and marine areas at all levels around the UK (**Figure 7.4**). There are many visible and unquantifiable reminders of England's rich and varied mining past along our coastline, both directly and in the infrastructure. The remains of these industrial processes on the present seascape can generate complex and mixed feelings in different regions and places. The current and potential future visual perception of the seascape is discussed further in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15).

Extractive industry

3.5.29 Marine aggregate deposits are sands and gravels of economic value found on the seabed after being deposited there through fluctuation in sea levels over the past two million years. Extractive mineral dredging from the seafloor is a prevalent example of industry in this area. Extractive industries are seen in the sub-sea floor, sea floor and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.30 Several aggregate dredging areas have been in use and continue to be active, including the Owers Bank, and Inner Owers licensed aggregate areas, about 10km south of Littlehampton. The cumulative effects of direct and indirect impacts of Rampion 2 and the other examples of offshore industry are discussed in **Section**

16.12 of **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

3.5.31 Marine aggregate deposits, such as sand and gravels are used primarily for building and construction, and much of the UK's aggregate resources are extracted from marine areas. The English Channel is one of two main areas identified for their potential within the UK.

3.5.32 The current historical seascape perception of the extractive industry through the established aggregate dredging enterprises in the area is assessed not to change during the construction, operation and maintenance and decommissioning of Rampion 2 as the cultural associations of industry in the area are unlikely to be altered or contributed to by Rampion 2. The impact on HSC of the development is therefore assessed as neutral.

The energy industry

3.5.33 The energy industry concerned with the extraction, processing and/or storage of hydrocarbons (oil, oil derivatives, and gas, but not coal) as well as installations relating to all forms of renewable energy generation, by wind, wave or tide, and power stations of all fuels, together with their associated transmission facilities and directly associated transport facilities. General policy trends show an expansion of renewable energy with an encouragement of wind power, especially in offshore locations where more consistent strong wind speeds are available. Energy industries are seen in the sub-sea floor, sea floor, sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.34 The Rampion 1 Offshore Wind Farm, operational since 2017, and the Perpetuus Tidal Energy Centre planned off the Isle of Wight are the closest examples contributing to the growing offshore renewable industry. Perceptions of renewable energy sources, such as wind farms, are generally more favourable than those of fossil fuels, with the increasing social and political emphasis on sustainable and renewable resources.

3.5.35 The perceptions associated with the energy industry tend to be varied and complex and sometimes polarised due to the essential need for sustainable energy production, and the scale of the high-profile and visually intrusive infrastructure needed to achieve this, which may be perceived as infringing on familiar landscape and seascape. The extension of the existing Rampion 1 wind farm is likely to contribute to this existing perception of energy industry in the area.

3.5.36 The current historical seascape perception of the energy industry as complex but ultimately positive regarding renewable sources is assessed not to change during the construction, operation and maintenance and decommissioning of Rampion 2 but rather contribute to this existing perception. The impact on HSC of the development is therefore assessed as neutral. The current and potential future visual perception of the seascape is discussed further in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15).

The processing industry

3.5.37 The processing industry relates to the production and manufacture of goods, and more indirectly to their consumption. Areas occupied by processing industries have evolved over time, often leaving traces of earlier technologies, either via material remains or as influences. Remains can include settlements formed around such industries and fields pre-dating the industrial complexes. Processing industries are seen in the sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.38 Lime production began in Britain in the Roman period, and kilns from this period can be found throughout England, but with a concentration in the south. Lime became a commonly used building material for medieval castles and churches and from the 16th century it was burnt and used for fertiliser. This use as a fertiliser led to an increase in kilns particularly in coastal areas where limestone and coal could be easily imported.

3.5.39 Sewage works, such as Brede Seage Works and Jury's Gap Sewage Works, are a common modern example of processing, essential to the infrastructure of a settlement, but often negatively perceived due to associations with pollution.

3.5.40 The condition of coastal processing industry varies considerably from almost total destruction to excellent preservation. Where modern processing plants become redundant, they are generally quickly cleared and re-presented as areas ripe for new development. Historic coastal remains from these industries are prime targets for public-awareness initiatives in the context of the coastal access requirements from the Marine and Coastal Access Act 2009.

3.5.41 The current historical seascape perception of the processing industry varies, for some representing work or future employment and others perceiving the material presence of the processing industry as unattractive or polluting. It is assessed here not to change during the construction, operation and maintenance and decommissioning of Rampion 2 as there is no direct impact associated. The impact on HSC of the development is therefore assessed as neutral.

The shipbuilding industry

3.5.42 The shipbuilding industry in England is widely expressed through its components such as docks; basins; wrecks; wharfs, quays, jetties and slipways; warehouses, offices, depots and travelling cranes; dockworkers' cottages; and specifically, associated transport systems (such as railways, roads, tramways). The shipbuilding industry is seen in the coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.43 Historically the development of new technologies in shipbuilding was driven by economic and political pressures. Today, the shipbuilding industry can be seen as an expanding global business and linked to expanding recreational and leisure activities such as cruises and sailing. Historically used and now inoperative shipyards are sometimes converted for modern use, like yacht building and clubs.

3.5.44 The current historical seascape perception of the shipbuilding industry as an important part of England's long maritime heritage is assessed not to change during the construction, operation and maintenance and decommissioning of

Rampion 2 as the activities associated with shipbuilding will not be impacted. The impact on HSC of the development is therefore assessed as neutral.

The shipping industry

3.5.45 There are many activities relating to the non-recreational use, maintenance, storage and administration of shipping in this area. The shipping industry is seen in the sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.46 Commercial shipping routes coming out of Shoreham and Newhaven Ports provide a link to international trade. Trade networks have existed along the south coast since at least the Bronze Age between Britain and continental Europe and modern commercial routes continue to have a substantial direct socio-economic impact as a trade facilitator across all sectors of the economy.

3.5.47 Major lanes of shipping traffic and high levels of commercial shipping activity are recorded across the area (**Figure 7.4**). Additional vessel traffic due to the construction and operation of Rampion 2 would occur in active commercial shipping routes.

3.5.48 The current historical seascape perception of the shipping industry as commercially significant as well as a mean for recreation is assessed not to change during the construction, operation and maintenance and decommissioning of Rampion 2 as one of the dominant character types in the UK and this region it has the capacity to accommodate the additional traffic as a result of Rampion 2. The impact on HSC of the development is therefore assessed as neutral.

Fishing

3.5.49 The thriving fishing industry of the Southern England region has been documented from the seventh century onwards. Early methods of fishing include net-fishing and shellfish collection. The livelihoods of fishing communities are intimately tied to the productivity of the seas, and there are deep cultural attachments associated with fishing. The fishing character types are seen in the sub-sea floor, sea floor, water column, sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.50 While some small towns and villages, such as Shoreham-by-Sea and Pevensey Bay, within the East and West Sussex regions are very proud of their long links with the fishing industry and so attract tourists and day trippers. Offshore fishing is remote from the coast and only visible on clear days, so it does not connect so directly with the local tourist economy.

3.5.51 There are several examples of fishing types occurring in this area, including crab, lobster and whelk potting, seine netting and scallop dredging. However, much of the fishing character is associated with historical perceptions of the seascape. Aquaculture, fish and shellfish farming is still deeply engrained in the perception and economy of some communities in the region. As such, it is valued for the distinctiveness it affords such areas and as an important element in their local economy.

3.5.52 The current historical seascape perception of fishing as a deeply ingrained and traditional economic role for many coastal communities is assessed not to change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as any restrictions to fishing areas during construction and maintenance will be temporary. The impact on HSC of the development is therefore assessed as neutral.

Ports and docks

3.5.53 Forming an interface between land and marine transport and distribution system, ports and docks relate to the navigation, industry and fishing character types. The ports and docks character type is seen in the coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.54 The Southern England region contains numerous examples of small hards (loading platforms built for landing create during the Second World War), quays and landing places and major ports including docks, ferry terminals and car terminals. Although many of the port locations may be inaccessible to the public, the harbours contain an amenity value which is linked to recreational and leisure activities such as sailing and wildlife watching.

3.5.55 In the Middle Ages, Seaford was one of the main ports serving southern England, but coastal sedimentation and raids lead to a decline in its use. The ports, docks and harbours in the Southern England region, such as Shoreham Harbour and Portsmouth International Port, show impact at national and international levels through their commercial trade links and transatlantic cruise businesses.

3.5.56 The current historical seascape perception of ports and docks as an important element in trade and recreation is assessed not to change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as these industries and their uses will continue without significant impact. The impact on HSC of the development is therefore assessed as neutral.

Coastal infrastructure

Flood and erosion defences

3.5.57 Sea and flood defences in the region are characteristic for protecting agricultural land and coastal settlements where the coastline has been receding for hundreds of years, and settlements surrounding those rivers which are prone to flooding. The coastal infrastructure character type is seen in the coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.58 Sea, flood and erosion defences are generally seen as essential for the preservation of settlements along the Southern England coast for protecting property by preventing erosion and providing flood protection which conserves the economic value and provides local residents with reassurance. Approaches vary from ‘hard’ defences, such as sea walls, which absorb or reflect wave energy, and ‘soft’, nature-based solutions (NBS) which encourage natural systems, such as beaches and salt marshes which protect the coast.

3.5.59 Regeneration and defence schemes from Chichester to Eastbourne have included flood defences from river overflow following storms, groynes, rock armour and beach regeneration to protect against both stormy weather and the perpetual erosion of the coastline. Sea walls, such as those in Newhaven, are constantly repaired and maintained throughout their active lifetimes, giving them historical depth. These coastal defences are discussed further in **Chapter 25**: **Historic environment, Volume 2** of the ES (Document Reference: 6.2.25).

3.5.60 The current historical seascape perception of coastal infrastructure as a continual element in sustaining the coastline and coastal developments is assessed not to change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as the development of the wind farm is unlikely to contribute to any flooding or erosion or impact any existing defences. The impact on HSC of the development is therefore assessed as neutral.

Communications

Transport

3.5.61 Coastally specific and maritime-related infrastructure such as canals, motorways, main roads, railways and airports which enabled people to settle in and visit coastal regions are covered by this broad character type. The transport character types are seen in the sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.62 Canals were an important element in the early industrial period as they allowed for low-cost transport of bulk and raw materials. There is one canal in the study area, the Chichester Ship Canal. It opened in 1823 and was totally abandoned in 1928. Canals are a lasting imprint on the present-day landscape of a 19th century period of prosperity and success. At the same time, they are an integral part of the present social and cultural landscape, with a range of current uses, including leisure.

3.5.63 The current historical seascape perception of transport as a link to and from coastal areas both for leisure and commerce is assessed not to change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as no impacts to historic or existing transport infrastructure have been identified. The impact on HSC of the development is therefore assessed as neutral.

Telecommunications

3.5.64 Telecommunications cables have evolved from first carrying written communications, to voice communications, and now to data communication. All modern cables use optical fibre technology to carry telephone traffic, internet and private data traffic. The telecommunication character types are seen in the sub-sea floor and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.65 Due to the character of submarine telecommunications cables, their presence in the marine environment is likely to be known only to those who were involved in laying them, and to people involved in communications infrastructure. Although

highly dependent on them, the wider public are likely to know little about their location. However, their importance on public and private life cannot be underestimated due to the impact they have made for millions of internet and phone users.

3.5.66 There are two active principal submarine cables routes through the region: CrossChannel Fibre from Brighton, United Kingdom to Veules-les-Roses, France and Circle South from Cayeux-sur-Mer, France to Pevensey Bay, United Kingdom.

3.5.67 The current historical seascape perception of telecommunications as a vital yet physically unnoticed element in modern life and communications is assessed not to change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as their presence is unlikely to enter the perception of those who use them. The impact on HSC of the development is therefore assessed as neutral.

Military

Military defence and fortification

3.5.68 Military coastal defences and military bases in the Southern England region can be found all along the coast, although there is a tendency to find them concentrated around the main ports. The military character type is seen in the sea floor, water column and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.69 In addition to the long-appreciated heritage value of most medieval and earlier fortifications, post-medieval military defences are increasingly being perceived as part of the overall historic legacy of the landscape as well.

3.5.70 There are several examples of sites remaining from the First and Second World Wars along the southern English coastline. Coastal sites within the study area include Second World War anti-tank traps, anti-aircraft batteries at Atherington and Climping and the Littlehampton coastal battery.

3.5.71 In English waters, there are military vessels (including aircraft) which are protected as war graves under the Protection of Military Remains Act 1986. The primary reason for designation as a 'war grave' is to preserve the site as the last resting place of UK servicemen (or other nationals). There are several recorded aircraft crash sites and a number or aircraft components recorded in the area further detailed in **Section 3.2: Maritime activity**.

3.5.72 The current historical seascape perception of military as an integral part of the formation of England’s cultural narrative and heritage across many generations is assessed to positively change during the construction, operation and maintenance and decommissioning of Rampion 2 as the identification of wartime losses of military vessels within the Rampion 2 survey data may impact public awareness and the perception of this area and its historic military role. The impact on HSC of the development is therefore assessed as positive.

Settlement

3.5.73 The coastal area of the Southern England region is densely populated. It includes a variety of coastal settlement types including urban settlements, major cities, tourist resorts and smaller fishing towns and villages. The settlement character type is seen in the coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.74 Coastal settlements are where most people in the coastal region live and base their visits. As such, they are where most people develop their coastal perceptions. Some see the larger port cities as places of economic growth that support many local jobs and provide local income, contrasting with 'more tranquil' smaller fishing villages and the coastal resorts as areas of entertainment and holiday destinations. Coastal settlements hold a differing range of functions and historical trajectories which contribute to their present form. They are defined by both their capacity to accommodate change but also their continuity.

3.5.75 Brighton is now a popular seaside resort, gaining popularity after King George IV spent time there and after the introduction of rail made it more accessible, but has evidence of settlements from the Bronze Age, Roman and Anglo-Saxon periods. Other smaller towns, such as Littlehampton and Bognor Regis have similar histories as fishing communities, settled in Roman and Anglo-Saxon times respectively, which then expanded as seaside resorts following the advent of rail and recreational travel.

3.5.76 The current historical seascape perception of settlements as dynamic and multifaceted character types encompassing everything from cultural to economic elements is assessed to positively change during the construction, operation and maintenance and decommissioning phases of Rampion 2 as the potential for impact to residential, commercial, and industrial functions during the construction of the Rampion 2 extension due to the increase in labour may lead to a positive impact to the local economy. The impact on HSC of the development is therefore assessed as positive.

Recreation

3.5.77 Recreational enjoyment of the coast has a long history in England with origins in the earliest expressions of the Romantic movement. The growth of industrial towns, the railway network and during the later 19th and early 20th centuries, the increase in public holidays and workers' purchasing power led to the rise and massive expansion of seaside resorts and their attendant accommodation and entertainment facilities along England's coastline. Later and current themes affecting the expression of 'recreation' include the post-war rise and later decline of the 'holiday park'. Post 1950s there was a decline of the seaside resort due easier access to international travel, various initiatives aimed at the regeneration of coastal resorts and market towns have now been introduced. The recreation character types are seen in the sea floor, water column, sea surface and coastal levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.78 Currently tourism is an important source of income and employment in the region. Visitors are often involved in recreational activities such as walking, sunbathing,

and golfing. The coastline attracts people in pursuit of open-air leisure activities, often centred around the scenery and maritime themes. Popular water sport activities involve sea bathing, sailing, surfing, diving, leisure fishing, angling, water, and jet-skiing. Wildlife watching is also a popular pastime in the region which has several Nature Reserves, such as the Pevensey Marshes and Gillham Woods.

3.5.79 The value of coastal recreation and water related activities has a number of positive outcomes, including health benefits, social inclusion and quality of life, environmental protection and economic benefits.

3.5.80 Much of the Southern England region's foreshore is accessible to the public with the intertidal zone valued for its numerous and varied recreational opportunities. Where unmanaged, this zone is often subject to relatively low levels of visitors who enjoy its quiet and solitude as a source of relaxation and inspiration.

3.5.81 Protected wreck sites such as the HMS *Holland V* and Pevensey Bay wreck site, as well as unprotected wrecks, are popular sites for recreational diving. Dive trails and virtual dive trails offer a way for the public to experience a greater understanding and connection to heritage while minimising the risk of disturbing them.

3.5.82 The current historical seascape perception of recreation as both socially and economically important to coastal regions is assessed to positively change during the construction, operation and maintenance and decommissioning of Rampion 2 as there is potential for improved public awareness of historic and recreational dive areas following the identification of wreck locations in during archaeological surveys. This may lead to a greater understanding, respect and enjoyment of the seascape. The impact on HSC of the development is therefore assessed as positive.

Cultural topography

Palaeolandscape component

3.5.83 Palaeolandscapes are areas of former human habitat with evidence for past topographical and ecological regimes, shaping much earlier human cultural activity and landscape perceptions. The palaeolandscape character type is seen in the sub-sea floor and sea floor levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

1.1.1 Palaeochannels identified through previous research, including the survey work for Rampion 1 (**Figure 7.5**), show evidence for the network of prehistoric landscapes and their changes over time. Submerged prehistoric landscapes often escape public perception because of their inaccessibility to many. However; increase in our understanding of where they are and the evidence for former habitats which they contain may lead to a greater appreciation of their importance.

3.5.84 The potential for survival of palaeolandscape components and submerged archaeology in the marine topography and deposits in the study area is further discussed in **Section 3.1: Environmental context**, the cultural topography landward is discussed in detail in **Chapter 25: Historic environment, Volume 2** of the ES (Document Reference: 6.2.25).

3.5.85 The current historical seascape perception of palaeolandscapes as a relict connection to an ancient past and heritage is assessed to positively change during the construction, operation and maintenance and decommissioning of Rampion 2 through an increase in research and awareness following archaeological surveys. The impact on HSC of the development is therefore assessed as positive.

Peat deposits

3.5.86 Peat deposits are comprised of unconsolidated semi-carbonised plant remains formed in freshwater-saturated environments formed in earlier periods and often exposed by erosion on the land, inter-tidal or seafloor surface, or found buried under later deposits. Because of the potential for preservation of organic remains and cultural artefacts within peat, it can provide important understanding of past environmental conditions and cultural historic landscape perceptions. Peat has been seen in seventeen locations across the marine archaeology study area, identified during benthic surveys and discussed further in **Chapter 9: Benthic, subtidal and intertidal ecology, Volume 2** of the ES (Document Reference: 6.2.9). The peat deposit character type is seen in the sub-sea floor and sea floor levels of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.87 It is unlikely that the perception of peat deposits will be impacted by Rampion 2. However; there is potential for increase in understanding of their presence in the area and further contribution to public knowledge and awareness following archaeological surveys.

3.5.88 The current historical seascape perception of peat deposits as a relict connection to an ancient past and heritage is assessed to positively change during the construction, operation and maintenance and decommissioning of Rampion 2 through an increase in research and awareness following archaeological surveys. The impact on HSC of the development is therefore assessed as positive.

Woodland

3.5.89 Coastal woodlands were often important in providing timber and other materials for boat building and other coastally focused activities. Patterns of woodland also form distinctive elements of the coastal landscape visible from the sea, aiding position-finding from ships. The woodland character type is seen in the coastal level of the seascape as defined in the multi-dimensional aspects of the marine environment.

3.5.90 Those patterns are culturally defined and combine with variation in topography and other cultural features and aspects to give a sense of place and position to mariners and coastal users alike.

3.5.91 Plantations, areas deliberately planted for domestic and industrial use, are found at the edge of settlements such as Littlehampton and Middleton, while Goring by Sea has both ancient woodland and plantations.

3.5.92 The current historical seascape perception of woodland as a distinctive coastal element with both commercial and recreational uses is assessed not to change during the construction, operation and maintenance and decommissioning of Rampion 2 as the wind farm infrastructure will be predominantly offshore and not a

site from which to view the coast. The impact on HSC of the development is therefore assessed as neutral.

Summary

3.5.93 The value and perception of the above Broad Historic Character Types include the increased attention of the wider general public of modern aquaculture and the benefits and disadvantages of renewable energy, sub-sea communication cables and marine global trading. People's perception of the sea and its value also include the biodiversity, the archaeological potential, the fishing and transport heritage, and the recreational and socio-economic qualities.

3.5.94 Within the sub-sea floor and sea floor character types include navigation, industry, fishing, communications, military, recreation and cultural topography. Activities on the sea floor and sub-sea floor are dominated by communications, fishing and cultural topography. The sub-sea floor and sea floor are less likely to enter the perceptions of the public due to their remoteness and inaccessibility compared with other dimensions. The perception of use within these levels is often peripheral rather than from participation. The perception of cultural topography and recreation may undergo a positive change with the increase in understanding and awareness of palaeolandscapes, peat deposits as well as artefacts and wrecks identified in the geophysical and geotechnical surveys undertaken for Rampion 2. The impact on identified heritage receptors is discussed in **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.1.16).

3.5.95 Within the water column and sea surface, character types include navigation, industry, fishing, communications, military and recreation. Activities on the sea surface and the water column are dominated by modern and current navigational routes in combination with historic shipping routes. The sea surface also comprises offshore infrastructure such as renewables, gas, oil, navigational markers and ocean survey equipment. The perception of the water column and sea surface in relation to navigation and industry is likely to be impacted by Rampion 2 following construction due to the presence of navigational aids and the visual impact of the turbines. This is discussed further in **Volume 2, Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15).

3.5.96 Within the coastal and conflated level, character types include navigation, industry, fishing, ports and docks, coastal infrastructure, communications, military, settlement, recreation and woodland. Activities on the coast are varied and are the most easily perceived. The perception of character types within the coastal and conflated level is not assessed to change following the development of Rampion 2. This is discussed further in **Chapter 15: Seascape, landscape and visual impact assessment, Volume 2** of the ES (Document Reference: 6.2.15).

3.5.97 Considering the perception of the above outlined Broad Historic Character Types (as well as the dynamic nature of people's perception of the sea and its value), no significant change in the multiple characters and dimensions of the marine environment as a result of Rampion 2 in isolation or cumulatively with neighbouring developments is identified. Rather, Rampion 2 will contribute to the existing perceptions of the seascape and use of the marine environment.

3.5.98 It has been established that HSC is value-neutral and was developed to be a positive force in informing change as well as recognising that landscape and seascape are both a product of that inevitable change. Developments should therefore respect and retain cultural distinctiveness and legibility wherever possible (Cornwall Council, 2008).

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4. Geophysical assessments

4.1.1 The archaeological assessment of geophysical data is presented below and summarised in Table 4-1. The archaeological potential of the anomalies was determined following the criteria as stated in **Table 2-2**.

4.1.2 All anomalies could represent archaeological materials and will continue to be a key factor in all future planning for this project. The location of the anomalies identified in geophysical assessments will be considered for future surveys and seabed impacts.

Table 4-1 Summary of archaeological anomalies within the marine archaeology study area seen in the geophysical data

Archaeological potential	No. anomalies
High	30
Medium	22
Low	210
Magnetic anomalies of low potential	1,993

4.2 Anomalies of archaeological potential

High potential anomalies

4.2.1 Thirty anomalies have been assessed as high archaeological potential as summarised below and detailed in **Annex D and E**. Of these, 28 correlate with records for known wreck positions (see **Section 3.3** and **Figure 7.3**).

- **MA0004** The semi-coherent bow of a vessel, partially buried, measuring 31m in length and 6.5m in width (SSS MA2014, MBES MA4012) with a magnetic return of 1,760nT (MAG MA6868). This is potentially the wreck of the MV *Gerlen*, sunk on 19 July 1972 (UKHO ID 20005). (**Graphic 16.1.E-1 MA0004**).
- **MA0005** The semi-coherent, partially buried outline of a hull measuring approximately 22m in length and 9m in width with a magnetic return of 17nT (SSS MA2017, MBES MA4013, MAG MA5093). (**Graphic 16.1.E-2** MA0005).
- **MA0007** (SSS MA2028, MBES MA4014) The coherent outline of the bow of a vessel and associated debris to the southwest, covering an area of approximately 60 x 40m with a magnetic return of 3,344nT (MAG MA7123).

The identity of the remains of this vessel are unknown (UKHO ID 19961). (**Graphic 16.1.E-3** MA0007).

- **MA0008** (SSS MA2029, MBES MA4015) The coherent remains of a vessel and its super-structure, measuring approximately 93m in length and 19m width and with a magnetic return of 1,007nT (MAG MA 6738). The shadow suggests a height of 8m above the seabed, with some scour. This is potentially the wreck of the Northern Irish cargo vessel SS *Glenarm Head*, sunk on 4 January 1918 (UKHO ID 19926/20012). (**Graphic 16.1.E-4** MA0008).
- **MA0009** (SSS MA2031, MBES MA4016) The coherent remains of a wreck and associated debris over an area of 90m x 45m with a magnetic return of 4,766nT (MAG MA6784). This correlates with the wreck of the English cargo vessel SS *Pagenturm*, sunk on 16 May 1917 (UKHO ID 20001). (**Graphic 16.1.E-5** MA0009).
- **MA0010** (SSS MA2033, MBES MA4017) The cylindrical, partially buried remains of a wreck, measuring approximately 77m in length and 7m width with a magnetic return of 1,237nT (MAG MA6705). This record correlates with the British destroyer HMS *Minion*, sunk on 1 January 1921 (UKHO ID 20014). (**Graphic 16.1.E-6** MA0010).
- **MA0011** (SSS MA2036, MBES MA4018) The semi-coherent outline of a vessel measuring 60m in length and 17m width with an extended shadow suggesting it sits approximately 7m above the seabed with a magnetic return of 691nT (MAG MA6830). This is the other possible site for the remains of the Northern Irish cargo vessel SS *Glenarm Head* (UKHO ID 20169). (**Graphic 16.1.E-7** MA0011).
- **MA0012** (SSS MA2041, MBES MA4031) The semi-coherent remains of a partially buried cylindrical anomaly, potentially a wreck, measuring approximately 61m in length and 14m width, associated with two hard reflectors ca 100m to the north northeast and a magnetic return of 2,435nT (MAG MA7043). This is potentially the site of the wreck of the cargo vessel SS *London Trader*, sunk on 26 July 1940 (UKHO ID 19972). (**Graphic 16.1.E-8** MA0012).
- **MA0013** (SSS MA2042, MBES MA4019) The coherent remains of a vessel measuring approximately 73m in length and 11m in width, with an extended shadow which suggests the wreck sits approximately 7m above the seabed and much of the super-structure remains. There is a magnetic return of 1,375nT (MAG MA7268). This correlates with the record of the cargo vessel SS *Quail*, sunk on 27 August 1886 (UKHO ID 20000). (**Graphic 16.1.E-9** MA0013).
- **MA0014** (SSS MA2044, MBES MA4020) The semi-coherent remains of a cylindrical anomaly, measuring approximately 60m in length and 7m width, partially buried with an extended shadow which suggest a height of 8m above the seabed with a magnetic return of 637nT (MAG MA6876) (UKHO ID 19970, an unknown vessel). (**Graphic 16.1.E-10** MA0014).
- **MA0015** (SSS MA2045, MBES MA4021) The semi-coherent outline of a vessel, measuring approximately 76m in length and 7m width, with associated scour and a magnetic return of 909nT (MAG MA6724). This correlates with the

remains of a cargo vessel (UKHO ID 19991). (**Graphic 16.1.E-11** MA0015).

- **MA0016** (SSS MA2047, MBES MA4022) A spread of debris over an area of 105m x 30m with an extended shadow which suggests a height of 7.3m above the seabed with a magnetic return of 7720nT (MAG MA6693). This correlates with the remains of a freighter (UKHO ID 19996). (**Graphic 16.1.E-12** MA0016).
- **MA0017** (SSS MA2053, MBES MA4025) A long ovate feature, measuring approximately 23m in length and 6m width, partially buried, with an elongated shadow that suggest a height of 2m above the seabed. This correlates with the fishing vessel *Ny-Eeasteyr*, sunk on 8 December 1980 (UKHO ID 20186). (**Graphic 16.1.E-13** MA0017).
- **MA0018** (SSS MA2055, MBES MA4001) The semi-coherent partially buried remains of a vessel with associated debris measuring approximately 77m in length and 16m width with a magnetic return of 1,198nT (MAG MA5011). This correlates with the wreck of the English cargo vessel SS *Ramsgarth*, sunk on 28 November 1916 (UKHO ID 20049). (**Graphic 16.1.E-14** MA0018).
- **MA0019** (SSS MA2057) An ovate feature with an extended shadow suggesting a height of approximately 3m above the seabed and some scour. Corresponds to site of possible fishing vessel (UKHO ID 82762). (**Graphic 16.1.E-15** MA0019).
- **MA0020** (SSS MA2060, MBES MA4026) The coherent remains of a partially buried vessel measuring approximately 70m in length and 14m width, with extended shadows suggesting the presence of super-structure with a magnetic return of 2,311nT (MAG MA6277). This correlates with the cargo vessel SS *Ariel*, sunk on 10 June 1892 (UKHO ID 20023). (**Graphic 16.1.E-16** MA0020).
- **MA0021** (SSS MA2062, MBES MA4027) A buried linear anomaly measuring approximately 28m in length with a shadow suggesting a height of 2m above the seabed. (**Graphic 16.1.E-17** MA0021).
- **MA0022** (SSS MA2065, MBES MA4003) The semi-coherent buried remains of a vessel measuring approximately 102m in length and 32m width, with extended shadows from the centre of the vessel suggesting the remains of super-structure, potentially the boilers, and other associated debris with a magnetic return of 7,729nT (MAG MA5029). This correlates with the wreck of the English cargo vessel SS *Cairndhu*, sunk on 15 April 1917 (UKHO ID 19987). (**Graphic 16.1.E-18** MA0022).
- **MA0024** (SSS MA2067, MBES MA4004) The broken remains of a vessel over an area approximately 60 x 8m, with extended shadow suggesting a height of approximately 4m above the seabed with a magnetic return of 1,022nT (MAG MA5028). Probable association with MA0023 (MA2066). This correlates with the wreck of an unidentified steam vessel UKHO 19993. (**Graphic 16.1.E-19** MA0024).
- **MA0025** (SSS MA2068, MBES MA4005) The semi-coherent remains of a partially buried vessel measuring approximately 74m in length and 20m width,

with an extended shadow suggesting debris and super-structure with a height of 5m above the seabed with a magnetic return of 6,783nT (MAG MA6275). This correlates with the English cargo vessel SS *Jaffa*, sunk on 2 February 1918 (UKHO ID 20010). (**Graphic 16.1.E-20** MA0025).

- **MA0026** (SSS MA2073, MBES MA4006) The semi-coherent remains of a partially buried vessel measuring approximately 55m in length and 10m width, with an extended shadow suggesting debris and super-structure with a height of 3m above the seabed with a magnetic return of 5,079nT (MAG MA6203). This correlates with the remains of a tank landing craft (UKHO ID 20020). (**Graphic 16.1.E-21** MA0026).
- **MA0027** (SSS MA2080, MBES MA4007) Three sets of parallel linear hard reflectors with associated shadows suggesting a height of approximately 2.5m above the seabed, and a partially buried ladder-like anomaly, contained within an area of approximately 55 x 50m with a magnetic return of 728nT (MAG MA6265). This correlates with a wreck believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges on which they were towed (UKHO ID 19988). (**Graphic 16.1.E-22** MA0027).
- **MA0029** (SSS MA2088, MBES MA4008) The scattered debris of a wreck over an area of approximately 90 x 20m with a magnetic return of 439nT (MAG MA6243). This correlates with the English armed cargo vessel SS *War Helmet*, sunk on 19 April 1918 (UKHO ID 19984). (**Graphic 16.1.E-23** MA0029).
- **MA0030** (SSS MA2093, MBES MA4029) A cluster of features concentrated within an area measuring 60 x 15m with a magnetic return of 2,072nT (MAG MA6489). This correlates with the wreck of the Welsh cargo vessel SS *Afon Dulais,* sunk on 20 June 1942 (UKHO ID 19947). (**Graphic 16.1.E-24**).
- **MA0032** (SSS MA2095) The scattered debris of a wreck over an area of approximately 91 x 14m. This is potentially the wreck of the British cargo vessel SS *Lightfoot*, sunk on 16 March 1918 (UKHO ID 19948). It is located outside of the Proposed DCO Order Limits, but within the ASA. This anomaly was only identified in a single line of SSS data while the survey ship was turning and is ca 1.5km away from the Proposed DCO Order Limits, but within the marine archaeology study area. (**Graphic 16.1.E-25**).
- **MA0033** (SSS MA2097, MBES MA4009) The semi-coherent partially buried remains of a wreck measuring approximately 83m in length and 15m width, with extended shadow suggesting the remains of super-structure including two boilers with a magnetic return of 6,401nT (MAG MA6325). This correlates with the Scottish cargo vessel SS *Gartland*, sunk on 3 January 1918 (UKHO ID 19971). (**Graphic 16.1.E-26** MA0033).
- **MA0034** (SSS MA2112, MBES MA4023) Ovate anomaly with extended shadow, measuring approximately 14.5m in length and 7m width, sitting 3m above the seabed with a magnetic return of 538nT (MAG MA5889). This is potentially the wreck of a vessel carrying a cargo of metal bars (UKHO ID 20075). (**Graphic 16.1.E-27** MA0034).
- **MA0036** (SSS MA2121, MBES MA4000) Coherent remains of a steel plated cargo ship approximately 120m in length and 30m width. Super-structure including three boilers remains with a magnetic return of 3951nT (MAG

MA5994). This is potentially the wreck of the English cargo vessel SS *Glenlee*, torpedoed and sunk in 1918 (UKHO ID 20055). (**Graphic 16.1.E-28** MA0036).

- **MA0037** (SSS MA2129, MBES MA4024) Pair of 'L' shaped anomalies with extended shadows suggesting a height of approximately 4m above the seabed with a magnetic return of 823nT (MAG MA5931). These are likely to be boilers (UKHO ID 20068) from the wreck of the Scottish cargo vessel SS *Shirala*, sunk on 2 July 1918 (UKHO ID 20069). (**Graphic 16.1.E-29** MA0037).
- **MA0062** (SSS MA2034, MBES MA4041) Buried hard reflector measuring approximately 47m in length with a magnetic return of 1751nT (MAG MA5097). This is likely to be the wreck of the British cargo vessel SS *Broadhurst*, sunk on 26 July 1940 (UKHO ID 19959). (**Graphic16.1. E-30** MA0062).

Medium potential anomalies

4.2.2 Twenty-two anomalies of medium archaeological potential as summarised below and as detailed in **Annex D** and **Annex F**. These did not correlate with any known records.

- **MA0028** (SSS MA2087) A cluster of features concentrated within an area measuring 70 x 15m seen in SSS data, with a magnetic return of 414nT (MAG MA6477).
- **MA0031** (SSS MA2094) A linear anomaly measuring approximately 24m in length with an extended triangular shadow suggesting a height of 1m above the seabed, seen in SSS data.
- **MA0035** (SSS MA2117) Two parallel buried reflectors approximately 15m in length and 1m apart, seen in SSS data.
- **MA0038** (SSS MA2149) A prominent mound which may represent anthropogenic material. The mound measures 10.6 x 3.7m, with a maximum height of 0.9m, seen in SSS data.
- **MA0040** (SSS MA2165) A cluster of features concentrated within an area measuring 48 x 16m, with shadow suggesting a height of 1.6m above the seabed, seen in SSS data.
- **MA0041** (SSS MA2167) A cluster of features concentrated within an area measuring 38 x 29m, seen in SSS data.
- **MA0042** (SSS MA2172) A cluster of features concentrated within an area measuring 57 x 24m, seen in SSS data.
- **MA0045** Two magnetic anomalies MAG MA5501 (104nT) and MAG MA5503 (105nT).
- **MA0047** Isolated magnetic anomaly (110nT) (MAG MA6298).
- **MA0048** Isolated magnetic anomaly (112nT) (MAG MA6485).
- **MA0049** Pair of linear hard reflectors; potential anthropogenic debris or boulders, seen in SSS data, associated with magnetic anomaly (115nT) (SSS MA2085, MAG ID MA6224).

- **MA0050** Isolated magnetic anomaly (116nT) (MAG MA6529).
- **MA0052** Isolated magnetic anomaly (125nT) (MAG MA5600).
- **MA0053** Isolated magnetic anomaly (145nT) (MAG MA5202).
- **MA0054** Isolated magnetic anomaly (156nT) (MAG MA5537).
- **MA0055** Isolated magnetic anomaly (165nT) (MAG MA5380).
- **MA0056** Isolated magnetic anomaly associated with seabed reflector also seen in the MBES data (MA4039) (4nT) (MAG MA5032).
- **MA0057** Isolated magnetic anomaly associated with seabed reflector also seen in the MBES data (MA4040) (209nT).
- **MA0058** Three magnetic anomalies MA5504 (245nT) MA5505 (47nT) MA5506 (38nT) (MAG MA5504).
- **MA0059** Isolated magnetic anomaly (147nT) (MAG MA6556).
- **MA0060** Isolated magnetic anomaly (300nT) (MAG MA5823).
- **MA0061** Isolated magnetic anomaly (716nT) (MAG MA5529).

Low potential anomalies

4.2.3 The low potential anomalies have been characterised as a mixture of small features, often boulder like, or isolated linear features and modern debris such as rope, chain, fishing gear or lost equipment.

4.2.4 Magnetic anomalies under 100nT with no corresponding records or data in any of the assessed geophysical datasets or research resources have also been assigned low archaeological potential.

4.3 Palaeogeographic assessment of geophysical data

4.3.1 This section presents a preliminary deposit model which is to be refined following the assessment of forthcoming geotechnical data. The sub-bottom geophysical survey data are interpreted and the results are presented in the context of current understanding of the complex prehistoric landscapes and the correlation between the marine and terrestrial sediment phases.

4.3.2 Knowledge and understanding of submerged prehistory is developing rapidly as a positive outcome of collaboration and data sharing between offshore developers, curators and researchers.

4.3.3 The nature, extent, and distribution of preserved palaeolandscapes is being mapped and understood as survey methods are developing. The contextual relationship between channels, micro and macro fauna, submerged forests, and identified and potential sites, both in the marine zone and terrestrial area, are becoming more apparent as the volume of data is increasing.

Current understanding

4.3.4 As discussed in detail in **Section 3.1: Environmental context**, the area of seabed that the marine archaeology study area covers was previously large swathes of dryland that were exploited during the Pleistocene and early Holocene. Early to Middle Pleistocene deposits of the West Sussex Coastal Plain and wider Solent Basin were shaped by successive interglacial sea-level highstands during the last 500,000 years (Bates *et al.*, 2010).

4.3.5 Studies in the area undertaken by Imperial College (Gupta *et al.,* 2004) present details of submerged topography and outline features of the Palaeo- Arun Valley landform from the land out into the marine zone, including terraces and details of the submerged floodplain. The project aimed to use the understanding of terrestrial prehistoric deposits to show the offshore potential.

4.3.6 The Transition Zone Mapping Project (TZMP) also focused on linking the offshore sedimentation with the terrestrial record by using geophysical data and boreholes. The results showed that the area along the Sussex coast between the mouth of the River Arun at Littlehampton and Chichester Harbour is a Tertiary solid geology overlain by Pleistocene Head and raised beach deposits. Pleistocene fluvial channels and infilled Holocene marine inlets are also present. The study is a benchmark model for how the offshore records should be integrated with the terrestrial component.

4.3.7 It has also been highlighted that, although fluvial sediments exist in the submerged zone, they do not necessarily represent contexts associated with the terrestrial deposits of archaeological potential.

4.3.8 Offshore deposits should therefore not be understood as an extension of the terrestrial landscape but as a representation of a lower elevation landscape which has been subject to frequent transgressions and regression dominated by a large river system (Pope & Bates, 2016).

4.3.9 The purpose of increasing our understanding of the changes to climate, landscape and environment and its link to human behaviours, culture and therefore archaeological potential is based on the assumption that peoples have always and will always respond to short- and long-term changes in their immediate environs and adapt as necessary.

4.3.10 People tend to live where resources necessary for survival are available and, as further described in **Section 3.1**, the Palaeolithic climate in the area was dominated by numerous glacial cycles during the last 500,000 years, resulting in periods of lower sea-level where a land connection to modern mainland Europe was possible.

4.3.11 Previous assessments in the area have identified major palaeovalleys associated with the Northern Palaeovalley, which is the Northern branch of the English Channel River (Dyer, 1975; Hamblin *et al.*, 1992; Bellamy, 1995; Velegrakis *et al.*, 1999). The valley systems demonstrate complex channel infills and terrace deposits associated with cold climate fluvial activity during glacial lowstands.

4.3.12 At the end of the Pleistocene, the marine sediments infilled the river channels with estuarine deposits leading to extensive terraces and localised head deposits. The

transgression period allowed sediments to be reworked into lag sediments which covered the majority of the seabed and subsequently by marine deposits.

4.3.13 Throughout the Holocene, marine sediments began to build up in some areas of the seabed. They are now covering the Pleistocene sediments and bedrock outcrops, often very thinly inshore and thicker and more extensively further offshore (Gupta *et al.*, 2004).

4.3.14 Four main streams drain southwards into the English Channel along the coast of Sussex. These rivers are the Arun, Adur, Ouse and Cuckmere. Only the River Arun is located within the marine archaeology study area and the offshore extension of the river was first studied by Bellamy (1995) and later by Gupta *et al.* (2004) who concluded the palaeo-Arun cuts though the Upper Chalk bedrock and extends to about 8 km offshore. Analysis of seismic data also shows a valley, oriented NNW-SSE and in places the Upper Chalk bedrock has been eroded away by the palaeo-Arun which runs perpendicular to the current coastline.

4.3.15 While the Upper Chalk bedrock deposit is not of geoarchaeological interest, mapping the chalk shelf still is, as it is the primary source of flint for production of stone tools by prehistoric people, and is the reason why chalk landscapes often contain high concentrations of archaeological findspots (Gupta *et al*., 2004).

4.3.16 Further, a significant fluvial system east of the marine archaeology study area, the Adur Valley, has been draining into the English Channel River system for at least 250,000 years. The River Adur makes its course through the chalk downlands, where a wide, flat-bottomed profile with clearly demarked valley edges indicates an alluvial depositional regime as well as a significant estuarine depositional regime during the development of this valley (Bates, 2010; Burrin, 1983; Burrin & Jones, 1991; Jennings, 1985). The Adur and Tarring/Brooklands fluvial channels offshore have been shown to preserve Holocene alluvium, basal Pleistocene alluvium and possibly inter-digitated layers of head/dry Valley deposits (E.ON, 2012b).

4.3.17 We know that the Solent and what is currently the south coast of England has yielded early Palaeolithic archaeology in high concentrations, for example at Boxgrove, West Sussex (Roberts *et al.*, 1994; Roberts & Parfitt, 1998) where the earliest hominid fossils from the British Isles were recovered from a Pleistocene raised beach and various finds of interest reported by the aggregate dredging industry (Bates *et al*., 2004). Three of the finds are located within the Rampion 2 marine archaeology study area: one animal bone (NMRHE Object ID 196439), and two bone fragments (NMRHE Object ID 197962 and NMRHE Object ID 196869), dredged up at the Owers (Dredging Licence Area 123/1A).

4.3.18 The archaeological assessment of sub-bottom data ahead of Rampion 1 Offshore Wind Farm Environmental Assessment concluded that the majority of the area showed no apparent channel features and the sediment thickness varied between 4m to 30m. However, in the northwest of the Rampion 1 area a shallow buried channel feature was identified with the bedrock noted at a maximum of 5m below sea level. The ES Section 6 – Physical Environment noted that the geological structures include rock outcrops, rock ridges and a network of steep-sided buried north to south trending palaeochannels. Vibrocores collected in areas of acoustic blanking proved that the paleochannel infill is made up of peat and soft clays.

4.3.19 Surveys were undertaken in 2021 to collect data for seabed imagery, sediment composition and chemistry, macrobenthic analysis and predictive habitat mapping. Analysis of these data established areas of peat on the seafloor (Rampion 2 Offshore Wind Farm Characterisation Surveys Subtidal Habitats Survey, 2021).

4.3.20 The onshore Desk-based Geoarchaeological & Paleoenvironmental Assessment Report (**Chapter 25: Historic environment, Volume 2** of the ES (Application document reference 6.2.25)) considers the geoarchaeological and paleoenvironmental potential and heritage significance of the Assessment Boundary. By reviewing documentary sources including geological mapping, satellite imagery and relevant Quaternary data, initial characterisation of the geography, topography, geology, geoarchaeological and paleoenvironmental potential was undertaken. The assessment identified and assigned heritage significance to the geological contexts outlined in **Table 4-2**.

4.3.21 Where there is potential for a deposit located offshore (**Table 4-3)** to be associated with the onshore geological context this has also been referenced in **Table 4-2**.

Table 4-2 Onshore geological contexts identified

Geological Context	Description	Potential to be present within the offshore zone
Alluvium (Arun/Adur)	Alluvial deposits underlie the floodplains of the rivers and infill any buried valleys or palaeochannels that are present.	**High,** may represent peats and channel infills (Unit 4, **Table 4-3**).
River Terrace Deposits	River Terrace Deposits consist mainly of water-lain sediment deposited in fluvial environments. These include the deposits of active channels, generally gravel or sand, and those of low-energy environments such as backwaters, abandoned channels and floodplain ponds, generally sand, silt or clay.	**High**, may represent prehistoric channel and river infills (Unit 4, Unit 2, **Table 4-3**).
Raised Beach Deposits	Raised beach material consists most distinctively of well-rounded pebbles or shingle may be present representing intertidal deposition or deposition in low-energy environments.	**High**, may represent reworked material in areas of protruding bedrock, runs parallel MA3028 (Unit 2, **Table 4-3**).
Head Deposits	Bedrock and superficial geological material (colluvium) which has been redistributed by slope (colluvial) processes.	**Medium** Could be visible in sub-bottom data as valley/channel slopes, aiding mapping but possess low geoarchaeological potential.

Geological Context	Description	Potential to be present within the offshore zone
Clay-with-flints	Clay-with-flints consists of the insoluble clayey residue of the chalk together with whole and broken flint nodules, mixed with material derived from overlying Tertiary geological deposits.	**High** Similar in type to London Clay (Unit 3, **Table 4-3).**
Bedrock	Chalk of the White Chalk Subgroup.	**High**, Chalk bedrock is present within the offshore zone but has low geoarchaeological potential (Unit 1, **Table 4-3**).

Archaeological assessment of sub-bottom data

4.3.22 The archaeological assessment of the sub-bottom data collected in the offshore part of the ES Assessment Boundary has aimed to:

- locate and map channel and valley features present within the marine archaeology study area;
- identify and describe stratigraphic units within the channels and valleys;
- link the features identified from the sub-bottom data to known offshore and terrestrial landscape features; and
- develop an outline deposit model based on the information gathered.

Results

4.3.23 The assessment of sub-bottom data has resulted in the identification of the features described in detail below and as illustrated on

4.3.24 **Figure 7.7**.

MA3000

4.3.25 The sub-bottom assessment has shown that the mapping of the palaeo-Arun from the terrestrial zone follows the route as shown by Gupta *et al.* (2004) and continues to flow further south and turning east before the incision in the bedrock (Unit 1, **Table 4-3**) becomes less prominent. The valley is generally 3km wide but can be narrower in places, the bottom of the valley reaches 15m; the data indicates a flat valley floor. The thickness of the infill deposit varies between 5m and 15m. The western edge appears steep sided while the eastern edge is generally showing a gentle slope.

4.3.26 The infill (Unit 4, **Table 4-3)** is represented by dark reflectors which are indicative of complex cut and fill deposits representing different stages of deposit movements across the lowland, filling the valley with sediments. It is likely that the Arun Valley has been a dominant feature through the Quaternary and that the basal erosion surface (as indicated by the base of the palaeochannel) is at least a 500,000-year-old surface (Gupta *et al.*, 2004).

4.3.27 During stages of sea level movement areas of the Arun Valley would have been partly submerged and the lower levels dominated by tidal and marine conditions. It has been estimated that for the valley to have been completely exposed the sea level must have been below -45m (Gupta *et al.*, 2004).

4.3.28 Erosion and stages of sediment infill are noted in section where a terrace formation is visible along the eastern edge with hard basal, probably gravel or sand deposits throughout the valley infill. Refill of the valley is noted, caused by fluvial movements, probably tidal and later marine conditions which filled the valley with silt, sand and possibly clay.

4.3.29 As the Arun valley turns eastward it becomes hard to define and the chalk bedrock (Unit 1, **Table 4-3**) becomes dominant, overlain with a thinner layer of mobile sands (Unit 5, **Table 4-3**). However; it should be noted that the sub-bottom survey data in this area was collected using lines orientated north-south, which does not show the edges of the north-south flowing valley as clearly as the east-west lines. The data does not cover the extent of Rampion 1 offshore wind farm area, but there is an indication that the valley turns south again as the eastern edge is visible in the east—west lines in the middle of the Rampion 2 survey area. The southern part of the Arun Valley is located close to the Northern Palaeovalley of the English Channel (MA0001) and the palaeo-Arun is a tributary of this larger fluvial system.

MA3001

4.3.30 The Northern Palaeovalley was a large system that flowed from the east and joined the Median Palaeovalley offshore from Cherbourg, France before continuing westward along the Hurd Deep (Antoine *et al.*, 2003).

4.3.31 A feature identified as the Northern Palaeovalley was identified in the Rampion 1 data and the channel edges were identified and mapped. The feature is also identified in the 2020 sub-bottom data (MA3001) and clearly corresponds with the location previously identified. However, it is more likely that MA3001 represents a channel or valley tributary associated with the Northern Palaeovalley rather than the main valley itself.

4.3.32 MA3001 is approximately 3km wide and clearly infilled, while parts of the Northern Palaeovalley are only partly or not at all infilled and tends to be up to 15km wide. MA30001 also seems to run south-north rather than east-west.

4.3.33 There is some overlap between the Rampion 1 survey area and the Rampion 2 survey area at this location and while no archaeological or geoarchaeological assessment was undertaken in relation to this valley it is clear from the survey reports that the infill is made up of mainly clays and silts; a spongy peat was located in VC03 (E.ON, 2012b) at 0.21 – 0.45m Below Sea Bed (BSB).

4.3.34 The presence of peat in this part of the valley indicates a high rate of organic sedimentation with reduced erosion from marine influences or a quick burial of organic material from fluvial estuarine sediment input. It was also in this area that blanking was seen during the Rampion 1 survey indicating the presence of peat and gas. Some gas blanking is also noted in the 2020 survey data, likely to be a result of a concentration of peat.

4.3.35 As understood from the sub-bottom data, MA3001 is an approximately 3km wide channel with varying layers of infill and indications of islands. The banks are not clearly evident on all lines but where visible they are steep. The infill can be up to 20m deep but is generally less than 5m; the channel base is mostly flat but rounded at the deepest parts of the valley indicating several cutting events.

4.3.36 The channel is also clearly visible on the north-south sub-bottom survey lines in the eastern area adjacent to Rampion 1 but does not appear as clearly on the east-west going lines. The valley is possibly connected to the palaeo-Arun valley as the infill reflectors and valley banks are similar in deposition and form. The physical connection between MA3000 and MA3001 may no longer be clearly evident as tidal and marine mobile sediments have eroded the chalk bedrock and valley edges or the connection is further inshore, north of the marine archaeology study area and outside the survey areas for both Rampion 1 and 2. Both MA3000 and MA3001 are also likely to join the Northern Palaeovalley further south.

MA3002

4.3.37 Another narrower channel ca 7km long is running south-west to north-east to the east of MA3001, though the extent of the channel is not clearly defined. The bottom of the channel is wide, flat and uneven in places with some deeper cuts through the chalk. The infill in the channel is varied between light and dark reflectors representing soft material such as silt mixed with a layers and pockets of sand or gravel. The depth of the channel is generally noticed at around 10m but older cuts, especially close to the western bank go down to 20m with a rounded base. The eastern bank has a gentle slope and is at times hard to distinguish while the western edge generally shows steep banks. The composition of the infill and channel edges are similar to MA3000 and MA3001 and is likely to be associated with them. It also it is likely that this channel continues further north beyond the survey area. In the south the channel is both narrower and shallower before it turns eastwards and becomes slightly wider again.

MA3003

4.3.38 This braided channel is ca 1km wide with a clear main channel part and tributary streams getting more frequent as it stretches from the south to the north. The channel banks are clearly defined with steep sides both in the east and west. The channel base is generally flat with a rounded base in deeper cuts up to 15m, more commonly found closer to the eastern channel bank. The infill is mostly shown as light reflectors representing soft material like silt mixed with a layers and pockets of sand or gravel. As with MA3000- MA3002 channels and tributary, it is likely that this is also a substantial tributary of the Northern Palaeovalley fluvial system.

MA3004 and MA3005

4.3.39 MA3004 and MA3005 are two narrow channels, 1km and 3km wide respectively, lying northeast of MA3000. The direction of both of the channels is north-west south-east to southeast and indicates that they would probably join up with the main channel identified in the Rampion 1 data (E.ON, 2012b).

4.3.40 MA3004 is ca 4.5km long, between 300m and 2km wide at its widest point in the east where it joins the Rampion 1 development area outside of the 2020 survey area. The channel base is mostly flat with gently sloping banks where the western bank is slightly more graduated than the steeper eastern bank. The infill reflectors indicate soft sediments in layers with a hard lag base.

4.3.41 A total of 1.3km of feature MA3005 falls within the geophysical survey area. It may represent a smaller tributary of one of the other features and it is possibly associated with MA3004. The channel is ca 8m deep and 200-250m wide with a rounded base and mostly evenly sloped banks. The infill reflectors indicate soft sediments with a hard possible lag deposit at the bottom of the channel. The most eastern extent as picked up by the north-south going survey lines and reveals some higher ground or river islands which show prominently within the channel infill.

MA3006

4.3.42 MA3006 covers an area 2km by 800m and is a channel or lake feature with steep banks and an infill with hard reflectors possibly indicating gravel terraces, and some blanking in areas within the feature suggesting peat. The infill is generally ca 5m under the seabed but goes down to 20m depth in some areas. The extent of the channel is not known but it is possible that it continues into the Rampion 1 area and is associated with the channel previously identified (E.ON, 2012b).

MA3007

4.3.43 This narrow, braided channel with a few tributaries is 5 km long, while the widest part is 500m and the narrowest in its northern most extension is only approximately 100m wide. The feature is likely to be a smaller tributary of the Northern Palaeovalley fluvial system. The channel is in places underlying prominent sand banks and is cut into the underlying bedrock. In other places along the channel the sand bank is located west of the channel. The channel shows a flat base generally 6m deep. The eastern most tributary and the two northern most forks are 100m wide, 5m deep round-based channels with soft sediment infill and possibly with gravelly lag deposit at the base.

MA3008

4.3.44 A small feature on the western most edge of the survey extent. The feature is shallow at 6m deep with soft infill with a rounded base and steep banks.

MA3009

4.3.45 A 500m wide, 10m deep channel with a very flat base and very straight vertical banks on both sides. The reflections from the bedrock are not prominent in this

area and the feature might be cutting through the Tertiary sediments (Unit 3 and 4, **Table 4-3**). The infill is a mixture of light and dark reflectors indicating silty sands and gravels. In the southern part of the channel, it is wider with a round base and flatter banks.

MA3010

4.3.46 Small area (2 x 2km) of shallow (9m) channel features with very soft infill, rounded base, and consistently steep banks. The channel is not visible on all lines and does not indicate a strong cut through the chalk bedrock but rather a cut through the Tertiary sediments (Unit 3 and 4, **Table 4-3**).

MA3011

4.3.47 An approximately 140m wide and nearly 5km long tributary associated with the surrounding channels. The tributary has a rounded base and gently sloping banks, is ca 4m deep, cut into the chalk bedrock and is infilled with soft material.

MA3012-MA3025

4.3.48 Simple cut and fill features not clearly associated with channels or valleys less than 10m deep and generally 100m wide. Likely to be associated with the Northern Palaeovalley.

MA3026

4.3.49 Small part of a simple cut and fill channel ca 250m wide and about 10m deep, the extent of the channel is not clear from the data coverage but might connect to terrestrial deposits. The infill reflectors indicate soft material, the northeastern bank is steeper than the southwestern bank which has a gentler slope. The position of the feature aligns with the palaeo-Arun feature as identified by Gupta *et al.* (2004) where the offshore section meets the terrestrial area. The future is also identified further offshore (MA3000).

MA3027

4.3.50 A part of a braided channel extending outside the survey area. The feature is ca 700m wide at the southern extent with a clear main channel part and tributary streams in the northern area closer inshore. The channel banks are clearly defined with steep sides both in the east and west. The channel base is generally rounded and up to 10m deep. In the widest part in the south, the bank cutting through the bedrock shows flattened sides for up to 300m on either side of the channel indicating several stages of development. The feature is aligned parallel with the palaeo-Arun valley MA3000 and might represent the western extension as mapped by Gupta *et al.* (2004).

MA3028

4.3.51 MA3028 is a braided channel valley oriented north-west to south-east. The mapped extent is 5.3km, but it is likely that the feature extends beyond the data collection area. The channel is 1.8km at its widest point with narrower tributaries in

the north and west. The channel base at the widest part is flat, around 10m deep with steep sides on both the east and southwest. The infill is mixed soft and hard materials with some indication of a harder lag layer and possible blanking indicating peat. The tributaries have rounded bases and support softer infill material. The feature might be an extension of MA3003 located directly south of MA3028. The north-eastern bank of the channel is running parallel with the Goodwin Slindon raised beaches possibly connecting the offshore sediments with deposits identified in the terrestrial areas and dated to the Comerian age. The deposits are normally located at 30m OD and are associated with the Boxgrove site where the raised beach deposit is overlying a chalk bedrock (Timpany, 2009).

Areas of seabed peat

4.3.52 For the purpose of collecting samples for benthic and sediment type analysis, 39 drop-down video transects, 21 drop-down video stations, 45 Hamon grabs, and 10 Day grabs were undertaken within the Assessment Boundary. The results of the assessments showed that peat and clay exposures were observed in 17 images across one station (ST032) and three transects (T_011, T_027 and T_033) within the western areas of the Assessment Boundary and nearshore areas of the export cable corridor.

4.3.53 The locations where peat and clay was confirmed match spatially with the results from the archaeological interpretation of geophysical survey data. Future geotechnical sampling should, therefore, focus on these areas specifically to gain a greater understanding of the channel deposits and how these peats may be associated with the onshore deposits of geoarchaeological potential (**Figure 7.5**).

Outline deposit model

4.3.54 As outlined in **Table 4-3,** the seabed in the marine archaeology study area is predominantly gravels and sands (Unit 5) which are overlying consolidated and clays (Unit 3 and 2). The fine-grained sediments tend to be mobile which allows coarse-grained surface deposits to form. The underlying geology in the area is characterised by Upper Cretaceous Chalk (Unit 1) which is in places cut by channel and valley features filled with Unit 4.

4.3.55 Similar deposits which may be associated were identified onshore as outlined in **Table 4-2** and cross referenced in **Table 4-3**. The onshore assessment is further discussed in Desk-based Geoarchaeological & Paleoenvironmental Assessment Report (**Chapter 25: Historic environment, Volume 2** of the ES (Document Reference: 6.2.25).

4.3.56 The outline deposit model will be further refined following a staged geoarchaeological assessment as outlined in the **Outline Marine Written Schemes of Investigation** (Document Reference: 7.13) (C-57) **Table 2-3**.

Table 4-3 Outline deposit model

Unit	Sediment	Description	Epoch	Geoarchaeological potential	Onshore geological context (Table 4-2)
5	Mobile seabed sediments	Sand and gravel	Holocene	No	n/a
4	Channel/Valley infill	Soft possibly peaty clay and sand	Late Pleistocene to Early Holocene	Yes	Alluvium (Arun/Adur)
3	London Clay	Firm to hard silty clay	Tertiary	Low	Clay-with flints
2	Lambeth group	Silt, clay and sand	Tertiary	Low	River terraces and raised, beaches
1	Cretaceous Upper Chalk Group.	Chalk and gravel	Cretaceous	No	Bedrock

5. Mitigation

5.1 Introduction

5.1.1 The mitigation strategies outlined below are supported by the embedded environmental measures and have been designed to reduce or eliminate direct impact on known, unknown and potential heritage receptors. This approach is further detailed in **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16) and is expected to be to be reflected in the DCO requirements and/or dML conditions.

5.2 Mitigation for known wrecks and obstructions

5.2.1 One hundred wrecks are identified in the data provided by UKHO and NRHE are located within the marine archaeology study area. Of the 100 wrecks, 41 are classed as LIVE, 25 are classed as DEAD, two are classed as LIFTED, four are classed as UNKNOWN and 28 are recorded losses with no further detail about their status. In addition, there are 17 aircraft losses, 20 fishermen's fasteners, and 14 fouls and seabed obstructions.

5.2.2 As per embedded environmental measure C-60 **Table 2-3**, precautionary AEZs of 50m radius are recommended for all known marine heritage receptors. Of the 179 known marine heritage receptors detailed above, 28 have been identified in the geophysical data and assigned specific AEZs. The known wrecks and obstructions which were identified within the geophysical data sets were assigned site-specific 100m AEZs. The wrecks, aircraft, obstructions, and fishermen's fasteners not seen in the geophysical data are recommended precautionary AEZs of 50m radius, as illustrated in **Figure 7.6**. Full details of locations are provided **Annex D**.

5.3 Mitigation for unlocated marine heritage receptors

5.3.1 There is always a possibility that not yet located marine heritage receptors are situated within the marine archaeology study area and Proposed DCO Order Limits. Unlocated and unrecorded marine heritage receptors are of unknown archaeological potential and heritage significance but might still be impacted by indirect or direct impact caused by project activities. Large offshore renewable developments have over recent years located several previously unknown and unlocated sites of high archaeological significance within site boundaries, even after construction.

5.3.2 As per embedded environmental measures C-57, C-58 and C-59 (**Table 2-3**) which ensure further investigations of the seabed to locate and identify sites and objects of archaeological potential, impact on unlocated marine archaeological receptors will be mitigated and avoided.

5.3.3 As per environmental measure C-57 (**Table 2-3**), if any works during the construction, operational and decommissioning phases of the project are taking place within the Proposed DCO Order Limits, the project specific protocol for

archaeological discoveries (**Outline Marine Written Scheme of Investigation** (Document Reference: 7.13)) must be implemented and any objects of archaeological potential should be reported.

5.4 Mitigation for geophysical anomalies of archaeological potential

5.4.1 The combined geophysical data assessments undertaken to identify material of archaeological potential identified anomalies of low, medium and high archaeological potential within the marine archaeology study area, as detailed in **Table 4-1**.

5.4.2 As per embedded environmental measure C-60 (**Table 2-3**), to avoid direct impact, anomalies assigned medium and high archaeological potential have been assigned archaeological exclusion zones based on their archaeological potential, significance and extent, as interpreted from the geophysical data assessment.

5.4.3 Anomalies of low archaeological potential and magnetic anomalies < 100nT without correlating seabed feature have, due to the uncertainty of their archaeological potential, not been assigned AEZs.

5.4.4 Thirty high potential and 22 medium potential anomalies have been assigned AEZs, as shown in **Figure 7.7** and **Annex D**.

5.4.5 As per environmental measure C-57 (**Table 2-3**), if any works during the construction, operational and decommissioning phases of the project are taking place within the Proposed DCO Order Limits, the project specific protocol for archaeological discoveries (**Annex A, Outline Marine Written Schemes of Investigation** (Document Reference: 7.13)) must be implemented and any objects of archaeological potential should be reported.

5.5 Mitigation for deposits of geoarchaeological potential

5.5.1 The baseline review in **Section 3**, supported by the geophysical survey data (**Section 4**), has provided information about potential Holocene sediments and palaeolandscapes within the marine archaeology study area.

5.5.2 It is recognised that all phases of the development may cause direct impact to deposits which have the potential to be of geoarchaeological interest, however the impact to the mentioned sediments will be restricted to the required burial and penetration depths, as outlined in **Chapter 16: Marine archaeology, Volume 2** of the ES (Document Reference: 6.2.16).

5.5.3 As per environmental measure C-59 (**Table 2-3**), potential impacts will be offset by the collection and analysis of geotechnical data. The geoarchaeological assessment will be undertaken using a staged assessment approach and analysis of the collected geotechnical data will aim to enhance knowledge and understanding of the palaeogeographic potential, as detailed in **Annex A, Outline Marine Written Schemes of Investigation** (Document Reference: 7.13).

5.5.4 Indicative geotechnical sample locations as well as recommended archaeology specific samples can be seen in . These will be further refined within the specific Method Statements.

5.6 Mitigation for unexpected archaeological discoveries

5.6.1 Environmental measures C-58 and C-59 (**Table 2-3**), ensure that archaeological input is sought ahead of and during all relevant geophysical and geotechnical surveys throughout construction, operation and maintenance, and/or decommissioning undertaken at Rampion 2.

5.6.2 Further, as per embedded environmental measure C-57 (**Table 2-3**), it is proposed that if any finds suspected to be of archaeological potential are recovered by any operating vessels during construction, operation and maintenance or decommissioning, they must be reported using the methodology outlined in the project-specific Protocol for Archaeological Discoveries (PAD) (**Annex A, Outline Marine Written Schemes of Investigation** (Document Reference: 7.13).

5.6.3 The PAD document aims to mitigate the effect on the historic environment by enabling personnel working offshore to report finds in an effective and efficient manner.

5.6.4 Any finds discovered should be safeguarded, for instance, kept in water in a clean, covered container. It is not recommended to remove concretions, clean the finds, or in any other way interfere with them.

5.6.5 Crew on board vessels and onshore staff must familiarise themselves with the PAD and the reporting procedures it describes, which is further detailed in the **Annex A, Outline Marine Written Schemes of Investigation** (Document Reference: 7.13).

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6. Glossary of terms and abbreviations

Table 6-1 Glossary of terms and abbreviations

Term (acronym)	Definition
Archaeological Exclusion Zones (AEZs)	Spatially defined zones around known marine heritage receptors that will be avoided during intrusive works. The avoidance of AEZs must also consider that the use of anchors and lines, which could impact upstanding features, are adequately taken into account in the planning of operations.
Before Present (BP)	Time scale referring to the years before 1950.
Bronze Age	This period follows on from the Neolithic and is characterized by the increasing use of bronze work. It is subdivided in the Early, Middle and Late Bronze Age. Archaeological period lasting from 2,600-700 BC.
Deemed Marine Licence (dML)	If a Development Consent Order (DCO) is granted, this will include provision deeming a marine licence to have been issued under Part 4 of the Marine and Coastal Access Act 2009.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Early Medieval	This dates from the breakdown of Roman rule in Britain to the Norman invasion in 1066 and is to be used for monuments of post Roman, Saxon and Viking date. Archaeological period lasting from AD410 to 1066.
Early Prehistoric	For monuments which are characteristic of the Palaeolithic to Mesolithic but cannot be specifically assigned. Archaeological period lasting from 50,000 to 4,000 BC.

Term (acronym)	Definition
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Regulations, 2017	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.The EIA regulations require that the effects of a project, where these are likely to have a significant effect on the environment, are taken into account in the decision-making process for the project.
Embedded environmental measures	Equate to 'mitigation' or protective measures that for part of a project and are intended to avoid or reduce adverse effects as established under Grave v An Bord Pleanala (C-164/17).
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Statement (ES)	Presents the full findings of the Environmental Impact Assessment and the results of the potential impacts of Rampion 2 Offshore Wind Farm on marine heritage receptors.
Geophysical	Relating to the physical properties of the Earth.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Historic England	The public body that champions and protects England's historic places.
Historic England National Record of the Historic Environment (NRHE)	National database of known wrecks and reported losses held by Historic England. Currently (March 2022) being developed into the National Marine Heritage Record (NMHR).
Historic Seascape Characterisation (HSC)	Maps and describes historic cultural influences which shape seascape perceptions across marine areas and coastal land.
Impact	The changes resulting from an action.
Intertidal	The area of the shoreline which is covered at high tide and uncovered at low tide.

Term (acronym)	Definition
Iron Age	This period follows on from the Bronze Age and is characterized by the use of iron for making tools and monuments such as hillforts and oppida. The Iron Age is taken to end with the Roman invasion. Archaeological period lasting from 800 BC to AD 43.
Last Glacial Maximum	Most recent time during the last glacial period that the ice sheets were at their greatest extents, approximately 26,500-19,000 years ago.
Magnetometer (MAG)	A device used to measure direction, strength, or relative change of a magnetic field at a particular location.
Marine archaeology study area	Defined as the proposed DCO Order Limits area up to MHWS and surrounded by a 2 km buffer.
Marine Heritage Receptors	Physical resources such as shipwrecks, remains of aircraft, archaeological sites, archaeological finds and material including pre-historic deposits as well as archival documents and oral accounts recognised as of historical/archaeological or cultural significance.
Marine Management Organisation (MMO)	MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs. MMO license, regulate and plan marine activities in the seas around England so that they're carried out in a sustainable way.
Medieval	The Medieval period or Middle Ages begins with the Norman invasion and ends with the dissolution of the monasteries. Archaeological period lasting from AD 1066-1540.
Mesolithic	The Middle Stone Age, falling between the Palaeolithic and the Neolithic; marks the beginning of a move from a hunter gatherer society towards food producing society. Archaeological period lasting from 10,000-4,000 BC.
Multi-beam Echo Sounder (MBES)	A type of sonar used to map the seabed by emitting acoustic waves in a fan shape beneath its transceiver. The time it takes for the sound waves to reflect off the seabed and return to the receiver is used to calculate the water depth and produce a visualisation of depths and shapes of underwater terrain.

Term (acronym)	Definition
Nanotesla (nT)	Measurement describing the magnetic field (flux) of ferrous materials as measures by a magnetometer. (One nanotesla equals 10−9 tesla)
Neolithic	This period follows on from the Palaeolithic and the Mesolithic and is itself succeeded by the Bronze Age. This period is characterized by the practice of a farming economy and extensive monumental constructions. Archaeological period lasting from 4,000-2,200 BC.
Offshore	The sea further than two miles from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbines in the same location (offshore) in the sea which are used to produce electricity.
Outline Written Schemes of Investigation (WSI) (Offshore)	Outline WSI, specific for the offshore area and developed during the EIA process to form frameworks for mitigation strategies that will be submitted with the DCO application. Followed by the Draft WSI (based on the Outline WSI) and the final Agreed WSI (based on the Draft WSI).
Palaeolithic	The period is defined by the practice of hunting and gathering and the use of chipped flint tools. This period is usually divided up into the Lower, Middle and Upper Palaeolithic. Archaeological period lasting from 50,000-10,000 BC.
Preliminary Environmental Information Report (PEIR)	Presents the results of the Environmental Impact Assessment to date and the results of the potential impacts of Rampion 2 Offshore Wind Farm on marine heritage receptors.
Portable Antiquities Scheme (PAS)	The Portable Antiquities Scheme is run by the British Museum and Amgueddfa Cymru - National Museum Wales to encourage the recording of archaeological objects found by members of the public in England and Wales.
Post-medieval	Begins with the dissolution of the monasteries (AD 1536-1541) and ends with the death of Queen Victoria (AD 1901). A more specific period is used where known. Archaeological period lasting from AD 1540-1901.
Proposed Development	The development that is subject to the Application for development consent.

Term (acronym)	Definition
Protocol for Archaeological Discoveries (PAD)	A document detailing how finds made during the lifetime of the Proposed Development should be reported.
Receiver of Wreck	Official of the British Government whose main task is to administer the law in relation to Wreck and Salvage.
RED	Rampion Extension Development Limited
Roman period	Traditionally begins with the Roman invasion in AD 43 and ends with the emperor Honorius directing Britain to look to its own defences in AD 410. Archaeological period lasting from AD 43-410.
Sub-Bottom Profiler (SBP)	An acoustic system used to determine physical properties of the sea floor and to image and characterise geological information a few metres below the sea floor.
Scour	A localised sediment erosion feature caused by local enhancement of flow speed and turbulence due to interaction with an obstacle.
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Side Scan Sonar (SSS)	A sonar system that provides high-resolution seafloor morphology from both sides of the vessel track to produce an image of the seafloor.
Study area	Area where potential impacts from the Proposed Development could occur, as defined for each aspect.
Ultra-High Resolution Seismic (UHRS)	An acoustic system used to image submerged and buried features in shallow water.
United Kingdom Hydrographic Office (UKHO)	Database of known wrecks and obstructions held and maintained by the UKHO.
West Sussex Historic Environment Record	This record collection provides details of all known archaeological assets, sites and former archaeological events within West Sussex.

Term (acronym)	Definition
Written Schemes of Investigation (WSI)	A document forming the agreement between the client, the appointed archaeologists, contractors and the relevant stakeholders. The document sets out methods to mitigate the effects on all the known and potential marine heritage receptors within the development area.

7. Figures

Figure 7.1 Marine archaeology study area and geophysical survey extent

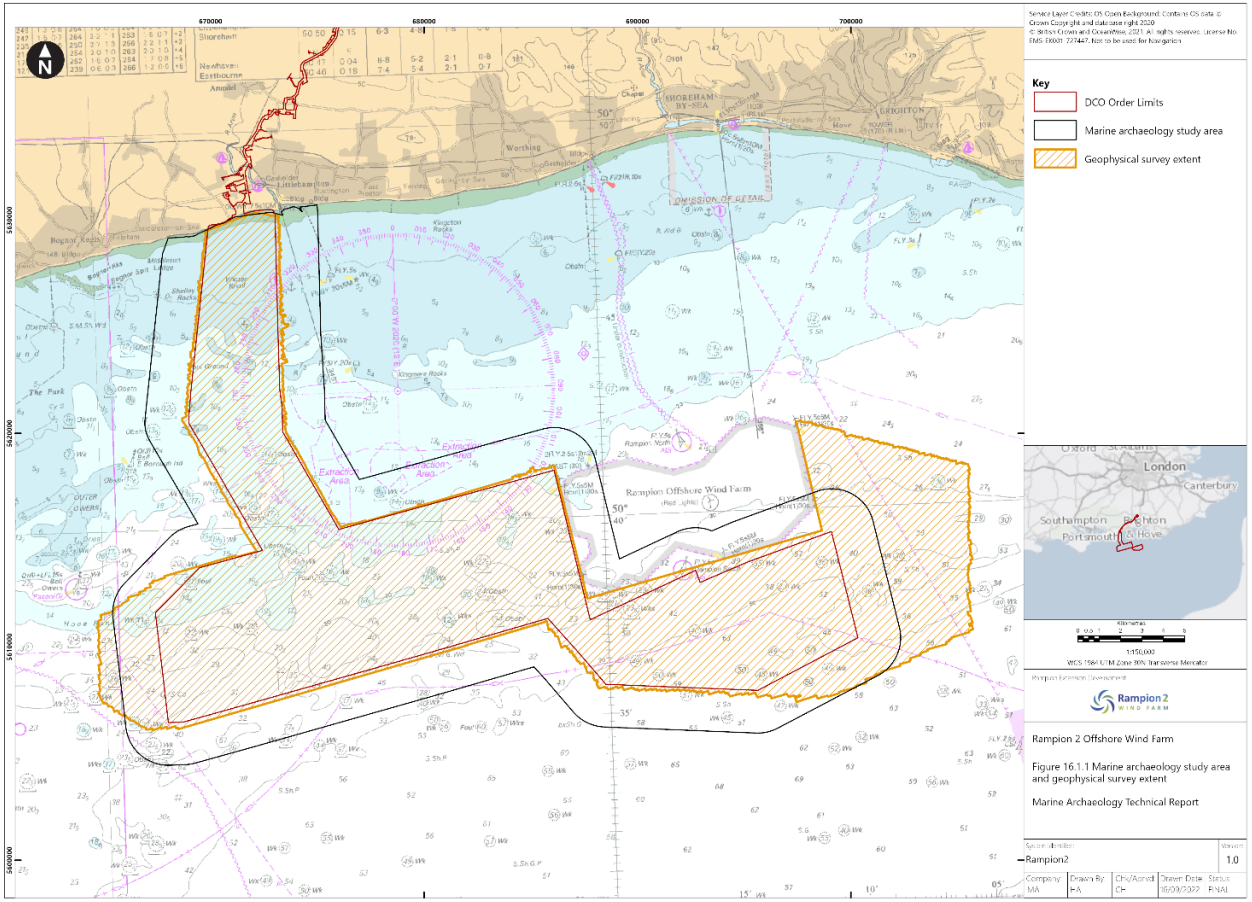


Figure 7.2 Changes in assessment boundary and marine archaeology study area from PEIR to ES

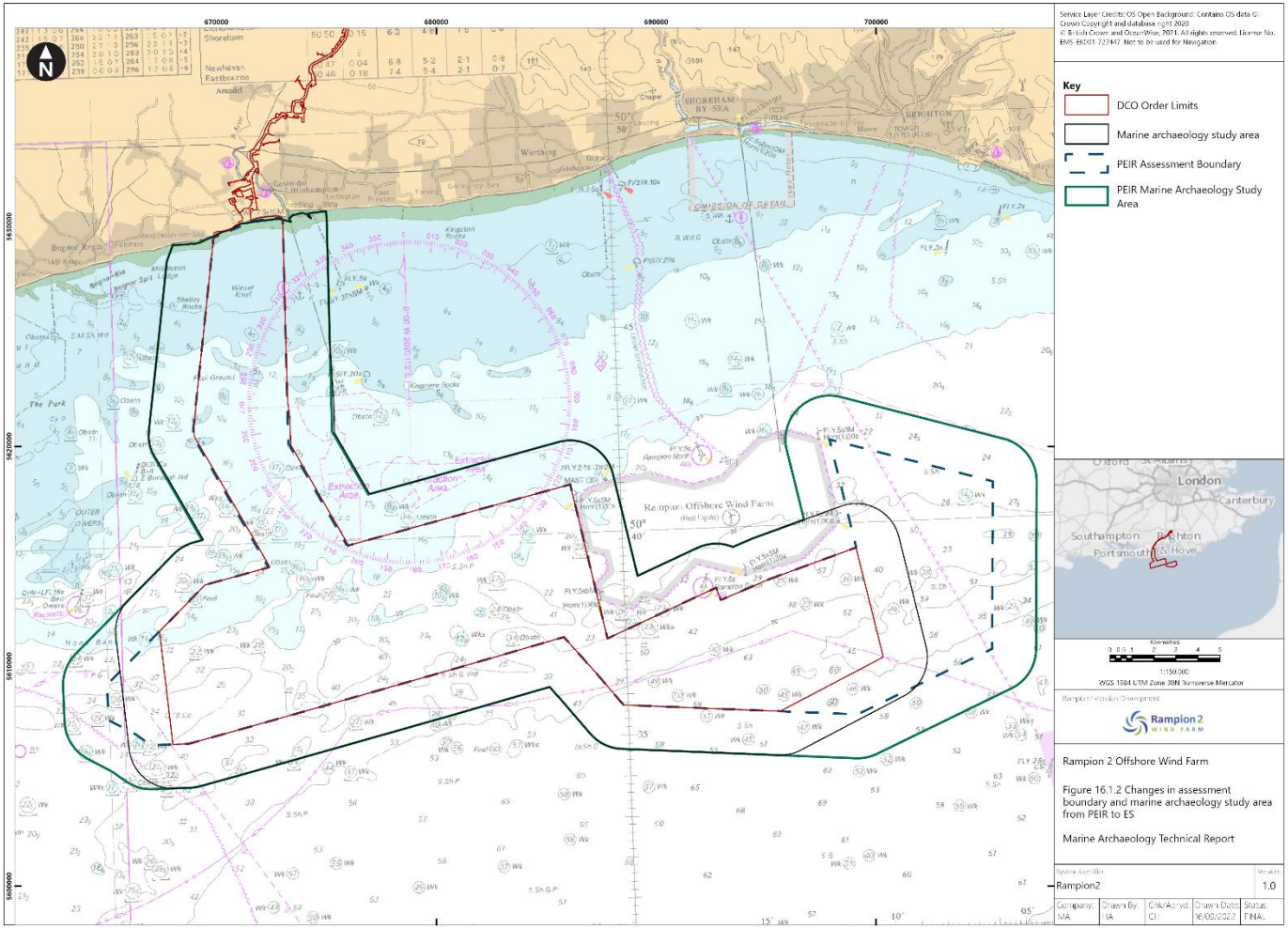


Figure 7.3 Known wrecks and obstructions within the marine archaeology study area

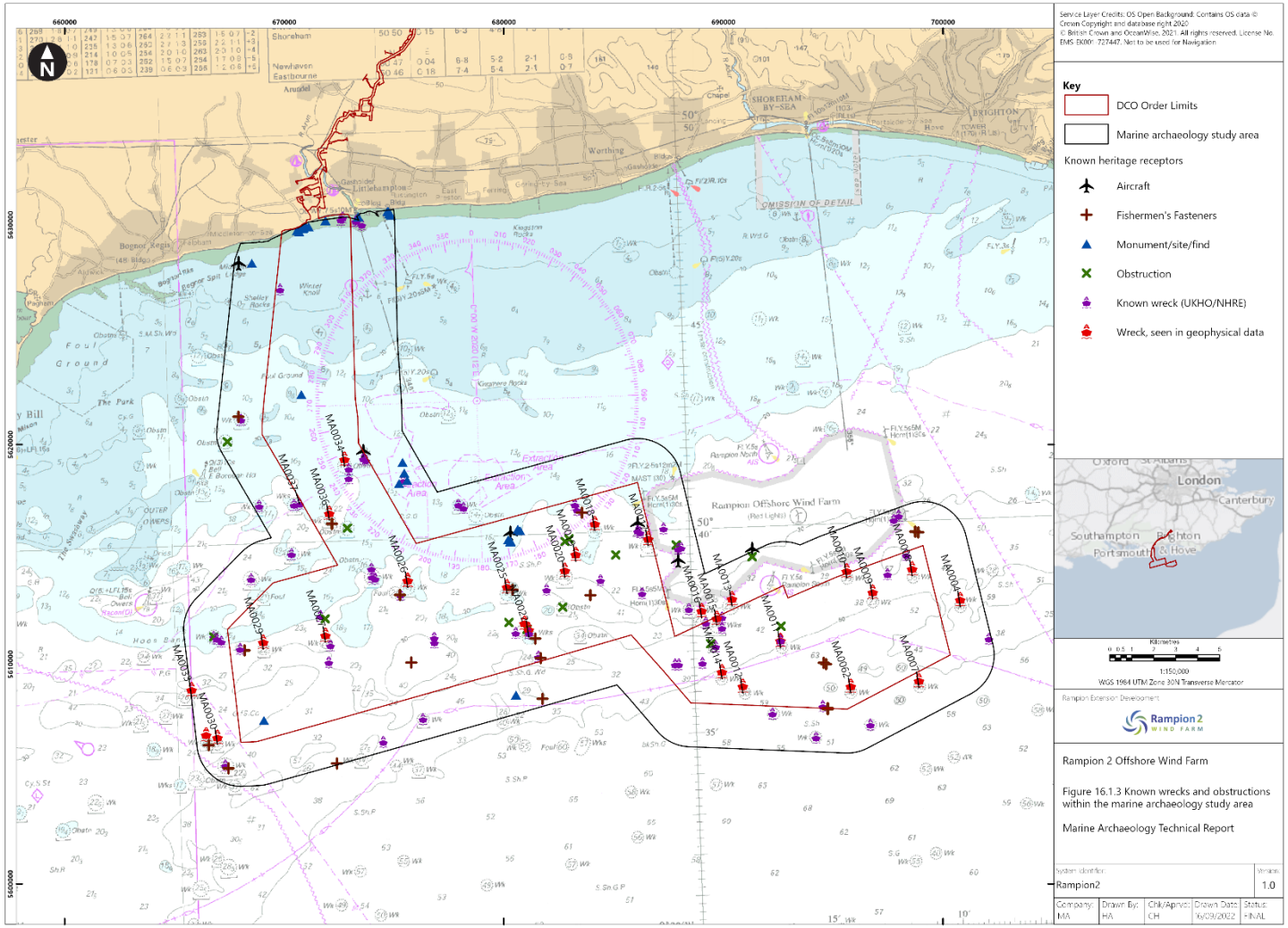


Figure 7.4 Historic seascape broad character types

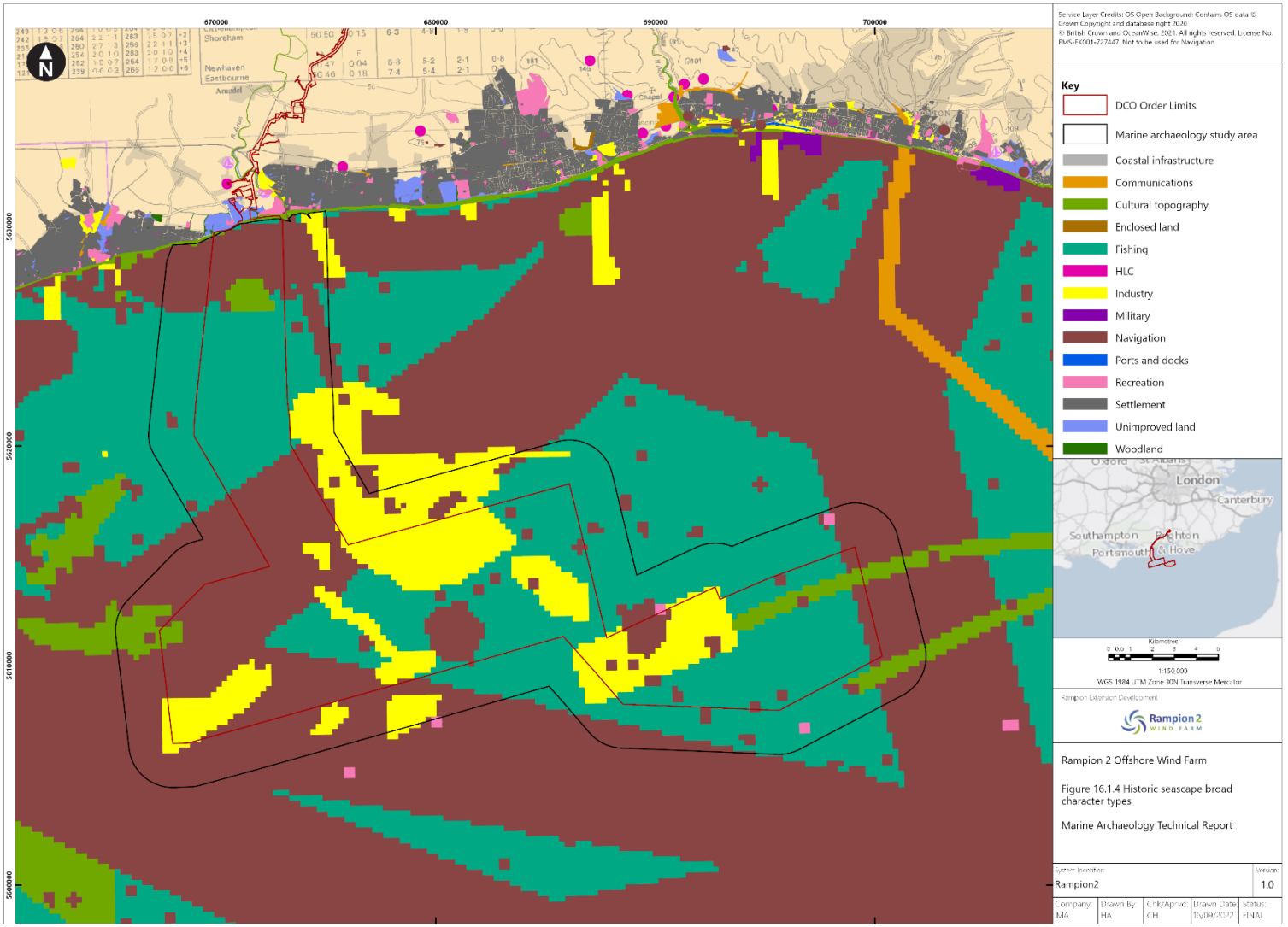


Figure 7.5 Valleys and channels of geoarchaeological potential

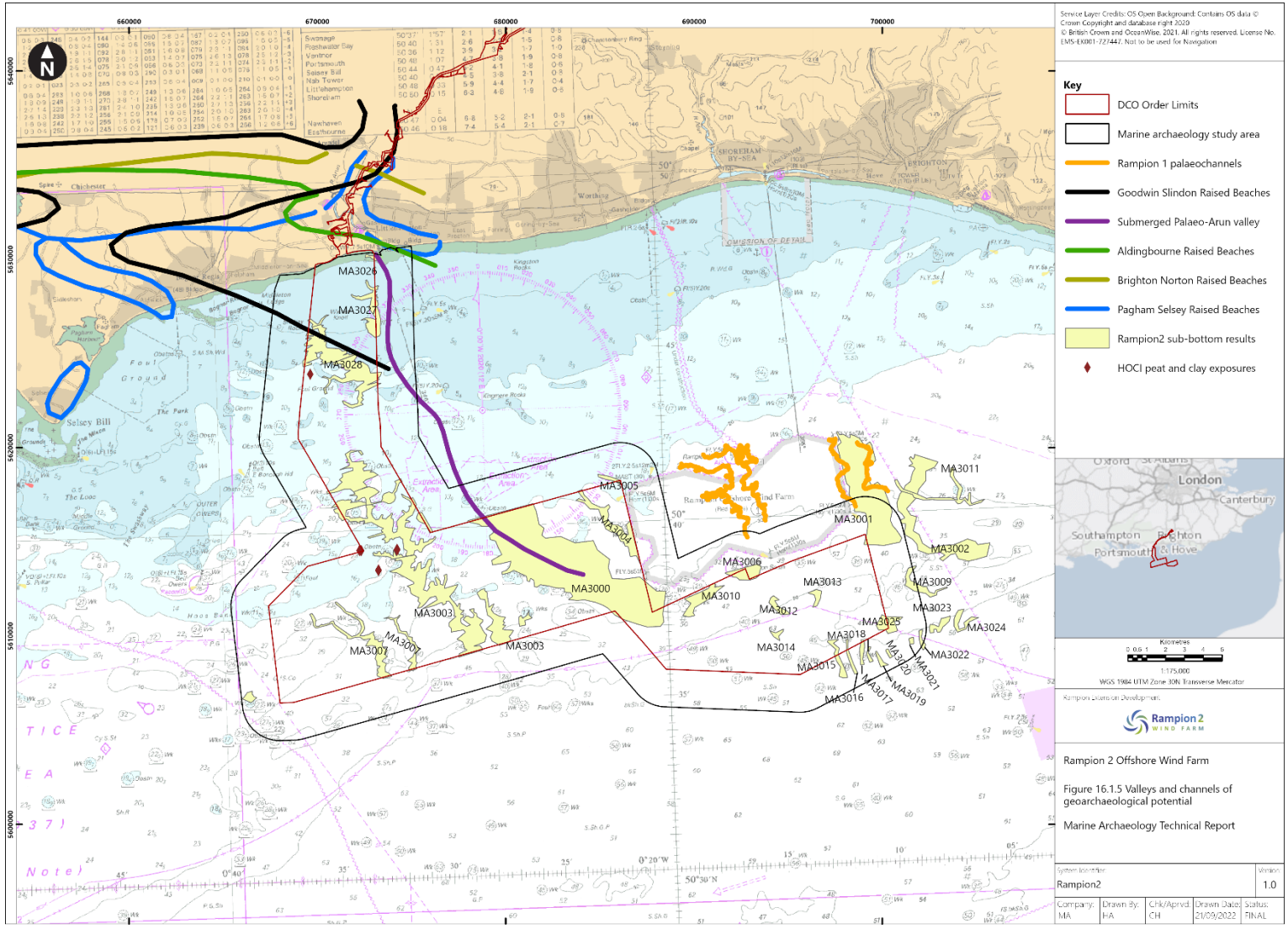


Figure 7.6 Archaeological Exclusion Zones recommended for known wrecks, obstructions and high and medium potential anomalies

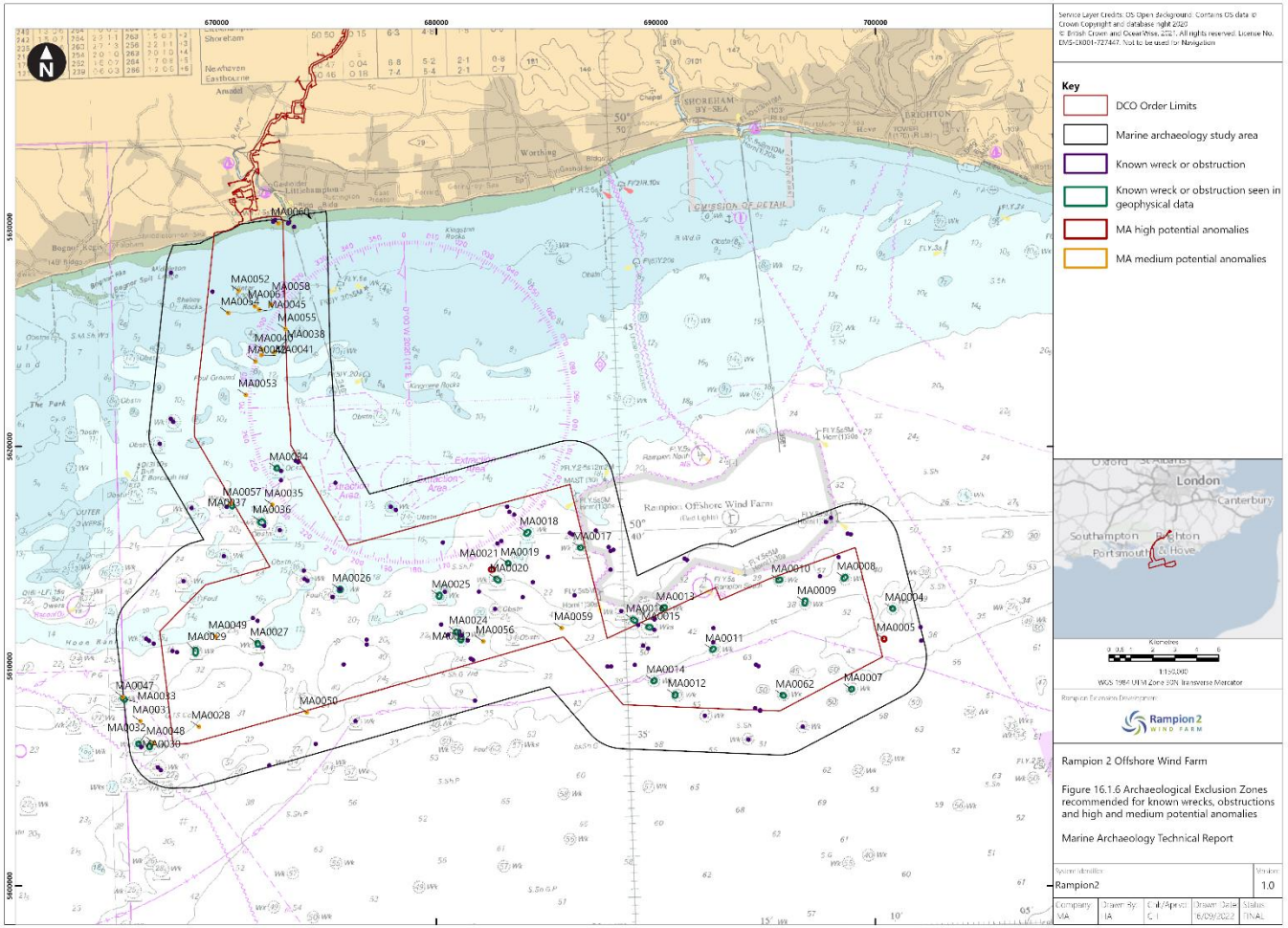


Figure 7.7 Archaeological Exclusion Zones recommended for high and medium potential anomalies

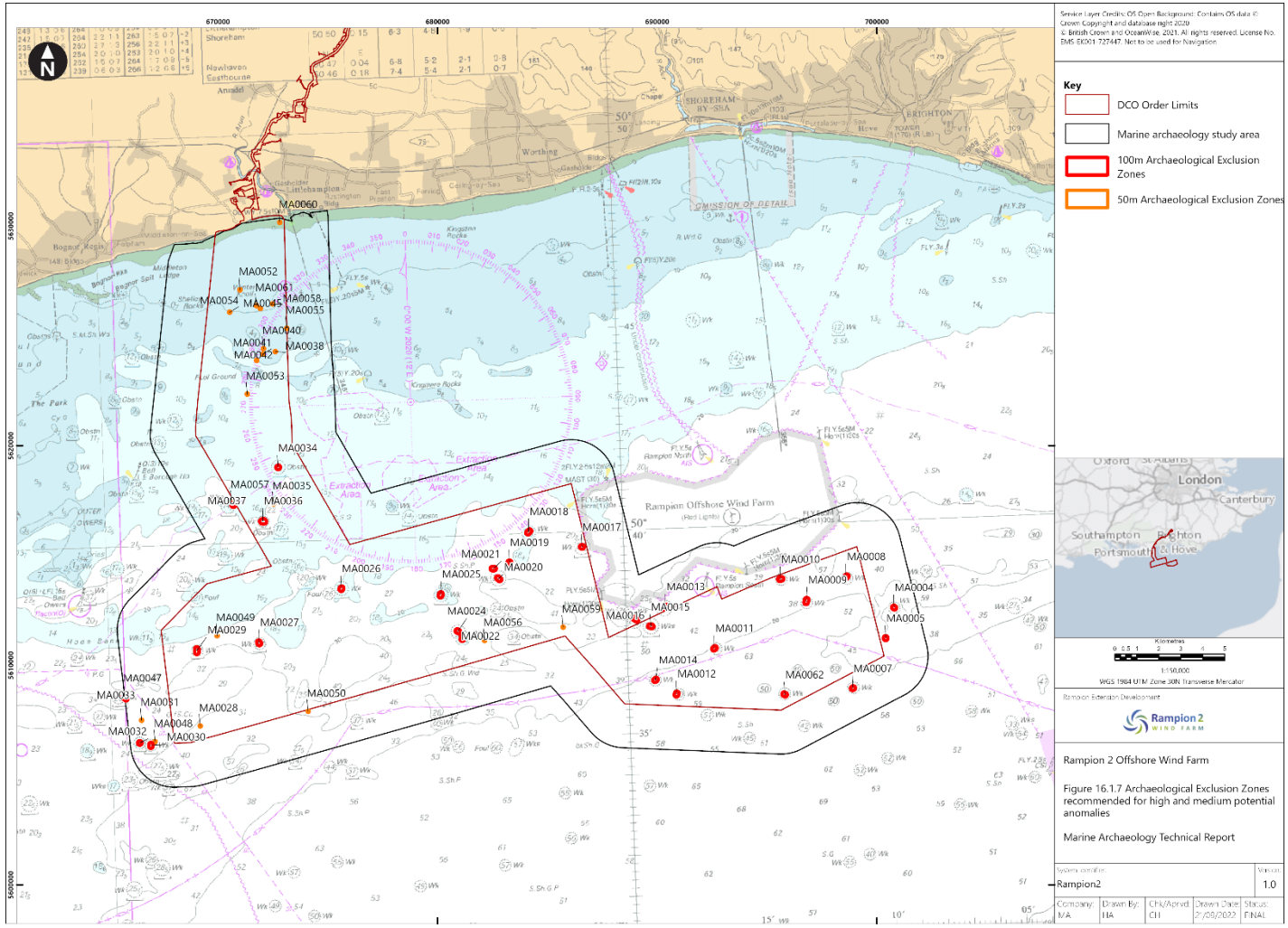
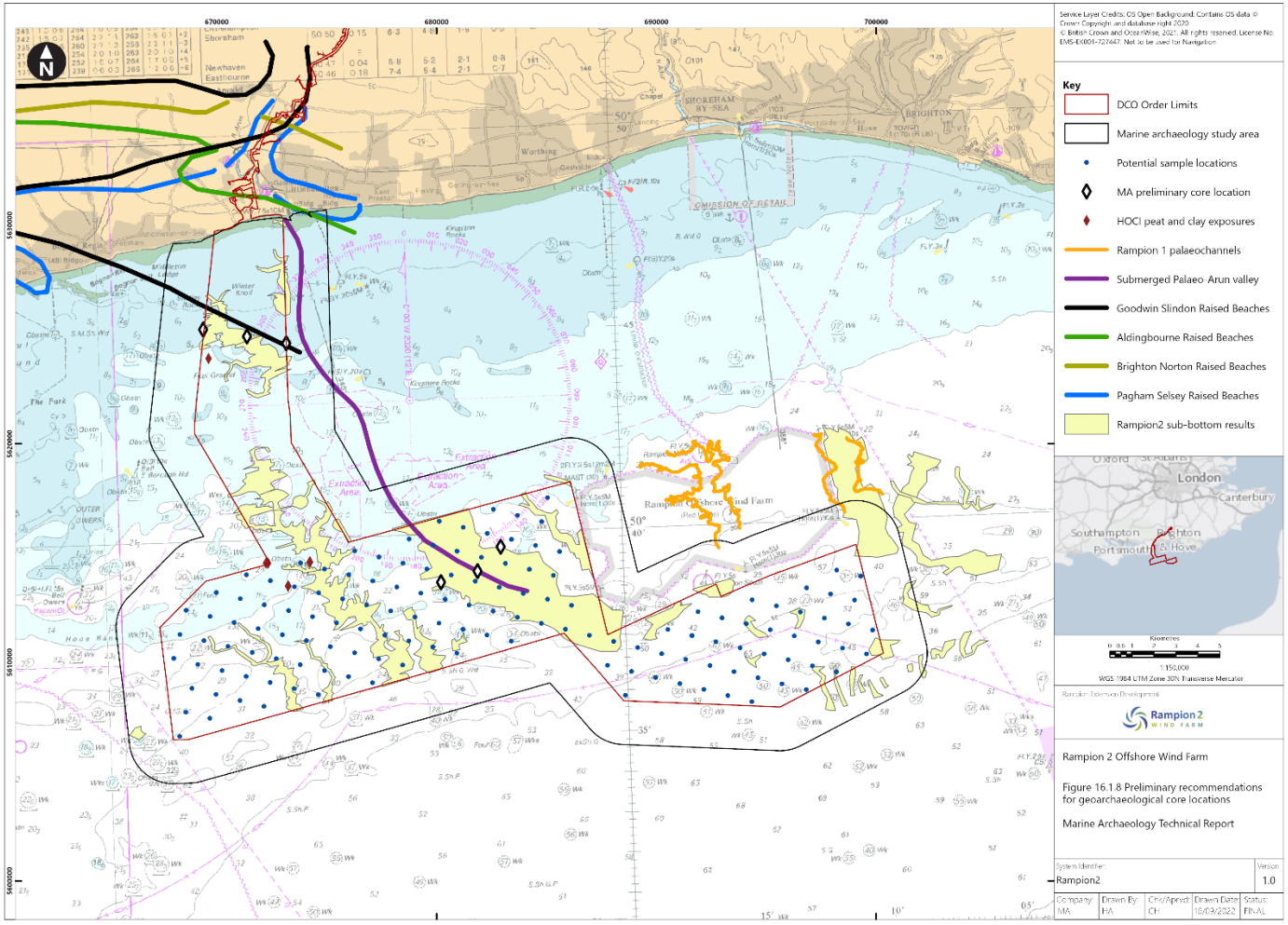


Figure 7.8 Preliminary recommendations for geoarchaeological core locations



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Annex A
Known wrecks and obstructions

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Aircraft	-	An aircraft undercarriage locking pin was found at Greenwich Wharf after dredging operations by the City of Westminster from licence area 122/1A which is located approximately 8 miles south of Bognor Regis in the Owers Bank dredging region.	-	1542551	-	-0.4486279	50.6645965	50
Aircraft	-	Propeller from a military aircraft discovered on the seabed during a remote operated vehicle (ROV) survey along the length of an inter-array cable corridor, at the site of the Rampion offshore wind farm.	168134	1601330	-	-0.3413262	50.6510282	50
Aircraft	Wreck of German Aircraft	Aircraft crash site.	-	911198, MWS10352	-	-0.291950349	50.65389052	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Aircraft	The Wreck of a Dornier *DO217E* Aircraft	Aircraft; DO217; aircraft crash site, Dornier DO217E-4 (5383).	-	MWS10383, 1403523	-	-0.541640457	50.70002961	50
Aircraft	The Wreck of a Junkers *JU87* Aircraft	Aircraft; *JU87*; aircraft crash site.	-	MWS10385, 1400236	-	-0.541640455	50.70002961	50
Aircraft	The Wreck of a Heinkel *HE111* Bomber	Aircraft; HE111; aircraft crash site, Heinkel *HE111P-4* (2976) G1+KH.	-	MWS10875, 1401913	-	-0.366614364	50.66666779	50
Aircraft	The Wreck of a Junkers *JU88* Bomber	Aircraft; JU88; aircraft crash site, *Junkers JU88A-5* (01419) 7A+LM.	-	MWS10874, 1401896	-	-0.366614364	50.66666779	50
Aircraft	Beaufighter *MK VIF MM869*	British fighter, 1943.	-	1341010	-	-0.541640457	50.70002961	50
Aircraft	Wellington *MK IV Z1278*	British heavy bomber, 1942.	-	1354187	-	-0.541640455	50.70002961	50
Aircraft	Halifax *MK III LW132*	British heavy bomber, 1944.	-	1354833	-	-0.541640455	50.70002961	50
Aircraft	Hurricane *MK I P3140*	British fighter, 1940.	-	1319189	-	-0.61811527	50.77863138	50
Aircraft	Spitfire *MK I L1019*	British fighter, 1940.	-	1325139	-	-0.61811527	50.77863138	50
Aircraft	Beaufighter *MK IF R2135*	British fighter, 1941.	-	1322757	-	-0.133340077	50.66667357	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Aircraft	Beaufighter *MK IF X7672*	British Nightfighter, 1942.	-	1354136	-	-0.61811527	50.77863138	50
Aircraft	Beaufighter *MK IF R2068*	British fighter, 1940.	-	1322751	-	-0.133340077	50.66667357	50
Aircraft	Havoc *MK I BD124*	British fighter, 1941.	-	1342738	-	-0.366581936	50.66666174	50
Aircraft	Walrus *MK I W2736*	British flying boat, 1942.	-	1352956	-	-0.366581936	50.66666174	50
Aircraft	Typhoon *MK IB JP532*	British fighter, 1943.	-	1356474	-	-0.366581936	50.66666174	50
Aircraft	Heinkel *HE111H-3 (6915) 6N+HL*	1941 wreck of a German Heinkel He111 which was shot down and crashed off Hove. It was part of Squadron 3/kgr100.	-	1402787	-	-0.133340077	50.66667357	50
Aircraft	*WP275*	The findspot of aircraft remains identified as belonging to aircraft WP275, a British Supermarine Attacker, which crashed into the sea on 6th July 1956 after taking off from Royal Naval Air Station Ford, in Sussex when the wing tip folded.	-	1473508	-	-0.366581936	50.66666174	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by	190301	904307	-	-0.187882	50.6621752	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		fishermen. Possibly indicative of wreckage or a submerged feature.						
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	71969	904311	-	-0.2484399	50.6093859	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	18689	904313	-	-0.248446	50.5913315	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	49231	1027922	-	-0.5632361	50.6738532	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	23715	1027926	-	-0.6220987	50.6232847	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	192823	1027929	-	-0.5209677	50.6438404	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly	125086	1027931	-	-0.6470969	50.5849514	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		indicative of wreckage or a submerged feature.						
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	173942	1027933	-	-0.4020648	50.6749507	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	7937	1027934	-	-0.6348738	50.5752196	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	128212	1027936	-	-0.4484586	50.6443994	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	161254	1027937	-	-0.5151375	50.6160601	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	104482	1027941	-	-0.3984617	50.6410601	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly	75010	1027944	--	-0.4348579	50.6241125	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		indicative of wreckage or a submerged feature.						
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	10037	1027951	-	-0.4315229	50.5993928	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	144550	1027955, 1027948	-	-0.1859397	50.6618908	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	124838	1027960	-	-0.2484422	50.5910526	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	141827	1027907	-	-0.6212565	50.7189005	50
Fishermen's Fasteners	-	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.	-	1027958, 904311	-	-0.249972081	50.60999079	50
Monument/ site/ find	-	A bone fragment was found at Erith Wharf after dredging operations by the City of Westminster from	-	1545543	-	-0.450132562	50.66517879	0

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		licence area 122/1A which is located off the South Coast near Bognor Regis. The material was dredged on 28 April 2011.						
Monument/ site/find	-	An animal bone was found during dredging activities in Licence are 124/1A at Owers Bank, approximately 11 miles south-south-west of Worthing. The animal bone was discovered at Burnley Wharf in material dredged by TARMAC before July 2010.	134529	1524328	-	-0.4487668	50.6642476	0
Monument/ site/find	-	An animal bone fragment was discovered onboard Sand Harrier in summer 2010 during dredging operations. The material was dredged from Licence Area 123G (Owers) which is located about 14 miles south-south-east of Bognor Regis.	58587	1531709	-	-0.6111184	50.5946338	0
Monument/ site/find	-	A ship timber fragment with copper nails was found after dredging operations by the City of Westminster from licence area 122/1A	-	1545521	-	-0.4486187	50.6645849	0

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		which is located off the South Coast near Bognor Regis. The material was dredged on 17 March 2011. The fragment is 460mm long.						
Monument/ site/find	-	Atherington Village (eroded parts).	164862	392896	-	-0.5739093	50.7962232	0
Monument/ site/find	Bronze Age Finds - Bayliffscourt	-	-	-	-	-0.57526766	50.79551246	0
Monument/ site/find	Cudlow DMV	-	-	-	-	-0.57815394 9	50.79392873	0
Monument/ site/find	Atherington DMV	-	-	-	-	-0.57199120 5	50.79592209	0
Monument/ site/find	Prehistoric Finds - Bayliffscourt	-	-	-	-	-0.57598241 4	50.7953413	0
Monument/ site/find	Roman Pottery, West Beach	-	-	-	-	-0.56099348 4	50.79821536	0
Monument/ site/find	Coastal Defences, Elmer	-	-	-	-	-0.60943260 8	50.78178222	0
Monument/ site/find	Rustington - worked stone	-	-	-	-	-0.51948964 9	50.80021431	0

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Monument/ site/find	Brick	-	-	-	-	-0.520735245	50.80121947	0
Monument/ site/find	Post	-	-	-	-	-0.518658329	50.79957416	0
Monument/ site/find	Rustington Beach - Samian	-	-	-	-	-0.520034399	50.80094076	0
Monument/ site/find	Well - Elmer	-	-	-	-	-0.597829499	50.79083909	0
Monument/ site/find	-	Two wooden finds and a fragment of animal bone were found in material dredged from licence area 396 approximately 16km south-west of Worthing. The wooden fragments show no sign of fastenings, are highly abraded and may be oak.	-	1494167	-	-0.513910049	50.69090063	0
Monument/ site/find	-	A copper or brass hinge and a metal screw top unit were recovered from dredging material. It was dredged in May 2009 in Licence Area 396, approximately 12 kilometres off the coast of	-	1500558	-	-0.513910049	50.69090063	0

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		West Sussex. The exact position is unknown.						
Monument/ site/find	-	A ship's telephone and earpiece found in material dredged by Tarmac Marine Ltd from Licence Area 396/1, approximately 6.2 nautical miles south of Rustington, West Sussex. The object was discovered at Shoreham Wharf on 25 April 2016.	-	1604635	-	-0.516454339	50.69833191	0
Monument/ sitefind/	-	Site of former settlement of Cudlow, possibly deserted in medieval times and abandoned to the sea; recorded in the process of erosion in 1779, when only part of the church remained.	30945	392881	-	-0.5796378	50.7944943	0
Obstruction	Foul ground	-	20171	3707	LIVE	-0.322084	50.6194888	50
Obstruction	Foul ground	-	20185	3714	LIVE	-0.3420835	50.6603176	50
Obstruction	Obstruction	-	20174	8110	LIVE	-0.293477	50.6544856	50
Obstruction	Obstruction	-	19992	8268	DEAD	-0.44	50.62805	50
Obstruction	Obstruction	-	61633	8269	DEAD	-0.4165333	50.6366167	50
Obstruction	Obstruction	-	61581	12226	LIVE	-0.5534	50.6718667	50
Obstruction	Obstruction	-	19989	14115	LIVE	-0.2765331	50.6255999	50
Obstruction	Foul ground	-	20040	14312	DEAD	-0.4135667	50.6634	50
Obstruction	Foul ground	-	19986	302183484	DEAD	-0.6417	50.6292	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Obstruction	Foul ground	-	20171	1001698856	LIVE	-0.293483333	50.654483333	50
Obstruction	-	Remains of unidentified feature.	84895	911182	-	-0.4515143	50.6310638	50
Obstruction	-	Remains of unidentified feature.	25545	911184	-	-0.5695884	50.6350923	50
Obstruction	-	Remains of unidentified feature.	198832	911200	-	-0.3812289	50.6571758	50
Obstruction	-	Remains of pile of stone blocks	190303	911203	-	-0.4109579	50.6643947	50
Obstruction	-	Remains of an unidentified feature. Possibly part of a Mulbery Harbour unit.	-	911221	-	-0.6288863	50.7088236	50
Wreck	Unknown wreck	Speed boat.	94028	8121	UNKNOWN	-0.5917167	50.7703667	50
Wreck	Unknown wreck	-	89831	12223	UNKNOWN	-0.4064	50.6783	50
Wreck	Unknown wreck	-	19994	14301	DEAD	-0.6417	50.6292	50
Wreck	SS *Vesuvio* (possibly)	Steam ship; Sunk: 1916/04/06; Length: 74.1m; Beam: 10.1m; Draught: 5.5m; Tonnage: 1391; Cargo: general, including ammunition.	19952	1001698676, 911741	LIVE	-0.508816667	50.592733333	50
Wreck	Unknown wreck	-	20170	1001698689	LIVE	-0.284083333	50.58995	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	SS *Glenarm Head* (possibly)	Steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908; Cargo: fodder, guns and charcoal.	20169	1001698719	LIVE	-0.221416667	50.58393333	50
Wreck	SS *Clan Macmillan*	Steam ship; Sunk: 1917/03/23; Length: 120.7m; Beam: 14.6m; Draught: 8.2m; Tonnage: 4525; Cargo: ballast and 50 tons coir matting.	20168	1001698723, 1614454	LIVE	-0.256633333	50.5795	50
Wreck	SS *Porthkerry*	Steam ship; Sunk: 1917/05/20; Length: 85.3m; Beam: 12.2m; Draught: 5.5m; Tonnage: 1920; Cargo: coal.	20238	1001698830, 911751	LIVE	-0.3143	50.63005	50
Wreck	SS *Alert*	Steam ship; Sunk: 1916/11/28; Length: 38.1m; Beam: 7m; Draught: 3m; Tonnage: 289.	19945	1001708065	DEAD	-0.534833333	50.58393333	50
Wreck	Unknown wreck	Wooden vessel; sunk: 1955/12/08.	20058	1001708267	DEAD	-0.405133333	50.67615	50
Wreck	Unknown wreck		20261	1001708285, 911195	DEAD	-0.3916	50.64701667	50
Wreck	Unknown wreck	Cargo: 507,1. Remains of a cargo vessel, carrying a cargo of steel plate and coils of wire.	20013	1001708378; 911192	DEAD	-0.426516667	50.64393333	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	SV *Marie Marguerite* (possibly)	Sailing vessel; Sunk: 1924/11/07; Length: 47.7m; Beam: 9.4m; Draught: 4.3m; Tonnage: 491; Cargo: coke.	19973	1001708395, 911744	DEAD	-0.3432	50.61143333	50
Wreck	SS *Stanwold*	Steam ship; Sunk: 1941/02/27; Length: 64m; Beam: 10.1m; Draught: 4.3m; Tonnage: 1020; Cargo: coal.	19998	1001698637, 911752	LIVE	-0.33541667	50.63393333	50
Wreck	SS *Algiers*	Steam ship; Sunk: 1917/02/26; Length: 91.4m; Beam: 11.3m; Draught: 8.2m; Tonnage: 2361; Cargo: munitions.	19935	1001698727, 911732	LIVE	-0.63681667	50.57643333	50
Wreck	SS *Zaanstroom*	Steam ship; Sunk: 1911/12/21; Length: 65.1m; Beam: 9.8m; Draught: 5.1m; Tonnage: 990; Cargo: china clay.	20028	1001698878, 911760	LIVE	-0.61645	50.65228333	50
Wreck	Unknown wreck		20026	1001698881	DEAD	-0.53853333	50.65156667	50
Wreck	Unknown wreck	Boiler/engine/generator.	20068	1001698982, 911214	LIVE	-0.58370526	50.68246213	100
Wreck	Unknown wreck	Sailing vessel; Cargo: general.	20067	1001698983, 911213	LIVE	-0.6097	50.6821	50
Wreck	SS *Shirala*	Steam ship; Sunk: 1918/07/02; Length: 125m; Beam: 15.5m; Draught:	20069	1001698984, 911773	LIVE	-0.58716667	50.68208333	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		8.8m; Tonnage: 5306; Cargo: ammunition, general, wine, ivory and spares.						
Wreck	Unknown wreck	Steam ship; Cargo: 505, 6.	20064	1001698999	LIVE	-0.481416667	50.67993333	50
Wreck	HMS *Northcoates*	Trawler; Sunk: 1944/12/02; Length: 38m; Beam: 7.6m; Tonnage: 277.	20036	1001699065, 911763	LIVE	-0.589933333	50.66196667	50
Wreck	HMT *Pine*	Trawler; Sunk: 1944/01/31; Length: 45.7m; Beam: 7.6m; Draught: 3.7m; Tonnage: 545.	20091	1001699103, 911778	LIVE	-0.619733333	50.71761667	50
Wreck	SS *Jenny*	Fishing vessel; Sunk: 1979/09/14; Length: 16.2m	19985	1001708291	DEAD	-0.49985	50.62393333	50
Wreck	SS *Porthkerry*	Steam ship; Sunk: 1917/05/20; Length: 85.3m; Beam: 12.2m; Draught: 5.5m; Tonnage: 1920.	19978	1001708356	DEAD	-0.143216667	50.61726667	50
Wreck	*LCM*	Length: 15.2m; Beam: 4.3m; Draught: 1.2m; Tonnage: 30.	58349	1001702055	LIFTED	-0.54095	50.79751667	50
Wreck	Unknown wreck	Landing craft; Length: 15.2m; Beam: 4.3m; Draught: 1.2m; Tonnage: 30.	20149	1001702056, 911256	LIFTED	-0.541516667	50.79725	50
Wreck	SV *Marie Marguerite* (possibly)	Sailing vessel; Sunk: 1924/11/07; Length: 47.7m; Beam: 9.4m;	19973	302183409	DEAD	-0.3455167	50.6114667	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		Draught: 4.3m; Tonnage: 491; Cargo: coke.						
Wreck	Unknown wreck	-	19990	1001707997, 911176	DEAD	-0.44735	50.62671667	50
Wreck	Unknown wreck	-	58308	1001708002	DEAD	-0.49985	50.62586667	50
Wreck	Unknown wreck	Sunk: 1917/01/01.	19979	1001708355, 911173	DEAD	-0.43333333	50.61666667	50
Wreck	SS *Eden*	501; Sunk: 1917/04/30; Length: 75m; Beam: 10.4m; Draught: 5.2m; Tonnage: 1304; Cargo: coal.	20227	1001708370	DEAD	-0.5515	50.69225	50
Wreck	Unknown wreck	-	20046	1001708376, 911205	DEAD	-0.34986667	50.66726667	50
Wreck	Unknown wreck	-	58393	1001708404	DEAD	-0.51651667	50.69045	50
Wreck	Unknown wreck	-	20003	1001708467	DEAD	-0.57261667	50.63628333	50
Wreck	Unknown wreck	-	58365	1001708328	DEAD	-0.27708333	50.61976667	50
Wreck	Unknown wreck	-	19994	1001708596	DEAD	-0.63988333	50.62835	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	Unknown wreck	-	58366	1001708393	DEAD	-0.327916667	50.61171667	50
Wreck	SS *St Anne*	501; sunk: 1924/04/07; tonnage: 2247.	20044	1001708407	DEAD	-0.20155	50.66726667	50
Wreck	Unknown wreck	-	85937	302110021	UNKNOWN	-0.537616667	50.79575	50
Wreck	SS *Concha*	Built 1919 by Eriksbergs M/V A/B, Gothenburg. Owned at time of loss by Compania Linea Roza Ltd. Passage Dublin for Swansea. Sank off Grassholm Island following explosion and fire in engine room.	-	911210	LIVE	-0.4781815	50.6785695	50
Wreck	-	Remains of vessel.	-	911174	-	-0.3190068	50.6182791	50
Wreck	-	Wreck remains believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges without propulsion on which they were towed, located approximately 11.5 miles SE of Selsey Bill or 11.7 miles SSE of Bognor Regis.	-	911175	-	-0.5668105	50.6241197	50
Wreck	-	Remains of a cargo vessel	199914691	911177	-	-0.3145673	50.6257803	50
Wreck	-	Remains of a drifter or trawler. The wreck has	199972531	911179	-	-0.438744	50.6263326	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		been suggested to be either the remains of the *Klondyke*, sunk 4 June 1916 after a collision near the Owers Light Vessel (see 1614394) or the remains of the *Evadne*, sunk on 27 February 1917 by a mine.						
Wreck	-	Possible remains of vessel.	-	911180	-	-0.6368774	50.6271467	50
Wreck	-	Remains of a vessel located approximately 10.9 nautical miles south of Worthing. The wreck appears to have broken in to two pieces.	-	911181	-	-0.3248402	50.6280065	50
Wreck	-	Possible remains of vessel.	-	911193	-	-0.520699	50.6438369	50
Wreck	-	Remains of cargo of stone blocks, located approximately 8.75 miles south of Littlehampton. This cargo is said to belong to a barge or dispersed vessel; the site is also described as being a mound of clay retaining the impression of the timbers of a capsized vessel.	-	911199	-	-0.5387456	50.6549492	50
Wreck	-	Possible remains of a wreck.	-	911202	-	-0.3390032	50.6591182	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	-	Possible remains of cargo vessel	-	911481	-	-0.2067713	50.6452204	50
Wreck	-	Possible remains of a vessel	-	911482	-	-0.1942736	50.6527277	50
Wreck	--	A possible wooden shipwreck dating from the post-medieval period, comprised of several large timbers and an anchor. The remains were discovered during a remote operated vehicle (ROV) survey, approximately 9.0 nautical miles south of Worthing.	-	1601343	-	-0.3408849	50.6587312	50
Wreck		Cargo of metal bars, thought to be steel or cast iron, located on the seabed approximately 6 miles SSW of Littlehampton. This cargo appears to retain its deck arrangement, suggesting that it was not jettisoned, but represents the shipwreck of a vessel.	-	911219	-	-0.5512482	50.6960703	50
Wreck	-	Remains of wreck of craft, located on Littlehampton Beach in the inter-tidal zone, at approximately TQ 023010. In this position the manner of loss appears to	-	1466504	-	-0.5498453	50.7988949	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
		have been stranding. The remains are of a wooden sailing vessel, with a possible mast visible.						
Wreck	SS *Eden*	Remains of cargo vessel, suggested in some sources as those of the 1917 wreck of the Eden, located approximately 9.25 miles south of Littlehampton. If the remains of the Eden, she was a Norwegian cargo vessel which foundered after being torpedoed.	-	911197	-	-0.536646976	50.650819994	50
Wreck	Wreck - West Beach	Unknown wreck.	-	MWS3897	-	-0.551062895	50.798092422	50
Wreck	SS *Huntsholm*	Possible remains of the 1917 wreck of a Scottish cargo vessel, located approximately 8.6 nautical miles south-east of Selsey Bill. See 1390471 for the account of the wreck event.	-	911749	-	-0.624979301	50.623875334	50
Wreck	SV *Supply*	1813 wreck of English brig which foundered off Littlehampton following a collision. Constructed of wood, she was a sailing vessel.	-	1176754	-	-0.541603346	50.700016122	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	SS *Alison*	1916 wreck of English cargo vessel which foundered 8 miles SE of the Owers light vessel after being scuttled by a boarding party from a German U-boat. Bound from Le Havre to Littlehampton with government stores, she was a steel-built, steam-powered vessel.	-	1238821	-	-0.541640457	50.70002961	50
Wreck	*Gordyx*	Galliot, 1763	-	1319703	-	-0.541640457	50.70002961	50
Wreck	*Prosperity*	English cargo vessel, 1826.	-	1165633	-	-0.366581936	50.66666174	50
Wreck	*Sainte Anne*	French cargo vessel, 1924.	20044	1174895	-	-0.133338134	50.66666839	50
Wreck	*Tally-Ho*	British lugger, 1881.	-	1174965	-	-0.366581936	50.66666174	50
Wreck	*Pecheries Ostendaises V*	Belgian trawler, 1910.	142319	1238667	-	-0.366581936	50.66666174	50
Wreck	*Stavros*	Greek cargo vessel, 1920.	19921	1240377	-	-0.366614364	50.66666779	50

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck	*Catch Me If You Can*	Schooner, 1815.	-	1344456	-	-0.366614364	50.66666779	50
Wreck	Unknown	1814 wreck of cutter, probably English, which foundered off Brighton during a storm, with her cargo of porter; a wooden sailing vessel.	-	1401726	-	-0.133340077	50.66667357	50
Wreck	SS *Pagenturm*	501; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000.	20050	1001708345	DEAD	-0.198216667	50.66893333	50
Wreck	SS *Gartland*	501; Sunk: 1918/01/03; Length: 91m; Beam: 12.2m; Draught: 6.1m; Tonnage: 2613; Cargo: coal.	19980	1001708354	DEAD	-0.568166667	50.61726667	50
Wreck	SS *Broadhurst* (probably)	501; sunk: 1940/07/26; tonnage: 1013; cargo: coal.	19951	1001708022	DEAD	-0.251533333	50.59226667	50
Wreck, seen in geophysical data (MA0004)	MV *Gerlen* (possibly)	Motor vessel; Sunk: 1972/07/19; Length: 38.7m; Beam: 7m; Draught: 2.4m; Tonnage: 299.	20005	1001698817	LIVE	-0.160819459	50.63081215	100
Wreck, seen in geophysical data (MA0007)	Unknown wreck	-	19961	1001698662, 911464	LIVE	-0.189334623	50.59831581	100

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
Wreck, seen in geophysical data (MA0008)	SS *Glenarm Head* (possibly)	Steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908; Cargo: ammunition.	20012	1001698827, 911884	LIVE	-0.190991984	50.64414447	100
Wreck, seen in geophysical data (MA0009)	SS *Pagenturm*	Steam ship; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000; Cargo: military stores.	20001	1001698774, 911879	LIVE	-0.216904553	50.63520483	100
Wreck, seen in geophysical data (MA0010)	HMS *Minion*	Destroyer; Sunk: 1921/01/01; Length: 84.1m; Beam: 8.2m; Draught: 3m; Tonnage: 1042.	20014	1001698811, 911756	LIVE	-0.23312559	50.64427882	100
Wreck, seen in geophysical data (MA0011)	Unknown wreck	Steam ship; Cargo: coal.	19975	1001698782	LIVE	-0.277384815	50.61688512	100
Wreck, seen in geophysical data (MA0012)	SS *London Trader* (possibly)	Steam ship; Sunk: 1940/07/26; Length: 59.9m; Beam: 8.8m; Draught: 3.4m; Tonnage: 646; Cargo: 750 tons of coal.	19972	1001698661	LIVE	-0.30268617	50.59876654	100
Wreck, seen in geophysical	SS *Quail*	Steam ship; Sunk: 1886/08/27; Length: 68.3m; Beam: 8.5m; Draught: 5.2m; Tonnage:	20000	1001698638, 911753	LIVE	-0.307580983	50.63465411	100

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
data (MA0013)		924; Cargo: natural fibres and materials in general.						
Wreck, seen in geophysical data (MA0014)	Unknown wreck	-	19970	1001698895	LIVE	-0.315753358	50.60492929	100
Wreck, seen in geophysical data (MA0015)	Unknown wreck	Steam ship; Tonnage: 2000; Cargo: ballast.	19991	1001698867	LIVE	-0.317819394	50.62693768	100
Wreck, seen in geophysical data (MA0016)	Unknown wreck	Freighter.	19996	1001698846	LIVE	-0.327400238	50.63022762	100
Wreck, seen in geophysical data (MA0017)	*Ny-Eeasteyr*	Fishing vessel; Sunk: 1980/12/08; Length: 24.1m; Beam: 6.4m; Draught: 2.4m; Tonnage: 61.	20186	1001698765, 1522854	LIVE	-0.360153976	50.66046253	100
Wreck, seen in geophysical data (MA0018)	SS *Ramsgarth*	Steam ship; Sunk: 1916/11/28; Length: 74.7m; Beam: 11m; Draught: 5.8m; Tonnage: 1553; Cargo: ballast.	20049	1001699038, 911768	LIVE	-0.394121249	50.66737043	100
Wreck, seen in geophysical	Unknown wreck	-	82762	302183487	UNKNOWN	-0.407123126	50.65512218	100

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
data (MA0019)								
Wreck, seen in geophysical data (MA0020)	SS *Ariel*	Steam ship; Sunk: 1892/06/10; Length: 91.4m; Beam: 12.8m; Draught: 6.1m; Tonnage: 2200; Cargo: grain.	20023	1001698904, 911759	LIVE	-0.414460972	50.64867917	100
Wreck, seen in geophysical data (MA0022)	SS *Cairndhu*	Steam ship; Sunk: 1917/04/15; Length: 112.8m; Beam: 15.5m; Draught: 7.6m; Tonnage: 4019; Cargo: coal.	19987	1001698891, 911750	LIVE	-0.439059352	50.62495656	100
Wreck, seen in geophysical data (MA0024)	Unknown wreck	-	19993	1001698848	LIVE	-0.441631372	50.62764432	100
Wreck, seen in geophysical data (MA0025)	SS *Jaffa*	Steam ship; Sunk: 1918/02/02; Length: 79.2m; Beam: 10.7m; Draught: 4.9m; Tonnage: 1383; Cargo: ballast.	20010	1001698842, 911755	LIVE	-0.452043531	50.64278592	100
Wreck, seen in geophysical data (MA0026)	Unknown wreck	Landing craft.	20020	14307	LIVE	-0.51584597	50.64675202	100
Wreck, seen in geophysical	Unknown wreck	Barge.	19988	1001698869	LIVE	-0.569893498	50.62546671	100

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
data (MA0027)								
Wreck, seen in geophysical data (MA0029)	SS *War Helmet*	Steam ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: ballast.	19984	1001698913, 911748	LIVE	-0.610082464	50.62345927	100
Wreck, seen in geophysical data (MA0030)	SS *Afon Dulais*	Steam ship; Sunk: 1942/06/20; Length: 63.4m; Beam: 10.1m; Draught: 4m; Tonnage: 988; Cargo: coal.	19947	1001698704	LIVE	-0.641487765	50.58507735	100
Wreck, seen in geophysical data (MA0032)	SS *Lightfoot* (possibly)	Steam ship; Sunk: 1918/03/16; Length: 81.7m; Beam: 20m; Draught: 2m; Tonnage: 1875; Cargo: ballast.	19948	1001698697	LIVE	-0.648693588	50.58631713	100
Wreck, seen in geophysical data (MA0033)	SS *Gartland*	-	19971	14323, 911743	LIVE	-0.657138041	50.60492698	100
Wreck, seen in geophysical data (MA0034)	Unknown wreck	-	20075	12225	LIVE	-0.553929879	50.697199	100
Wreck, seen in geophysical	SS *Glenlee*	Steam ship; Sunk: 1918/08/09; Length: 121.9m; Beam: 16.2m; Draught: 8.2m; Tonnage:	20055	1001699013, 911770	LIVE	-0.56490425	50.67530035	100

Category	Name	Description	UKHO ID	GID/HOD ID	Status	X	Y	AEZ
data (MA0036)		4915; Cargo: 2100 tons of steel.						
Wreck, seen in geophysical data (MA0062)	SS *Broadhurst* (probably)	Steam ship; Sunk: 1940/07/26; Length: 66.1m; Beam: 10.4m; Draught: 4m; Tonnage: 1013; Cargo: coal.	19959	1001698668	LIVE	-0.233265167	50.59711451	100

Annex B
Recorded losses

Object id	Hob ooid	UKHO id	Name	Description	Type
102435	911749	-	SS *Huntsholm*	Possible remains of the 1917 wreck of a Scottish cargo vessel, located approximately 8.6 nautical miles south-east of Selsey Bill. See 1390471 for the account of the wreck event.	Named Location
140407	1176754	-	*Supply*	1813 wreck of English brig which foundered off Littlehampton following a collision. Constructed of wood, she was a sailing vessel.	Named Location
143977	1237642	-	*Lovely Druiner*	English ketch, 1887	Named Location
144114	1238821	19941	SS *Alison*	1916 wreck of English cargo vessel which foundered 8 miles SE of the Owers light vessel after being scuttled by a boarding party from a German U-boat. Bound from Le Havre to Littlehampton with government stores, she was a steel-built, steam-powered vessel	Named Location
151026	1319703	-	*Gordyx*	Galliot, 1763	Named Location
154821	1341010	-	Beaufighter *MK VIF MM869*	British Fighter, 1943	Named Location

Object id	Hob ooid	UKHO id	Name	Description	Type
157982	1354187	-	Wellington *MK IV Z1278*	British Heavy Bomber, 1942	Named Location
158093	1354833	-	Halifax *MK III LW132*	British Heavy Bomber, 1944	Named Location
171800	1400236	-	*JU87B*	1940 wreck of a German Junkers Ju87 which was shot down off Littlehampton. It was part of Squadron III/StG77.	Named Location
172800	1403523	-	Dornier *DO217E-4 (5383)*	1942 wreck of a Dornier Do217 which was shot down and crashed off Littlehampton. It was part of Squadron 1/KG2.	Named Location
181844	1444173	19935	SS *Algiers*	1917 wreck of English cargo vessel which foundered 3 miles south of the Owers Light Vessel after being torpedoed by a U boat *en route* from Calais to Barry Roads in ballast. Constructed of iron and steam driven.	
99735	902640	58393		Craft, 1789	Named Location
150913	1319189	-	Hurricane *MK I P3140*	British Fighter, 1940	Named Location
151989	1325139	-	Spitfire *MK I L1019*	British Fighter, 1940	Named Location
139691	1165633	-	*Prosperity*	English cargo vessel, 1826	Named Location

Object id	Hob ooid	UKHO id	Name	Description	Type
140147	1174895	20044	SS *Sainte Anne*	French cargo vessel, 1924	Named Location
140175	1174965	-	*Tally-Ho*	British lugger, 1881	Named Location
144099	1238667	-	FV *Pecheries Ostendaises V*	Belgian trawler, 1910	Named Location
144235	1240377	19921	SS *Stavros*	Greek cargo vessel, 1920	Named Location
155223	1342738	-	Havoc *MK I BD124*	British Fighter, 1941	Named Location
155682	1344456	-	*Catch Me If You Can*	Schooner, 1815	Named Location
157795	1352956	-	Walrus *MK I W2736*	British Flying Boat, 1942	Named Location
158412	1356474	-	Typhoon *MK IB JP532*	British Fighter, 1943	Named Location
172278	1401896	-	Junkers *JU88A-5 (01419) 7A+LM*	1941 wreck of a German Junkers Ju88 which was probably shot down and crashed off Worthing. It was part of Squadron 4(F)/121.	Named Location

Object id	Hob ooid	UKHO id	Name	Description	Type
172290	1401913	-	Heinkel *HE111P-4 (2976) G1+KH*	1941 wreck of a German Heinkel He111 which was shot down and crashed off Worthing. It was part of Squadron 1/KG55.	Named Location
191647	1473508	-	*WP275*	The findspot of aircraft remains identified as belonging to aircraft WP275, a British Supermarine Attacker, which crashed into the sea on 6th July 1956 after taking off from Royal Naval Air Station Ford, in Sussex.	Named Location
123986	911202	-		Possible remains of a wreck.	Point
123993	911210	11977	SS *Concha*	Built 1919 by Eriksbergs M/V A/B, Gothenburg. Owned at time of loss by Compania Linea Roza Ltd. Passage Dublin for Swansea. Sank off Grassholm Island following explosion and fire in engine room.	Point
102436	911754	-	SS *Eden*	Possible remains of 1917 wreck of Norwegian cargo vessel, said to be located approximately 10 miles south of Worthing Pier. If the Eden, she was an iron steamer which foundered after being torpedoed *en route* from the River Tyne for Rouen with coal. This wreck has two additional potential locations listed in the UKHO data and one additional potential location listed below, however the distance between all potential sites ranges from 2.8 km to 14 km so all have been included. None of the potential recorded locations correlated with geophysical anomalies.	Point
189321	1465830	-	SS *Eden*	A second potential location for the 1917 wreck of Norwegian cargo vessel which foundered 8 to 10 miles SW of Worthing Pier after being torpedoed *en route* from South Shields for Rouen with coal. She had been abandoned by her crew after escaping a previous torpedo fired. This wreck has two additional potential locations	

Object id	Hob ooid	UKHO id	Name	Description	Type
				listed in the UKHO data and one additional potential location listed above, however the distance between all potential sites ranges from 2.8 km to 14 km so all have been included. None of the potential recorded locations correlated with geophysical anomalies.	

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Annex C
Receiver of Wreck records

Droit Number	Name of Wreck	Description
A/0008	HMS *Pagenturm*	1 x china plate
A/0398	U-boat (Unknown)	1 x U boat toilet
A/2711	HMS *Inverclyde* (1942)	1 x brass shelf with holes in it, 1 x small brass valve, 1 x part of telegraph (wheel & handle), 1 x brass box lid
A/1368	Unknown	1 x Walker's Log head, 1 x plate, 1 x oil lamp, 1 x electric metre wooden case, 1 x egg cup
A/1998	Unknown	1 x terracotta bowl 10" diameter, 1 x fire hose muzzle, 1 x pottery fragment - neck of jug with handle, probably 15th-16th century according to local museum, 1 x anchor 43"
A/3692	SS *Quail*	5 x bottles
A/1267	*City of Waterford*	1 x brass casting - possibly a flange - photograph provided.
A/3801	Unknown	1 x gun part, 2 x shell cases
A/0996	*Ariston*	1 x 9" porthole.
A/2925	HMS *Pagenturm*	1 x porthole

Droit Number	Name of Wreck	Description
A/3677	Unknown	3 x fittings, 1 x connector, 12 x shell cases, 1 x copper pin, 7 x valves
A/4126	Unknown	1x naval shell
A/4098	*Candia*	1x bottle with cork in bottom, 1x brass object resembling propeller blade
A/4102	SS *Quail*	13x wine glasses
A/4104	Unknown	1x gauge, 1x porthole, 2x clay pipes, 3x clay jars, 4x bottles, 1x double handed telegraph, 1x brass plate inscribed with quartermaster, attached to a small piece of timber.
A/4086	Unknown	2 x portholes, 1 x skylight, 1 x pair hatch winders, 3 x shell cases, 2 x shell heads
A/1479	Unknown	2 x gate valves
A/4305	HMS *Pagenturm*	1x compass, 1x ships gimbles clock.
A/4311	Unknown	1x brass ships bell, half ships bell, 1x ships bell, 1x rectangular porthole, 1x white earthenware mug, 1x pistol, 1x copper ingot, 1x white earthenware bottle,2x brown earthenware bottle, clear glass bottle,1x fish from ships log,1x compass.
A/4504	Brighton cannon site - protected.	1 x cannon, iron. 1 x breech block wrought iron built up cannon, c.1520. 1 x barrel of wrought iron built-up gun.
A/4604	Brighton cannon site - protected wreck	2 x hollow lead shot, bronze c15th century Hackbutt swivel gun without tiller arm. Iron swivel supports, swivel gun spike for breech loading gun, lead plumb weight, collection of part melted shot from crucible.

Droit Number	Name of Wreck	Description
385/07	HMS *Minion*	2 x pressure gauges; 1 x brass wheel; 1 x electric fuse box
243/07	HMS *Pagenturm*	1 x Ship's builders plate inscribed 'SS 233, JoH. C. Techlenborg A-G, Shiffswerft und Machinenfabrik, Bremenhaven, Geestmunde 1909', brass, excellent condition. 1 x Twin lever telegraph with pedestal, brass, intact, areas of heavy corrosion, 4ft high, 14" diameter face, not yet cleaned & therefore uncertain about markings.
326/16	Unknown	1 x Flat based Hamilton or 'torpedo' bottle, stands 220mm high, with a 12mm wide neck and 54mm wide base and 79mm wide at the waist, it has an 'A' embossed on its base, there is possibly other text/numerals worn away present.
327/16	Unknown	1 x Flat based Hamilton or 'torpedo' bottle, stands 210mm high with a 25mm wide neck and 45mm wide base, it has 'SCHWEPPES', 'BY APPOINTMENT' and a UK royal coat of arms embossed on one side and 'BL' on the base.
316/16	Unknown	1 x cylindrical screw top beverage bottle, 500mm tall, 71mm wide at its base, 73mm wide at the shoulder with a 31mm wide neck, it is embossed with 'T. LINSLEY & Co Registered Trade Mark HULL' with a mounted rider and catafalque/plinth logo also present,
321/16	Unknown	1 x small cologne bottle, part prismatic, 5 flat faces, 1 curved. Embossed with 'Rue de la Cloche, No.4711 a Cologne' on one of the flat faceted faces.
322/16	Unknown	1 x cylindrical beverage bottle with an intact screw stopper, is embossed with 'D. STERRY & SONS LIMEHOUSE', there is also ‘DS' embossed on the base, the stopper is stamped 'HEY & HUMPHRIES, LEEDS 1911', the bottle is 204mm high with a 61mm base and 62mm wide at the shoulder, the neck is 30mm wide, with a straight lip and internal screw, the stopper is made of cork and Bakelite.

Droit Number	Name of Wreck	Description
323/16	Unknown	1 x Blob top squat cylindrical beverage bottle with 'Pint' and 'Imperial' embossed on shoulder, its base is date stamped 1892, it is 190mm tall and still has part of a cork present, it has a neck that is not 'square' to the rest of the bottle, it is 65mm wide at the base, 67mm wide at the shoulder and the throat of the bottle is 15mm wide with an internal screw thread.
324/16	Unknown	1 x cylindrical beverage bottle, 230mm tall, 59mm wide at the base and 61mm wide at the shoulder with a 13mm neck, it is embossed with 'W. CORRY & Co. Ltd Registered Trade Mark, BELFAST', the logo appears to be an eagle holding olive branches.
310/17	SS *Bessell*	2 x Earthenware gin bottles. 2 x 2oz medicine bottles. 1 x Complete toothpaste pot. 2 x Bases of toothpaste pot.
101/02	SS *London Trader (1940)*	1 x Porthole, 1 x Mug.
010/15	Unknown	1 x Olive lamp, brass or bronze object, possibly an old oil lamp, slightly bent with uneven patina, size approx. 12 x 10 x 5cm. Image provided shows small poss. Cu alloy lidded jug-shaped lamp with naïve bird shaped handle on lid and on handle for pouring.
A/2341	HMS *Brazen* (possibly)	1 x cannon.
A/4195	Unknown	1x compass case, 1x 4" brass shell case (empty).
A/0160	Unknown	1 x water jug, 1 x fire hose, 1 x filler cup, 3 x wheel boses, 1 x tray, 1 x flare gun, bottles, stair tread, 1 x cannon ball, 1 x large empty shell case, 1 x handle, 1 x bulkhead light.
A/1242	Unknown	1 x brass clamp, 1 x sounding weight.
A/4027	Unknown	1 x porthole, 6 x lead grapeshot balls

Droit Number	Name of Wreck	Description
A/1491	Unknown	16 x 8 Reals, 1 x stone anchor (is more likely some kind of weight).
A/4195	Unknown	1x compass case, 1x 4" brass shell case (empty).
B063/93/94	Unknown	1 x bronze age axe head app. 8" long. Approx. 1/3Ib in weight. Good Condition.
128/04	Unknown	1 x stone ring [Row comment - this appears to be a net weight or sinker from photo] - approx. 10 cm diameter, with 3.5 cm hole.
002/20	Unknown	3 x Timbers washed up on tide line after storm Atiyah. 1 x curved, oak, no fasteners, 8' 9" x 5' x 3'. 1 x straight, elm, with scarf joint and perpendicular fasteners including ferrous, 7' x 8' x 4', fasteners 1.5-2" diameter. 1 x Rib section, oak, with 6 pegs, 2' 3" x 4.75" x 3.5", fasteners 1.25" diameter x 5, one perpendicular 1 1/8 " - rib probably one of a pair.
A/2343	SS *Shirala*	1 x trumpet.
128/03	Unknown	1 x Dressel 20 Baetican Roman amphora neck & handles dating mid-1st - mid 3rd century.
141/07	Unknown	1 x Brass binnacle.
249/07	*Indiana*	1 x Compass bowl; 1 x Tureen lid.
059/18	Unknown	1 x Merlin 45gear unit, serial number GU 69677, with a truncated, heavily damaged and corroded, three-bladed propeller.
457/00	*Seaford Ferry*	1 x Plate, china. 1 x Brass plate saying, "engine room".
A/0157	*Thompson*	2 x portholes, 2 x shell cases (empty), 1 x bell, 1 x lead sounding weight, remains of a lamp - since thrown away.

Droit Number	Name of Wreck	Description
A/0160	Unknown	1 x water jug, 1 x fire hose, 1 x filler cup, 3 x wheel boses, 1 x tray, 1 x flare gun, bottles, stair tread, 1 x cannon ball, 1 x large empty shell case, 1 x handle, 1 x bulkhead light.
A/1613	3-mile wreck	1x 3-way brass valve.
A/0506	*Celtic*	1 x Porthole.
A/3481	Unknown	1x brass gauge body, 1x brass cover, 1x brass flanges, 1x brass electric box, 1x brass lamp, 1x brass port + starboard indicator, 2x portholes (no glass).
A/3901	Unknown	1x brass valve,1x brass tee piece, brass disc, brass leuber, 2x shell cases, 1x ceramic mug, 2x champagne bottles,4x shell cases,4x timing heads, 1x porthole window.
A/3903	*Basil*	2x shell cases, 3x timing heads.
046/08	Unknown	1 x Iron anchor, mid-19th century, Spanish, c. 8lb in weight, image provided.
221/17	Unknown	1 x Shell case 660mm x 152mm, empty with no base.
222/17	Unknown	1 x Remnants of a companionway ladder and stair. 1140mm, 150mm wide with 560mm wide step. Step and groove radiused rather than square cut.
223/17	Unknown	2 x Timber pieces (790 x 75 x 90mm and 160 x 100 x 60mm).
224/17	Unknown	1 x Ship's timber 830mm long, 110 x 120mm in profile with 25mm diameter treenail. Slotted on both side for metalwork with visible corrosion products present.
225/17	Unknown	1 x Brass porthole ring. 250mm in diameter with 28mm wide ring.

Droit Number	Name of Wreck	Description
091/07	Unknown	Newly cut timber washed ashore after gales between Christmas and New Year (2006-2007). Dimensions: 100x20mm or 130x20mm. Some were larger - 0.4 to 4.0m in length.
048/14	Unknown ("23")	1 x small sailing dinghy, no mast or keel board, approx. 5' long.
214/99	Unknown	39 planks of wood.

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Annex D
Geophysical anomalies of archaeological potential

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0004	Ovate reflector partially buried with extended shadow; wreck. (1760 nT)	MV *Gerlen* (possibly)	Motor vessel; Sunk: 1972/07/19; Length: 38.7m; Beam: 7m; Draught: 2.4m; Tonnage: 299		20005	1001698817	MA2014	MA4012	MA6868	High	Low	100	700785.01	5612618.39
MA0005	Ovate partially buried reflector; wreck. (17 nT)						MA2017	MA4013	MA5093	High	Not assessed	100	700404.67	5611235.09
MA0007	Pair of ovate hard reflectors with extended shadow; wreck with bow and stern separated but adjacent to each other. (3344 nT)	Unknown	Remains of vessel	911464	19961	1001698662	MA2028	MA4014	MA7123	High	Medium	50	698905.84	5608928.85
MA0008	Strong hard reflector of hull with extended shadow of super-structure; wreck. (1007 nT)	SS *Glenarm Head* (possibly)	Possible remains of 1918 wreck of Northern Irish cargo vessel located approximately 10.25 miles SSW of Brighton. If the SS *Glenarm Head*, she was a steamer, built of steel, which foundered after being torpedoed *en route* from Southampton for Boulogne. Steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908; Cargo: ammunition	911884	19926/20012	1001698827	MA2029	MA4015	MA6738	High	Medium	100	698595.34	5614019.2

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0009	Hard reflector of hull with associated debris and extended shadow; wreck. (4766 nT)	SS *Pagenturm*	Remains of 1917 wreck of English cargo vessel located approximately 18.5 miles SW of Beachy Head or 11.5 miles SSE of Shoreham-by-Sea and identified by her makers' plates. The Pagenturm foundered after being torpedoed *en route* from Sheerness for Barry. Steam ship; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000; Cargo: military stores	911879	20001	1001698774	MA2031	MA4016	MA6784	High	Medium	100	696800.97	5612956.19
MA0010	Cylindrical, partially buried reflector; wreck. (1237 nT)	HMS *Minion*	Remains of 1921 wreck of British destroyer located approximately 14 miles south of Shoreham-by-Sea, and positively identified by her name plate. She foundered in this position while under tow to Germany to be broken up, after being sold out of service. Destroyer; Sunk: 1921/01/01; Length: 84.1m; Beam: 8.2m; Draught: 3m; Tonnage: 1042	911756	20014	1001698811	MA2033	MA4017	MA6705	High	Medium	100	695616.41	5613921.99

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0011	Hard reflector of outline of hull and extended shadow from super-structure; wreck. (691 nT)	SS *Glenarm Head*	Possible remains of 1918 wreck of Northern Irish cargo vessel located approximately 13 miles due south of Shoreham-by-Sea. If the SS *Glenarm Head*, she was a steamer, built of steel, which foundered after being torpedoed *en route* from Southampton for Boulogne. Steam ship; Cargo: fodder, guns and coal	911171	20169	1001698782	MA2036	MA4018	MA6830	High	Medium	100	692599.74	5610760.59
MA0012	Cylindrical hard reflector partially buried with extended shadow; wreck. Associated with two hard reflectors ca 100m to the NNE. (2435 nT)	SS *London Trader* (possibly)	steam ship; Sunk: 1940/07/26; Length: 59.9m; Beam: 8.8m; Draught: 3.4m; Tonnage: 646; Cargo: 750 tons coal		19972	1001698661	MA2041	MA4031	MA7043	High	Medium	100	690883.5	5608680.83
MA0013	Cylindrical hard reflector approx. 70m long with pronounced shadow of super structure; steel hulled vessel. (1375 nT)	SS *Quail*	Remains of the 1886 wreck of an Irish cargo vessel, located approximately 10.7 nautical miles SE of Worthing. The SS *Quail* foundered following a collision with the French steam ship San Martin. She was *en route* from Antwerp to Glasgow, with a general cargo. Steam ship; Sunk: 1886/08/27; Length:	911753	20000	1001698638	MA2042	MA4019	MA7268	High	Medium	100	690392.13	5612657.95

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			68.3m; Beam: 8.5m; Draught: 5.2m; Tonnage: 924; Cargo: natural fibres and materials in general											
MA0014	Cylindrical hard reflector partially buried with extended shadow; wreck. (637 nT)	Unknown			19970	1001698895	MA2044	MA4020	MA6876	High	Medium	100	689934.07	5609332.38
MA0015	Strong hard reflector with extended shadow and scour; wreck. (909 nT)	Unknown	Remains of a cargo vessel. Steam ship; Tonnage: 2000; Cargo: 537	911177	19991	1001698867	MA2045	MA4021	MA6724	High	Medium	100	689699.3	5611773.82
MA0016	Scattered reflectors over approx. 100m with extended masking shadow; wreck. (7720 nT)	Unknown	Remains of a vessel located approximately 10.9 nautical miles south of Worthing. The wreck appears to have broken in to two pieces. Freighter.	911181	19996	1001698846	MA2047	MA4022	MA6693	High	Medium	100	689008.59	5612115.08
MA0017	Isolated reflector with elongated shadow; potential wreck.	*Ny-Eeasteyr*	A Manx fishing vessel which leaked and foundered approximately 8.9 miles SSE of Worthing pier while *en route* from Great Yarmouth to Ramsey on the Isle of Man. Built of wood in Germany in 1970, she was an engine-driven vessel. Fishing vessel; Sunk: 1980/12/08; Length: 24.1m; Beam: 6.4m;	1522854	20186	1001698765	MA2053	MA4025	n/a	High	Low	100	686572.7	5615393.35

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			Draught: 2.4m; Tonnage: 61											
MA0018	Partially buried hull of vessel with extended shadows; wreck. (1198 nT)	SS *Ramsgarth*	Remains of 1916 wreck of English cargo vessel which foundered 11 miles SE of the Owers light vessel after being fired on, whereupon the ship was abandoned. She was lost in company with the Alert [wreck event SZ 97 NW 45; possible remains TV 07 NW 4]. Steam ship; Sunk: 1916/11/28; Length: 74.7m; Beam: 11m; Draught: 5.8m; Tonnage: 1553; Cargo: ballast	911768	20049	1001699038	MA2055	MA4001	MA5011	High	Medium	100	684145.34	5616076.3
MA0019	Ovate reflector with large shadow; potential anthropogenic debris or boulder.	Unknown			82762	302183487/ 302110600	MA2057	MA4026	n/a	High	High	100	683274.37	5614682.34
MA0020	Partially buried vessel with shadow extending from bow structure; wreck. (2311 nT)	SS *Ariel*	Remains of the 1892 wreck of an English cargo vessel, which foundered following a collision approximately 9.8 nautical miles SSW of Worthing. She was an iron-hulled steamer, *en route* from Varna to Hamburg with a cargo of wheat. Steam ship; Sunk: 1892/06/10; Length:	911759	20023	1001698904	MA2060	MA4002	MA6277	High	Medium	100	682780.79	5613947.9

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			91.4m; Beam: 12.8m; Draught: 6.1m; Tonnage: 2200; Cargo: grain											
MA0021	Buried linear reflector with shadow; potential anthropogenic debris or sand bar.						MA2062	MA4027	n/a	High	Not assessed	100	682506.47	5614392.72
MA0022	Extended shadow from centre of vessel with hull plating and scattered debris in surrounding area; wreck. (7729 nT)	SS *Cairndhu*	Remains of English cargo vessel, 1917. Steam ship; Sunk: 1917/04/15; Length: 112.8m; Beam: 15.5m; Draught: 7.6m; Tonnage: 4019; Cargo: coal	911750	19987	1001698891	MA2065	MA4003	MA5029	High	Medium	100	681133.27	5611250.11
MA0024	Pair of reflectors with extended shadow showing separated bow and stern of vessel; wreck. (1022 nT)	Unknown	Remains of a wreck broken into two parts approximately 15m apart. The south-eastern part has two boilers at its north-western end, while the other half is a mass of debris. It has been suggested this wreck may possibly be in four parts, with the other two boilers of the same dimensions as those found here forming UKHO obstruction 19992 some 130m away to the northeast.	911179	19993	1001698848	MA2067	MA4004	MA5028	High	Medium	100	680941.05	5611542.64
MA0025	Outline of hull of vessel with extended shadow; wreck. (6783 nT)	SS *Jaffa*	Remains of the 1918 wreck of an English cargo vessel torpedoed by the German U-boat	911755	20010	1001698842	MA2068	MA4005	MA6275	High	Medium	100	680146.83	5613200.63

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			UB 30 approximately 10 nautical miles SW of Worthing. She was a steel-hulled steamer, *en route* from Boulogne to Southampton in ballast. Steam ship; Sunk: 1918/02/02; Length: 79.2m; Beam: 10.7m; Draught: 4.9m; Tonnage: 1383; Cargo: ballast											
MA0026	Reflector of outline of hull with shadow of super-structure; wreck. (5079 nT)	Unknown	Potential remains of a tank landing craft located approximately 9.3 nautical miles south of Littlehampton previously listed as DEAD but recorded at the same location.	911194	20020	1001698634	MA2073	MA4006	MA6203	High	Medium	100	675621.61	5613488.32
MA0027	Three sets of parallel linear hard reflectors with a ladderlike reflector; wreck. (728 nT)	Unknown	Wreck remains believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges without propulsion on which they were towed, located approximately 11.5 miles SE of Selsey Bill or 11.7 miles SSE of Bognor Regis. If these remains	911175	19988	1001698869	MA2080	MA4007	MA6265	High	Medium	100	671878.72	5610995.1
MA0028	Hard reflector approx. 70m	Unknown					MA2087	MA4043	MA6477	Medium	Not assessed	50	669197	5607236.66

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	length; potential wreck. (414 nT)													
MA0029	Scattered array of plating from hull of vessel; wreck. (439 nT)	SS *War Helmet*	Remains of the 1918 wreck of an English armed cargo vessel torpedoed by the German U-boat UC 75 approximately 8.9 nautical miles south-east of Selsey Bill. She was a steel-hulled steamer, *en route* from London to Barry in ballast. Steam ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: 537 team ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: ballast	911748	19984	1001698913	MA2088	MA4008	MA6243	High	Medium	100	669043.73	5610679.45
MA0030	Line/cluster of hard reflectors; potential wreck or boulders. (2072 nT)	SS *Afon Dulais*	Remains of the 1942 wreck of a Welsh cargo vessel which foundered 9.8 nautical miles south-east of Selsey Bill after detonating a German mine. She was a steel-hulled steamer *en route* from Seaham to Poole with a cargo of coal. Steam ship; Sunk: 1942/06/20; Length: 63.4m; Beam:	911738	19947	1001698704	MA2093	MA4029	MA6489	High	Medium	100	666958.43	5606341.04

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			10.1m; Draught: 4m; Tonnage: 988; Cargo: coal											
MA0031	Isolated linear hard reflector with angular shadow; potential anthropogenic debris or sand bar.	Unknown					MA2094		n/a	Medium	Not assessed	50	666527.31	5607493.48
MA0032	Scattered debris with extended shadows forming an ovate outline; wreck.	SS *Lightfoot* (possibly)	Possible remains of the 1918 wreck of a British cargo vessel torpedoed by the German U-boat *UB 30*, approximately 1 mile south of the Varne. She was a steel-hulled steamer on Admiralty Service, *en route* from London to Barry in ballast. Steam ship; Sunk: 1918/03/16; Length: 81.7m; Beam: 20m; Draught: 2m; Tonnage: 1875; Cargo: ballast	911169	19948	1001698697	MA2095			High	Medium	100	666444.01	5606462.68
MA0033	Scattered super-structure and hull plating of vessel with shadows extending from potential boilers; wreck. (6401 nT)	SS *Gartland*	Remains of the 1918 wreck of a Scottish cargo vessel, torpedoed by the German U-boat *UB 30* approximately 1-mile south-east of Owers. She was a steel-hulled steamer, *en route* from Newcastle upon Tyne to Gibraltar with a cargo of coal. Steam ship; Sunk:	911743	19971	1001698893	MA2097	MA4009	MA6325	High	Medium	100	665780.91	5608512.76

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			1918/01/03; Length: 91m; Beam: 12.2m; Draught: 6.1m; Tonnage: 2613; Cargo: 5											
MA0034	Curvilinear hard reflector, extended shadow; raised feature likely anthropogenic small vessel. (538 nT)	Unknown	Cargo of metal bars, thought to be steel or cast iron, located on the seabed approximately 6 miles SSW of Littlehampton. This cargo appears to retain its deck arrangement, suggesting that it was not jettisoned.	911219	20075	1001699212	MA2112	MA4023	MA5889	High	Not assessed	100	672744.19	5619007.28
MA0035	Parallel linear buried reflectors; possible buried anthropogenic debris.	Unknown					MA2117			Medium	Not assessed	50	672532.51	5617353.15
MA0036	Wreck approx. length 120m; probable steel hulled cargo shipwreck with three boilers. (3951 nT)	SS *Glenlee* (possibly)	Remains of 1918 wreck of English cargo vessel located approximately 7.5 miles SW of Littlehampton, or 5 miles NE of the Owers Light Vessel. The identity of this wreck has been confirmed as that of the SS *Glenlee*, which foundered after being torpedoed.	911770	20055	1001699013	MA2121	MA4000	MA5994	High	Medium	100	672049.37	5616547.07
MA0037	Pair of L shaped hard reflectors with extended shadows; potential anthropogenic	SS *Shirala* (possibly)	Remains of 1918 wreck of Scottish cargo vessel which foundered approximately 6.5 nautical miles south	911214	20069	1001698982 /302182881/ 1001698984	MA2129	MA4024	MA5931	High	High	100	670695.16	5617299.78

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	debris or boulders. (823 nT)		of Middleton-on-Sea; a position which is approximately 6.7 nautical miles SE of Bognor Regis or 7.3 nautical miles SW of Littlehampton. Steam ship; Sunk: 1918/07/02; Length: 125m; Beam: 15.5m; Draught: 8.8m; Tonnage: 5306; Cargo: general, including wine, ivory and spares.											
MA0038	A large isolated curvilinear hard reflector with crater-like depression; possible debris of anthropogenic origin.	Unknown					MA2149	MA4032		Medium	Not assessed	50	672614.3	5624283.05
MA0040	An isolated area of dark reflectors; possible debris field of anthropogenic origin.	Unknown					MA2165	MA4033	n/a	Medium	Not assessed	50	672075.25	5624418.89
MA0041	An isolated area of hard reflectors; possible debris field of anthropogenic origin.	Unknown					MA2167	MA4034	n/a	Medium	Not assessed	50	672039.42	5624167.09
MA0042	Scatters of dark reflectors; possible debris field.	Unknown					MA2172	MA4035	n/a	Medium	Not assessed	50	671767.42	5623881.7
MA0045	Two magnetic anomalies								MA5501	Medium	Not assessed	50	671924.31	5626243.51

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	MA5501 (104nT) MA5503 (105nT)													
MA0047	Isolated magnetic anomaly (110nT)								MA6298	Medium	Not assessed	50		
MA0048	Isolated magnetic anomaly (112nT)								MA6485	Medium	Not assessed	50	667140.81	5606522
MA0049	Pair of linear hard reflectors; potential anthropogenic debris or boulders, associated with magnetic anomaly (115nT)						MA2085	MA4037	MA6224	Medium	Not assessed	50	669964.38	5611345.3
MA0050	Isolated magnetic anomaly (116nT)							MA4038	MA6529	Medium	Not assessed	50	674110.69	5607897.5
MA0051	Isolated magnetic anomaly (125nT)								MA5844	Medium	Not assessed	50	672304.63	5630280.5
MA0052	Isolated magnetic anomaly (125nT)								MA5600	Medium	Not assessed	50	671003.75	5627095
MA0053	Isolated magnetic anomaly (145nT)								MA5202	Medium	Not assessed	50	671336.25	5622349
MA0054	Isolated magnetic anomaly (156nT)								MA5537	Medium	Not assessed	50	670536.31	5626078.5
MA0055	Isolated magnetic anomaly (165nT)								MA5380	Medium	Not assessed	50	670101.31	5626471
MA0056	Isolated magnetic anomaly associated with seabed reflector							MA4039	MA5032	Medium	Not assessed	50	682143.69	5611126
MA0057	Isolated magnetic anomaly associated with seabed reflector							MA4040	MA5927	Medium	Not assessed	50		
MA0058	Three magnetic anomalies MA5504 (245nT)								MA5504	Medium	Not assessed	50	672489.06	5626455.5

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	MA5505 (47nT) MA5506 (38nT)													
MA0059	Isolated magnetic anomaly (147nT)								MA6556	Medium	Not assessed	50	685715.69	5611733.5
MA0060	Isolated magnetic anomaly (300nT)								MA5823	Medium	Not assessed	50	672817.81	5630164.5
MA0061	Isolated magnetic anomaly (716nT)								MA5529	Medium	Not assessed	50	671751.19	5626378
MA0062	Buried hard reflector; possible anthropogenic debris (1751nT)	SS *Broadhurst* (possibly)	Steam ship; Sunk: 1940/07/26; Length: 66.1m; Beam: 10.4m; Draught: 4m; Tonnage: 1013; Cargo: coal		19959	1001698668	MA2034	MA4041	MA5097	High	Medium	100	695802.41	5608678.3

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Annex E
High potential anomalies

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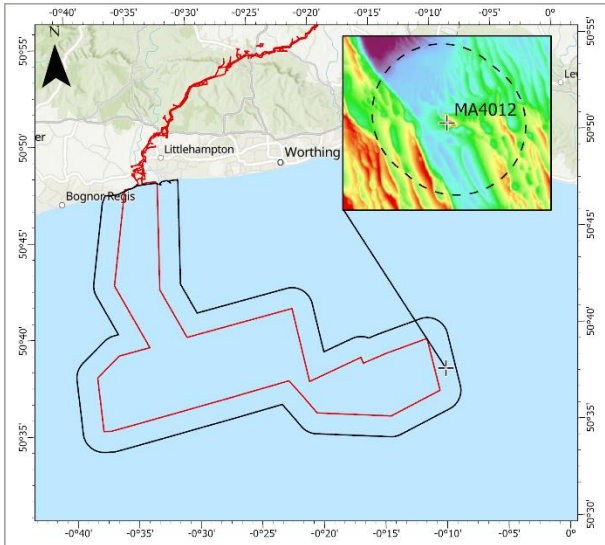
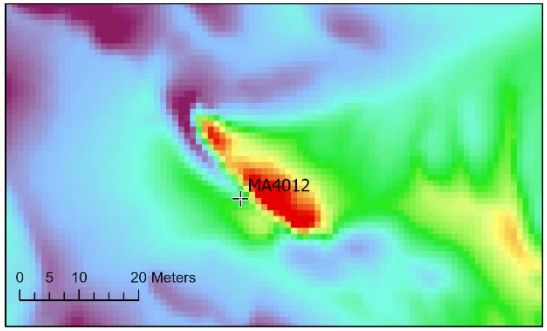
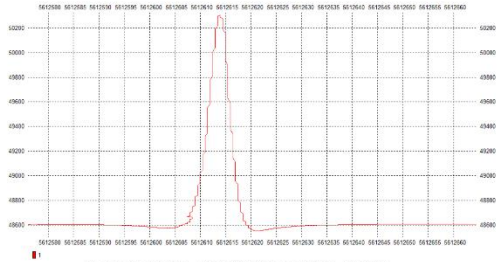
Graphic 16.1.E-1 MA0004

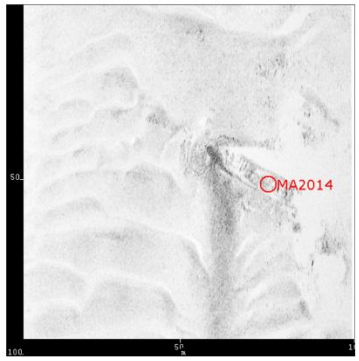




Multibeam bathymetry image of MA4012 looking north



Magnetic profile of MA6868 measuring 1760nT



Side scan sonar image MA2014 with 70° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0004

Location	***Coordinate System***	UTM84-30N
Wreck IDs	MA ID	**MA0004**
	Wreck ID	**20005**
	SSS ID	MA2014
	MBES ID	MA4012
	MAG ID	MA6868
Geophysical notes		**MA0004** The semi-coherent bow of a vessel, partially buried, measuring 31m in length and 6.5m in width with a magnetic return of 1760nT. This is the potential wreck of the MV *Gerlen*, sunk on the 19th of July 1972.
Build	Type	Motor vessel, diesel
	Construction	Steel
	Dimensions (m)	45.6 x 7 x 2.4
	Shipyard	Schulte & Bruns, Emden
Loss	Cause	Sank following collision with MV *Gotland* whilst *en-route* to Utersen.

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0004 - MV Gerlen, UKHO20005

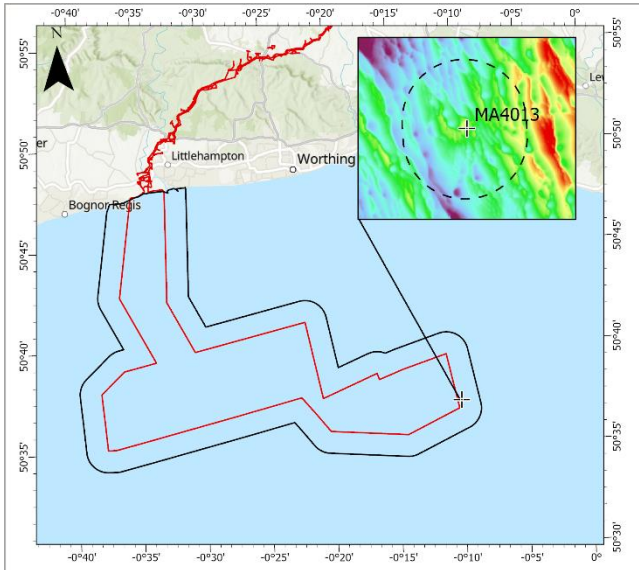
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

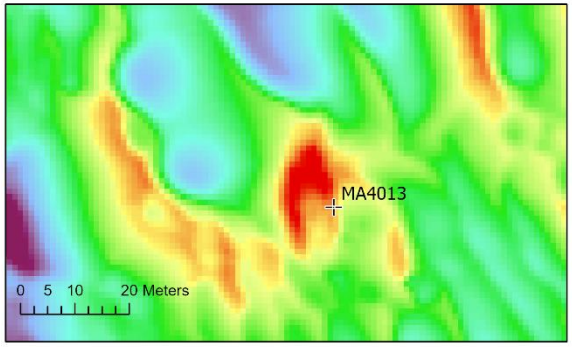
DRAWING NUMBER: Graphic 16.1.E-1

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

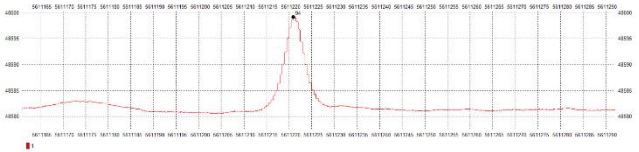
Rampion 2 WIND FARM

Graphic 16.1.E-2 MA0005



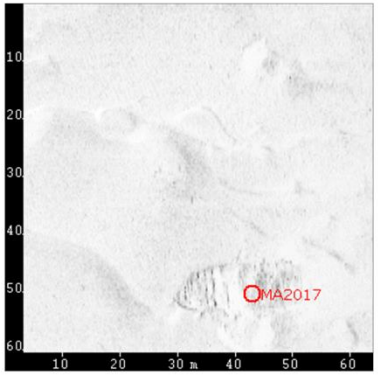


Multibeam bathymetry image of MA4013 looking north



Magnetic profile of MA5093 measuring 17nT

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0005**
	Wreck ID	-
	SSS ID	MA2017
	MBES ID	MA4013
	MAG ID	MA5093
Geophysical notes		**MA0005** The semi-coherent, partially buried outline of a hull measuring approximately 22m in length and 9m in width with a magnetic return of 17nT.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Side scan sonar image MA2017 with 76° heading

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0005

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0005 - Unknown potential wreck

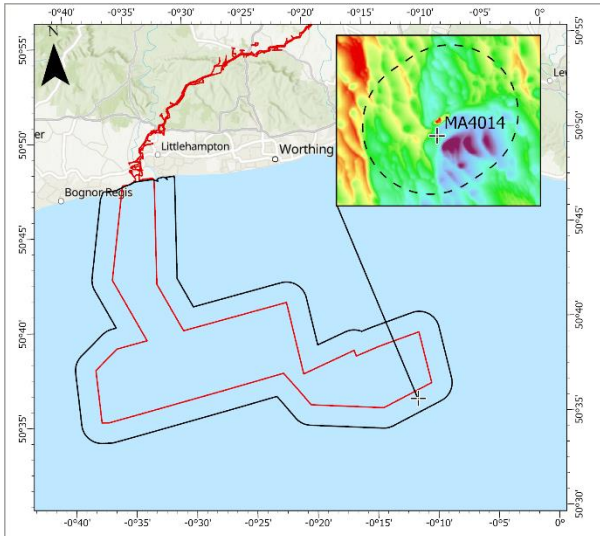
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

DRAWING NUMBER: Graphic 16.1.E-2

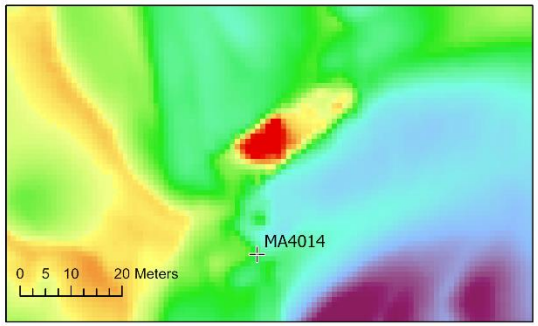
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

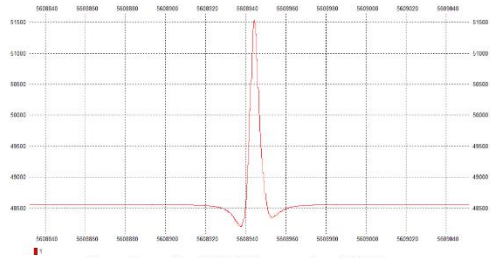
Graphic 16.1.E-3 MA0007



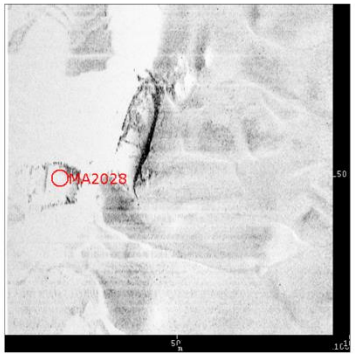
Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0007**
	Wreck ID	**19961**
	SSS ID	MA2028
	MBES ID	MA4014
	MAG ID	MA7123
Geophysical notes		**MA0007** The coherent outline of the bow of a vessel and associated debris to the southwest, covering an area of approximately 60 x 40m with a magnetic return of 3344nT.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Multibeam bathymetry image of MA4014 looking north



Magnetic profile of MA7123 measuring 3344nT



Side scan sonar image MA2028 with 256° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0007

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0007 - Unknown wreck, UKHO19961

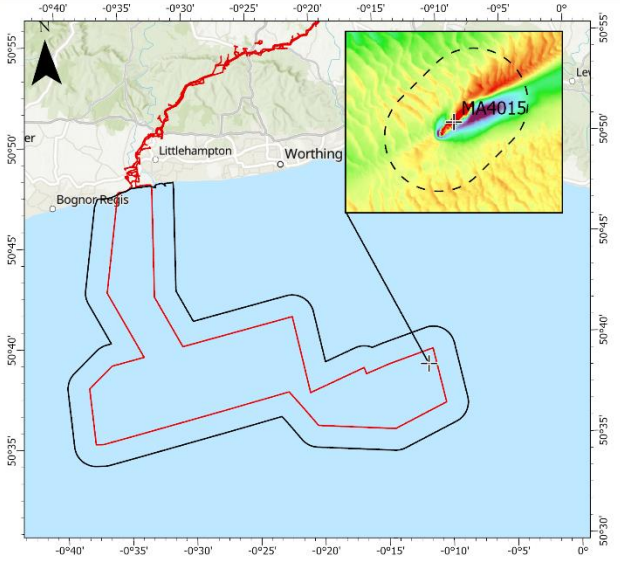
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

DRAWING NUMBER: **Graphic 16.1.E-3**

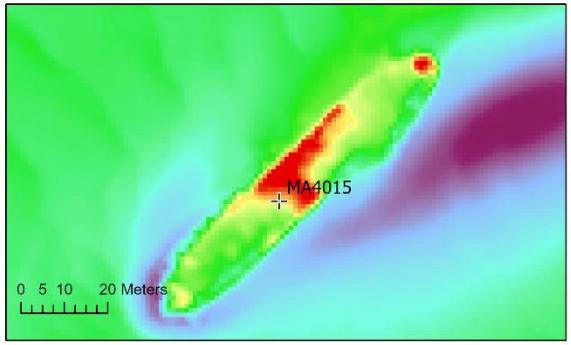
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-4 MA0008

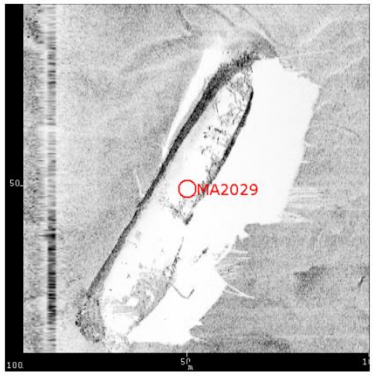


Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0008**
	Wreck ID	**19926/20012**
	SSS ID	MA2029
	MBES ID	MA4015
	MAG ID	MA6738
Geophysical notes		**MA0008** The coherent remains of a vessel and its super-structure, measuring approximately 93m in length and 19m width and with a magnetic return of 1007nT. The shadow suggests a height of 8m above the seabed, with some scour. This is potentially the wreck of the Northern Irish cargo vessel SS *Glenarm Head*, sunk on the 4th of January 1918.
Build	Type	Cargo, steam ship
	Construction	Unknown
	Dimensions (m)	109.7 x 14 x 6.1
	Shipyard	Workman, Clark & co. Ltd., Belfast
Loss	Cause	Torpedoed by German submarine.



Multibeam bathymetry image of MA4015 looking north

Magnetic profile of MA6738 measuring 1007nT



Side scan sonar image MA2029 with 73° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0008

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0008 - SS Glenarm Head, UKHO19926/20012

VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

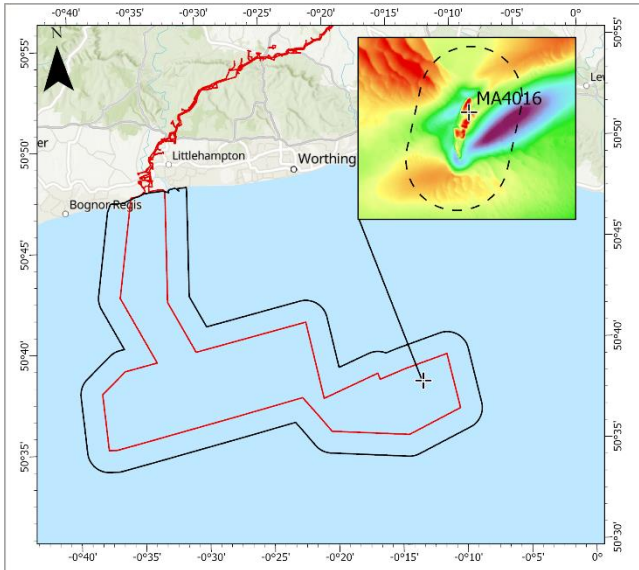
DRAWING NUMBER: **Graphic 16.1.E-4**

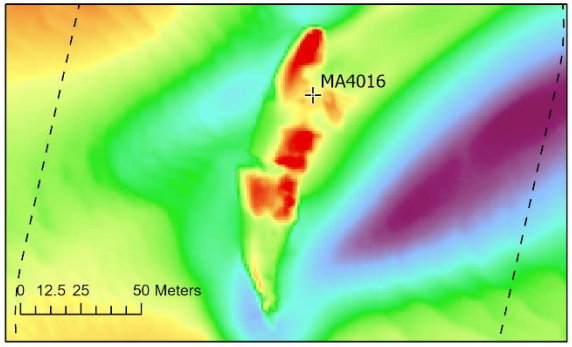
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

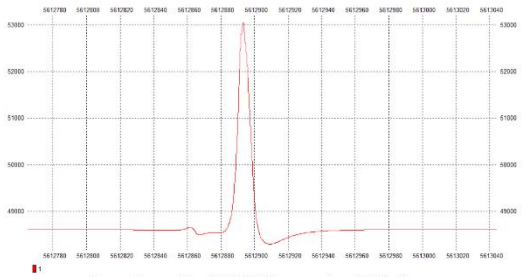
MARITIME ARCHAEOLOGY

Graphic 16.1.E-5 MA0009





Multibeam bathymetry image of MA4016 looking north



Magnetic profile of MA6784 measuring 4766nT

Side scan sonar image MA2031 with 74° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0009**
	Wreck ID	**20001**
	SSS ID	MA2031
	MBES ID	MA4016
	MAG ID	MA6784
Geophysical notes		**MA0009** The coherent remains of a wreck and associated debris over an area of 90m x 45m with a magnetic return of 4766nT. This correlates with the wreck of the English cargo steam vessel SS *Pagenturm*, sunk on the 16th of May 1917.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	122.3 x 15.8 x 8.5
	Shipyard	J. C. Tecklenborg AG, Geestemünde
Loss	Cause	Torpedoed by German submarine *UB-40*.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0009

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0009 - SS Pagenturm, UKHO20001

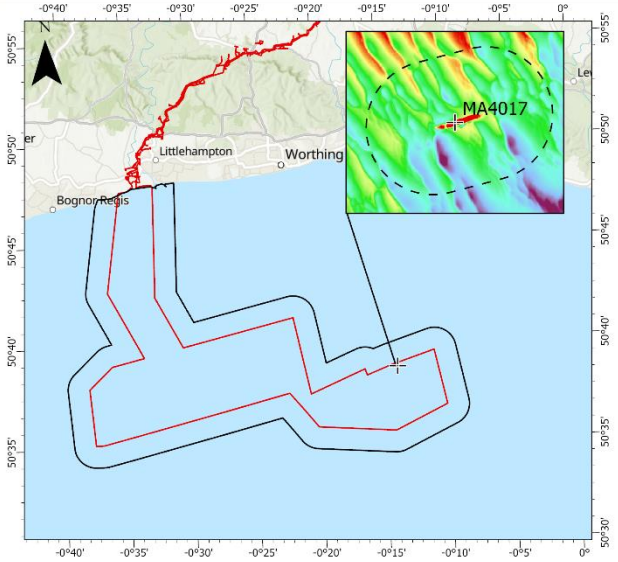
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

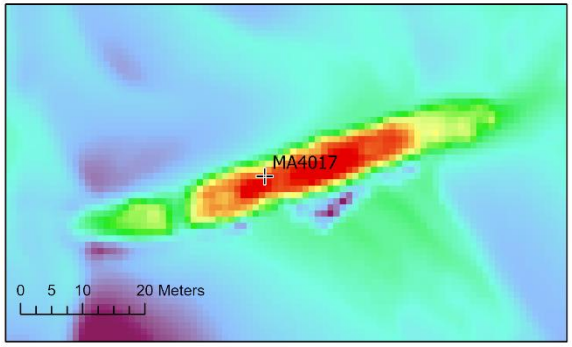
DRAWING NUMBER: **Graphic 16.1.E-5**

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

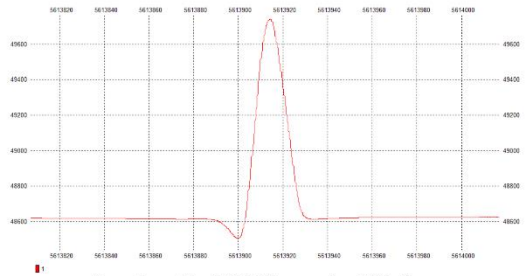
Rampion 2 WIND FARM

Graphic 16.1.E-6 MA0010

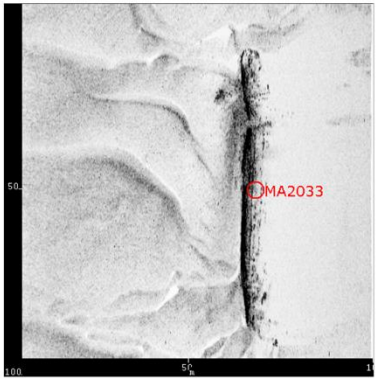




Multibeam bathymetry image of MA4017 looking north



Magnetic profile of MA6705 measuring 1237nT



Side scan sonar image MA2033 with 71° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0010**
	Wreck ID	**20014**
	SSS ID	MA2033
	MBES ID	MA4017
	MAG ID	MA6705
Geophysical notes		**MA0010** The cylindrical, partially buried remains of a wreck, measuring approximately 77m in length and 7m width with a magnetic return of 1237nT. This record correlates with the British destroyer HMS *Minion*, sunk on the 1st of January 1921.
Build	Type	Destroyer, steam ship
	Construction	Unknown
	Dimensions (m)	84 x 8 x 3
	Shipyard	Thornycroft & Co. Ltd
Loss	Cause	Lost under tow to the breakers yard.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0010

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0010 - HMS Minion, UKHO20014

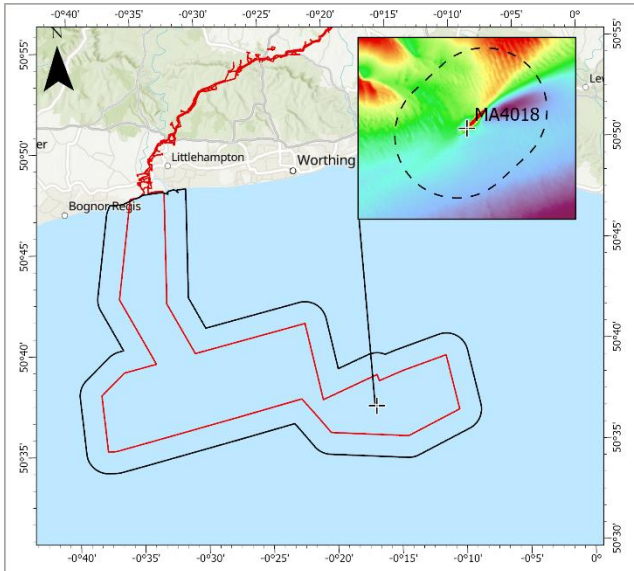
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

DRAWING NUMBER: **Graphic 16.1.E-6**

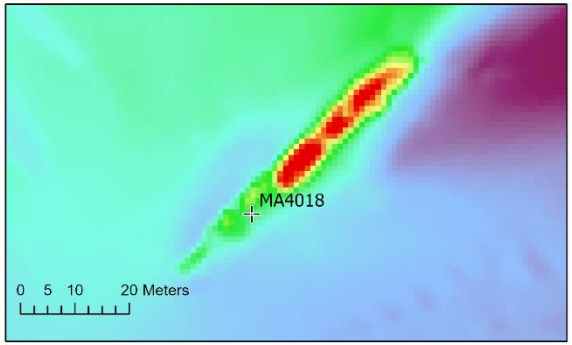
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-7 MA0011

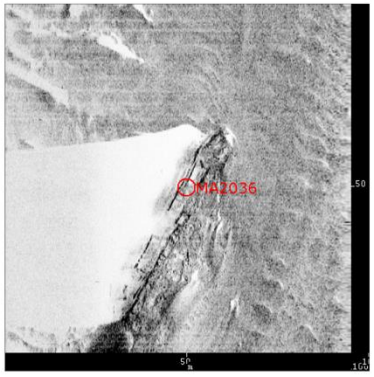


Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0011**
	Wreck ID	**20169**
	SSS ID	MA2036
	MBES ID	MA4018
	MAG ID	MA6830
Geophysical notes		**MA0011** The semi-coherent outline of a vessel measuring 60m in length and 17m width with an extended shadow suggesting it sits approximately 7m above the seabed with a magnetic return of 691nT. This is the other possible site for the remains of the Northern Irish cargo vessel SS *Glenarm Head*.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	109.7 x 14 x 6.1
	Shipyard	Workman, Clark & co. Ltd., Belfast
Loss	Cause	Torpedoed by German submarine.



Multibeam bathymetry image of MA4018 looking north

Magnetic profile of MA6830 measuring 691nT



Side scan sonar image MA2036 with 73° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0011

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0011 - SS Glenarm Head, UKHO20169

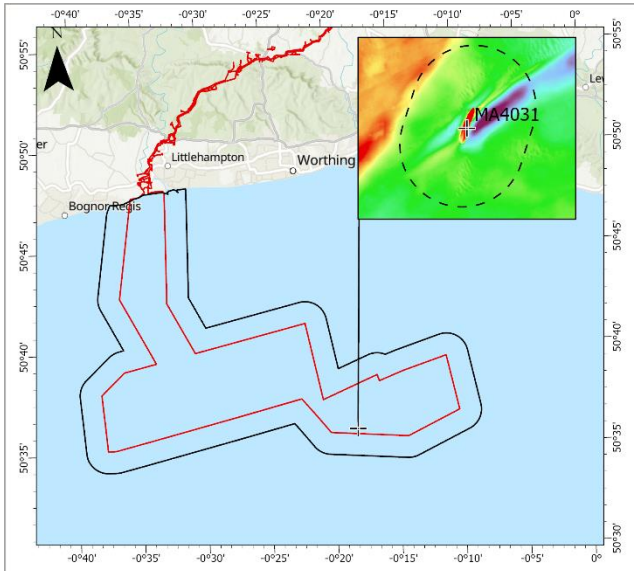
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

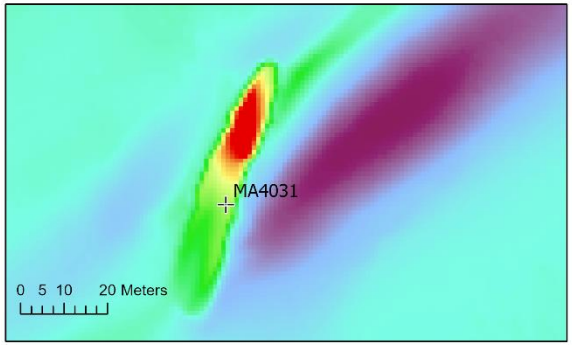
DRAWING NUMBER: Graphic 16.1.E-7

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

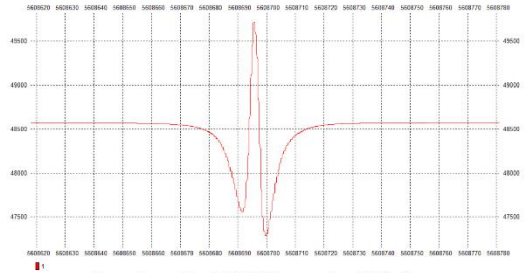
Rampion 2 WIND FARM

Graphic 16.1.E-8 MA0012





Multibeam bathymetry image of MA4031 looking north



Magnetic profile of MA7043 measuring 2435nT

Side scan sonar image MA2041 with 74° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0012**
	Wreck ID	**19972**
	SSS ID	MA2041
	MBES ID	MA4031
	MAG ID	MA7043
Geophysical notes		**MA0012** The semi-coherent remains of a partially buried cylindrical anomaly, potentially a wreck, measuring approximately 61m in length and 14m width, associated with two hard reflectors ca 100m to the north northeast and a magnetic return of 2435nT. This is potentially the site of the wreck of the cargo vessel SS *London Trader*, sunk on the 26th of July 1940.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	59.9 x 8.8 x 3.4
	Shipyard	Hawthorn Leslie & Co. Ltd, Newcastle
Loss	Cause	Torpedoed by German schenllboot Flottille.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0012

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0012 - SS London Trader, UKHO19972

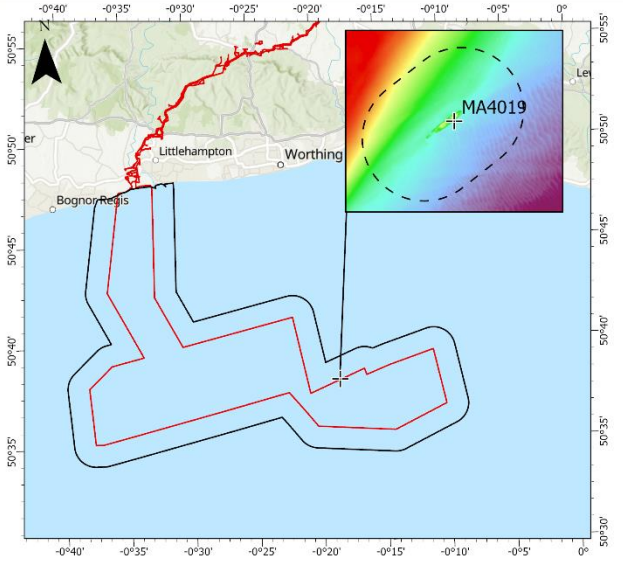
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

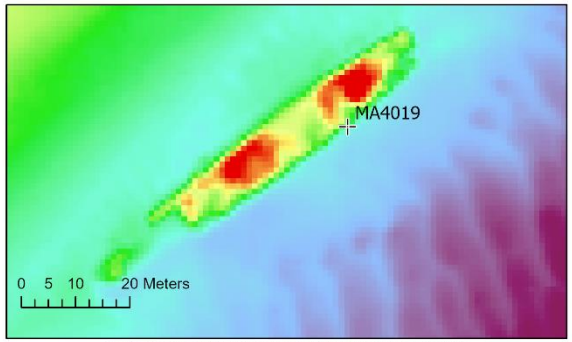
DRAWING NUMBER: Graphic 16.1.E-8

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

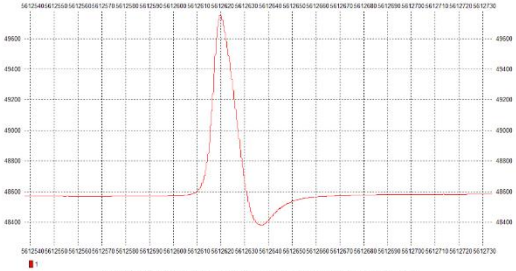
Rampion 2 WIND FARM

Graphic 16.1.E-9 MA0013

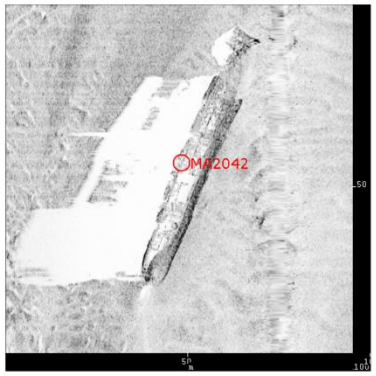




Multibeam bathymetry image of MA4019 looking north



Magnetic profile of MA7268 measuring 1375nT



Side scan sonar image MA2042 with 73° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0013**
	Wreck ID	**20000**
	SSS ID	MA2042
	MBES ID	MA4019
	MAG ID	MA7268
Geophysical notes		**MA0013** The coherent remains of a vessel measuring approximately 73m in length and 11m in width, with an extended shadow which suggests the wreck sits approximately 7m above the seabed and much of the super-structure remains. There is a magnetic return of 1375nT. This correlates with the record of the cargo vessel SS *Quail*, sunk on the 27th of August 1886.
Build	Type	Passenger/Cargo, sail and steam ship
	Construction	Iron
	Dimensions (m)	68.3 x 8.6 x 5.3
	Shipyard	Palmer's Shipbuilding & Iron Co. Ltd, Newcastle
Loss	Cause	Collision in fog with French steamer SS *San Martin*.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0013

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0013 - SS Quail, UKHO20000

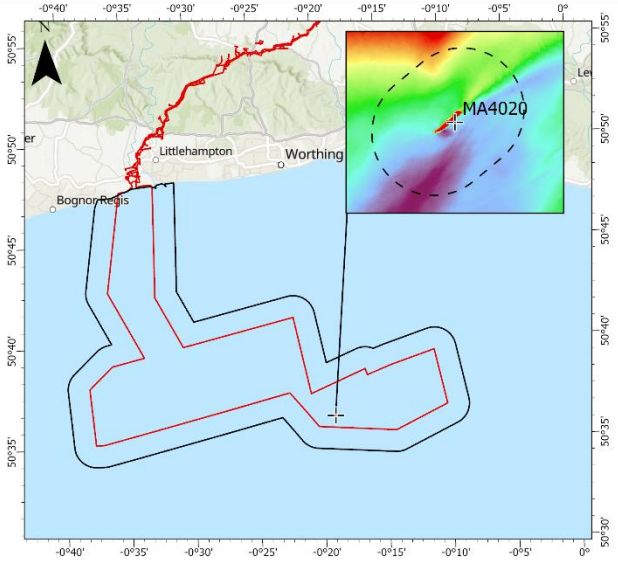
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

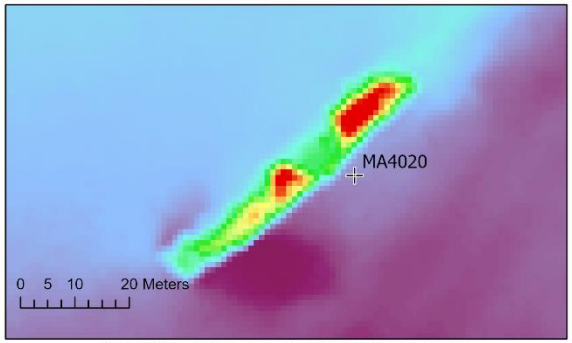
DRAWING NUMBER: Graphic 16.1.E-9

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

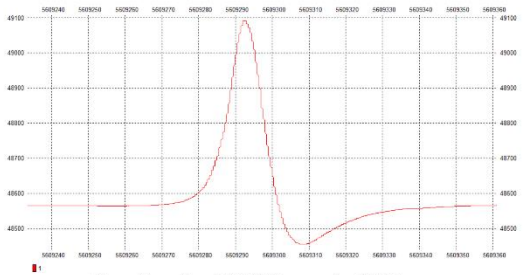
Rampion 2 WIND FARM

Graphic 16.1.E-10 MA0014

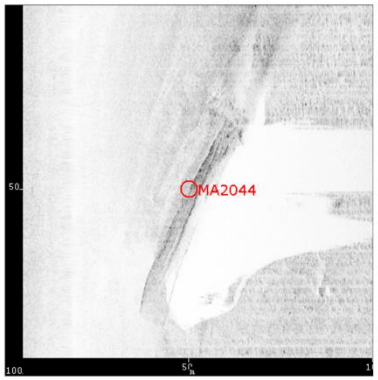




Multibeam bathymetry image of MA4020 looking north



Magnetic profile of MA6876 measuring 637nT



Side scan sonar image MA2044 with 253° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0014**
	Wreck ID	**19970**
	SSS ID	MA2044
	MBES ID	MA4020
	MAG ID	MA6876
Geophysical notes		**MA0014** The semi-coherent remains of a cylindrical anomaly, measuring approximately 60m in length and 7m width, partially buried with an extended shadow which suggest a height of 8m above the seabed with a magnetic return of 637nT.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0014

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0014 - Unknown wreck, UKHO19970

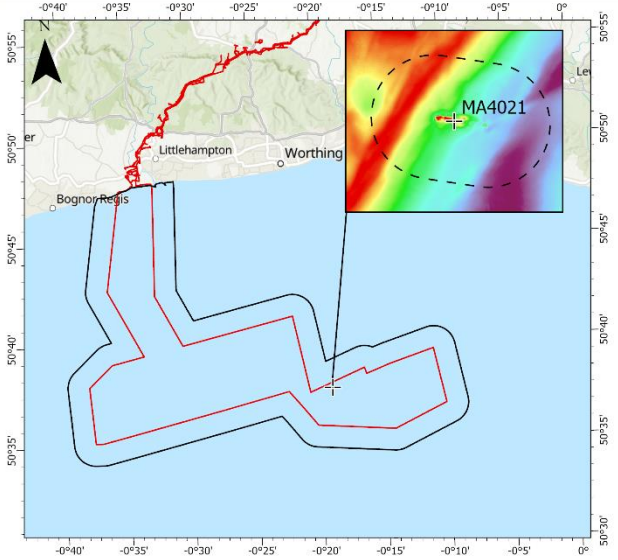
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

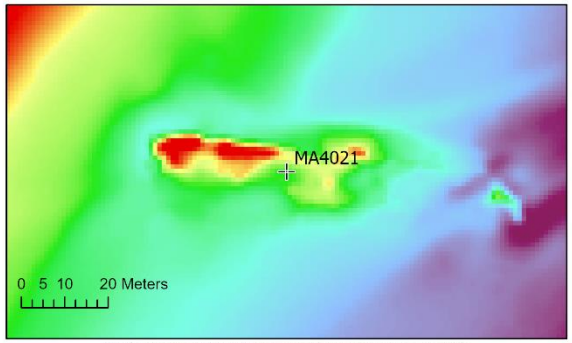
DRAWING NUMBER: Graphic 16.1.E-10

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

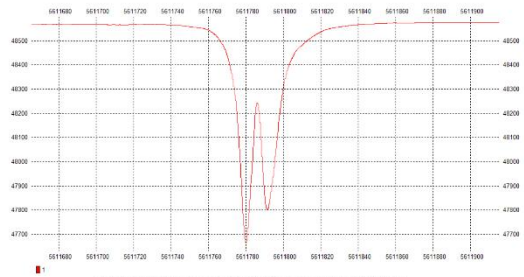
Rampion 2 WIND FARM

Graphic 16.1.E-11 MA0015

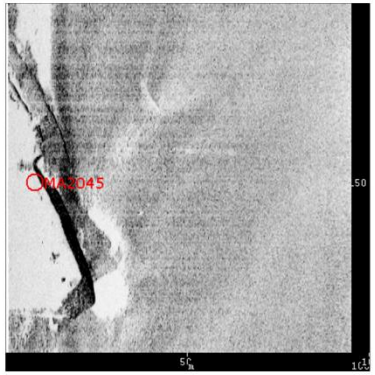




Multibeam bathymetry image of MA4021 looking north



Magnetic profile of MA6724 measuring 909nT



Side scan sonar image MA2045 with 255° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0015**
	Wreck ID	**19991**
	SSS ID	MA2045
	MBES ID	MA4021
	MAG ID	MA6724
Geophysical notes		**MA0015** The semi-coherent outline of a vessel, measuring approximately 76m in length and 7m width, with associated scour and a magnetic return of 909nT. This correlates with the remains of a cargo vessel.
Build	Type	Cargo, steam ship
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0015

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0015 - Unknown wreck, UKHO19991

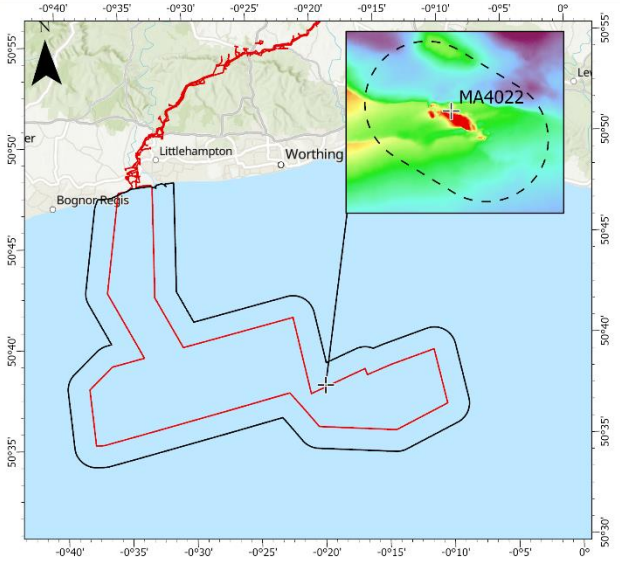
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

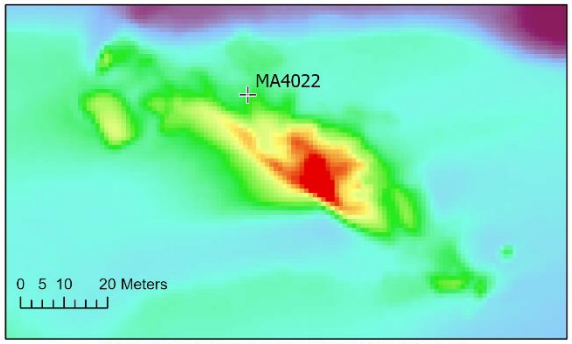
DRAWING NUMBER: **Graphic 16.1.E-11**

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

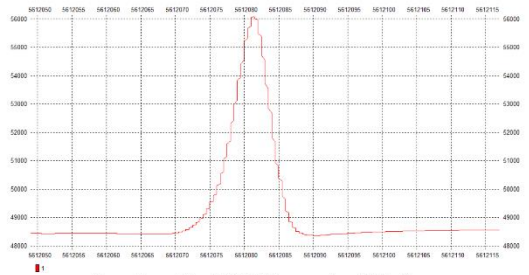
Rampion 2 WIND FARM

Graphic 16.1.E-12 MA0016

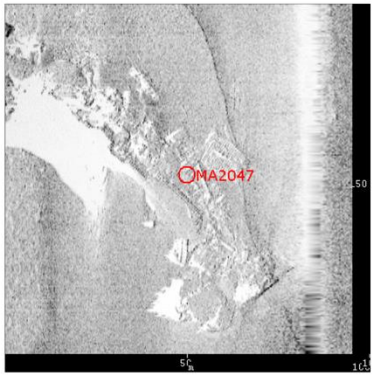




Multibeam bathymetry image of MA4022 looking north



Magnetic profile of MA6693 measuring 7720nT



Side scan sonar image MA2047 with 254° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0016**
	Wreck ID	**19996**
	SSS ID	MA2047
	MBES ID	MA4022
	MAG ID	MA6693
Geophysical notes		**MA0016** A spread of debris over an area of 105m x 30m with an extended shadow which suggests a height of 7.3m above the seabed with a magnetic return of 7720nT. This correlates with the remains of a freighter.
Build	Type	Freighter
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0016

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0016 - Unknown wreck, UKHO19996

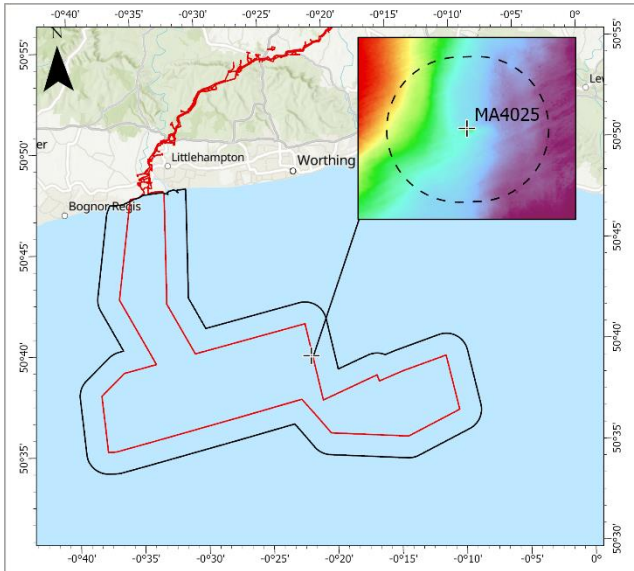
VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

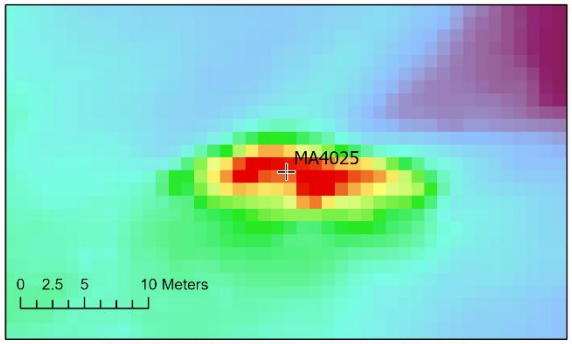
DRAWING NUMBER: Graphic 16.1.E-12

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-13 MA0017



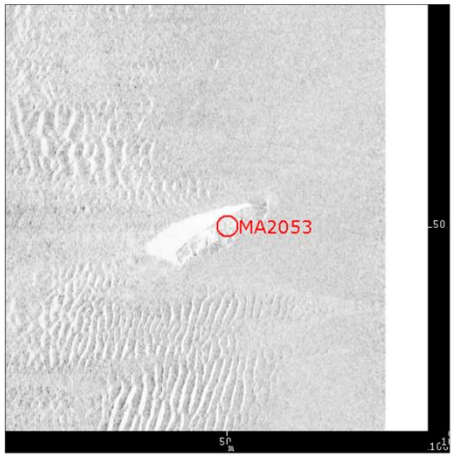


Multibeam bathymetry image of MA4025 looking north

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0017

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0017**
	Wreck ID	**20186**
	SSS ID	MA2053
	MBES ID	MA4025
	MAG ID	-
Geophysical notes		**MA0017** A long ovate feature, measuring approximately 23m in length and 6m width, partially buried, with an elongated shadow that suggest a height of 2m above the seabed. This correlates with the fishing vessel *Ny-Eeasteyr*, sunk on the 8th of December 1980.
Build	Type	Fishing vessel
	Construction	Wood
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Scuttled.



Side scan sonar image MA2053 with 156° heading

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0017 - Ny-Eeasteyr, UKHO20186

VER	DATE	REMARKS	Drawn	Checked
1	01/10/2022	Final	HA	CH

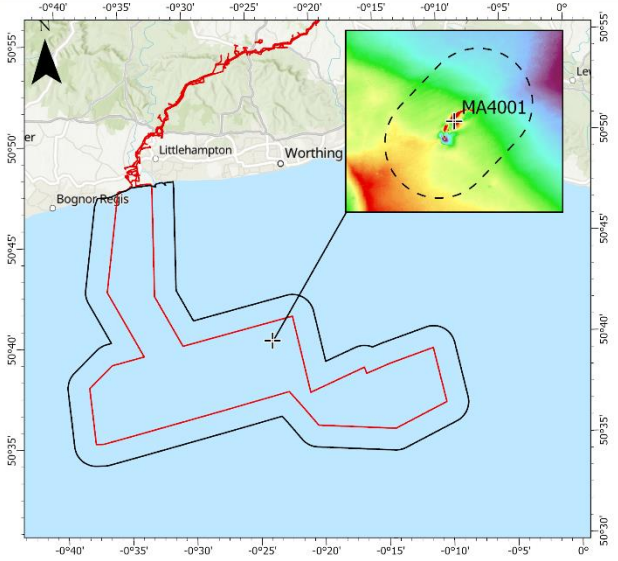
DRAWING NUMBER: **Graphic 16.1.E-13**

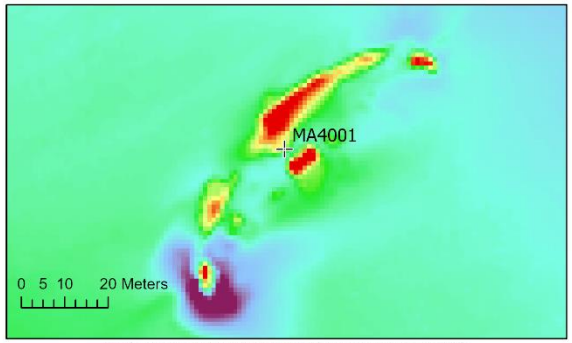
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

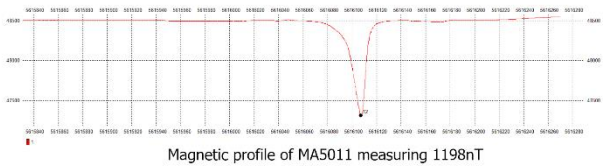
MARITIME ARCHAEOLOGY

Graphic 16.1.E-14 MA0018





Multibeam bathymetry image of MA4001 looking north



Magnetic profile of MA5011 measuring 1198nT

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0018**
	Wreck ID	**20049**
	SSS ID	MA2055
	MBES ID	MA4001
	MAG ID	MA5011
Geophysical notes		**MA0018** The semi-coherent partially buried remains of a vessel with associated debris measuring approximately 77m in length and 16m width with a magnetic return of 1198nT. This correlates with the wreck of the English cargo vessel SS *Ramsgarth*, sunk on the 28th of November 1916.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	74.7 x 11 x 5.8
	Shipyard	Sir Raylton Dixon & Co. Ltd., Middlesbrough
Loss	Cause	Sunk by scuttling charges by German submarine *UB-39*.

Side scan sonar image MA2055 with 79° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0018

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0018 - SS Ramsgarth, UKHO20049

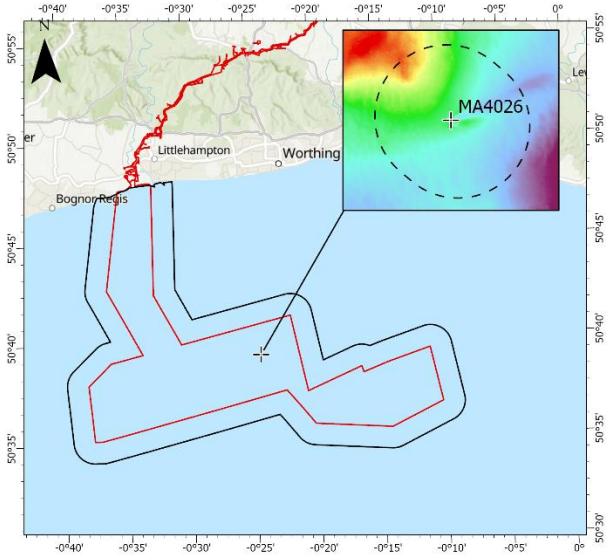
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

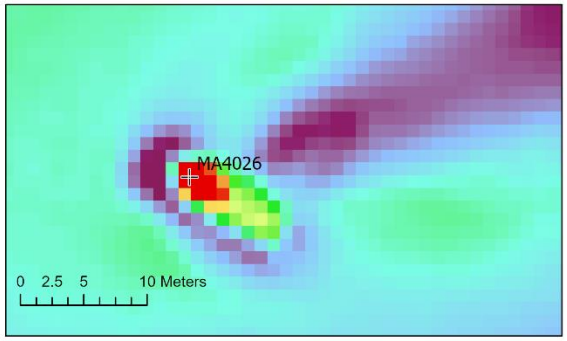
DRAWING NUMBER: Graphic 16.1.E-14

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-15 MA0019



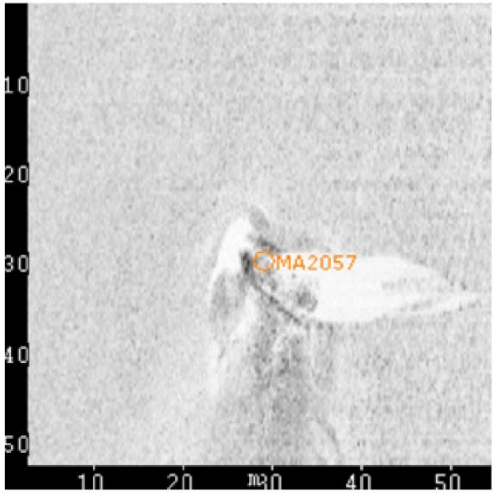


Multibeam bathymetry image of MA4026 looking north

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0019

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0019**
	Wreck ID	**82762**
	SSS ID	MA2057
	MBES ID	MA4026
	MAG ID	-
Geophysical notes		**MA0019** An ovate feature with an extended shadow suggesting a height of approximately 3m above the seabed and some scour. Corresponds to site of possible fishing vessel.
Build	Type	Small boat
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Side scan sonar image MA2057 with 74° heading

Data Source:

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0019 - Unknown wreck, UKHO82762

VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

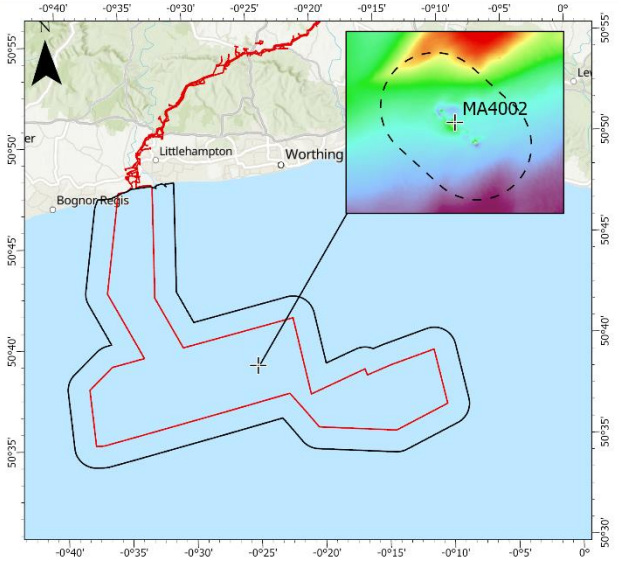
DRAWING NUMBER: **Graphic 16.1.E-15**

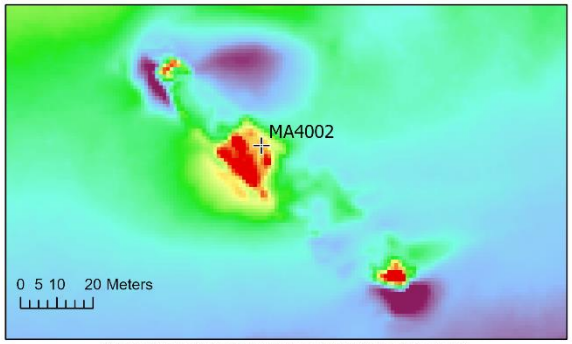
SCALE	1:400,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM29N

Rampion 2 WIND FARM

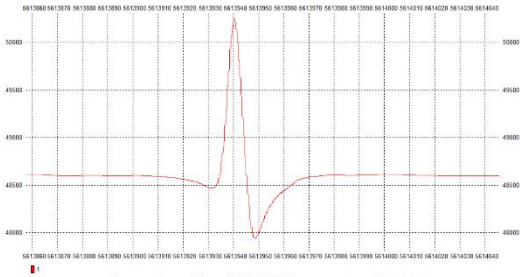
MARITIME ARCHAEOLOGY

Graphic 16.1.E-16 MA0020

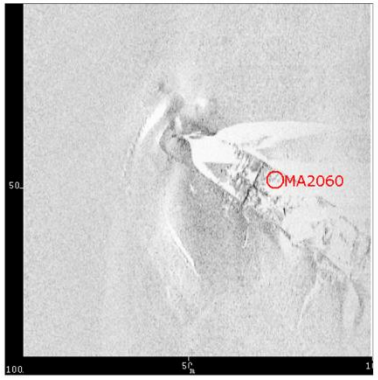




Multibeam bathymetry image of MA4002 looking north



Magnetic profile of MA6277 measuring 2311nT



Side scan sonar image MA2060 with 82° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0020**
	Wreck ID	**20023**
	SSS ID	MA2060
	MBES ID	MA4002
	MAG ID	MA6277
Geophysical notes		**MA0020** The coherent remains of a partially buried vessel measuring approximately 70m in length and 14m width, with extended shadows suggesting the presence of super-structure with a magnetic return of 2311nT. This correlates with the cargo vessel SS *Ariel*, sunk on the 10th of June 1892.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	91.44 x 12.86 x 6.07
	Shipyard	Earle's Shipbuilding & Engineering Co. Ltd., Hull
Loss	Cause	Collision in fog with SS *Lancashire*.

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0020

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0020 - SS Ariel, UKHO20023

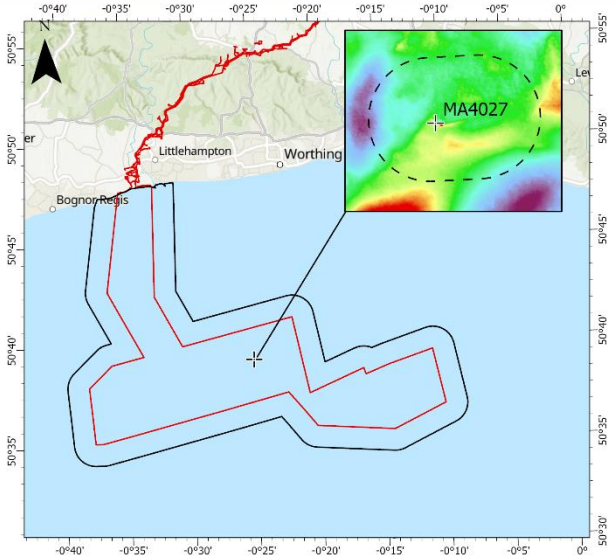
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

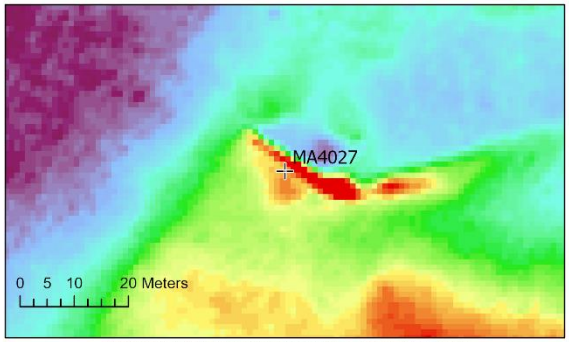
DRAWING NUMBER: Graphic 16.1.E-16

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-17 MA0021

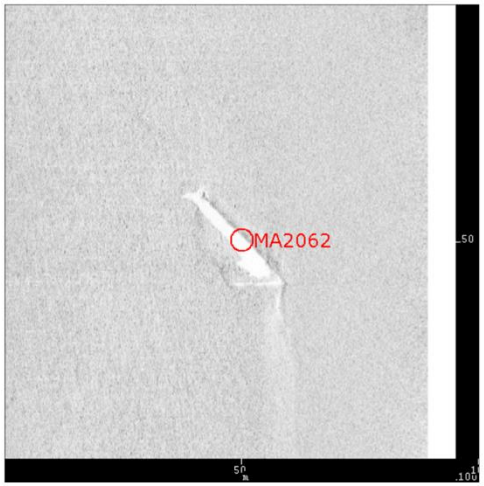




Multibeam bathymetry image of MA4027 looking north

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0021

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0021**
	Wreck ID	-
	SSS ID	MA2062
	MBES ID	MA4027
	MAG ID	-
Geophysical notes		**MA0021** A buried linear anomaly measuring approximately 28m in length with a shadow suggesting a height of 2m above the seabed.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Side scan sonar image MA2062 with 81° heading

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0021 - Unknown potential wreck

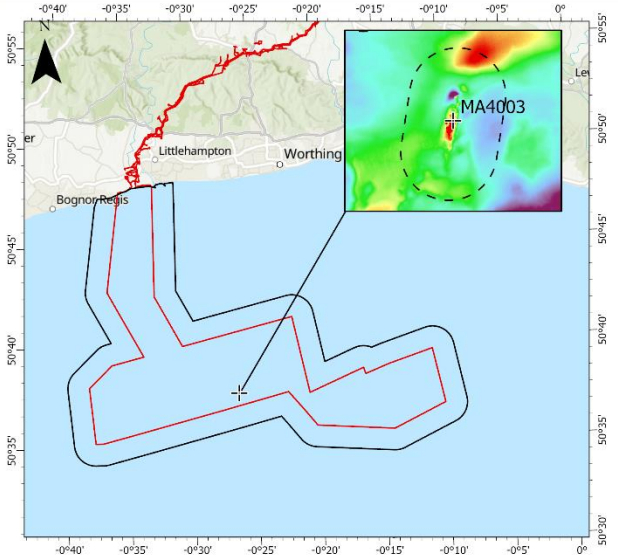
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

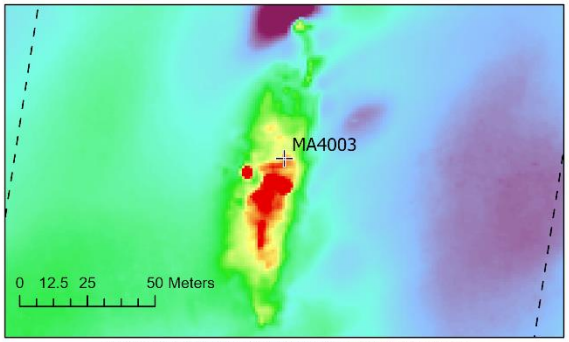
DRAWING NUMBER: Graphic 16.1.E-17

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

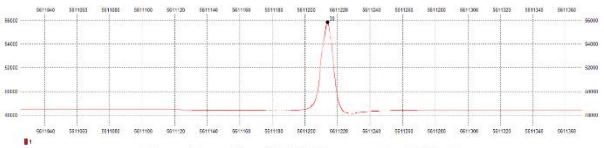
Rampion 2 WIND FARM

Graphic 16.1.E-18 MA0022



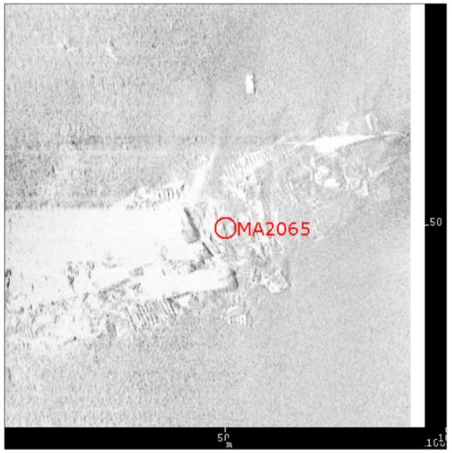


Multibeam bathymetry image of MA4027 looking north



Magnetic profile of MA5029 measuring 7729nT

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0022**
	Wreck ID	**19987**
	SSS ID	MA2065
	MBES ID	MA4003
	MAG ID	MA5029
Geophysical notes		**MA0022** The semi-coherent buried remains of a vessel measuring approximately 102m in length and 32m width, with extended shadows from the centre of the vessel suggesting the remains of super-structure, potentially the boilers, and other associated debris with a magnetic return of 7729nT. This correlates with the wreck of the English cargo vessel SS *Cairndhu*, sunk on the 15th of April 1917.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	112.8 x 15.5 x 7.5
	Shipyard	William Doxford & Sons Ltd., Sunderland
Loss	Cause	Torpedoed by German submarine *UB-40*.



Side scan sonar image MA2065 with 249° heading

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0022

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0022 - SS Cairndhu, UKHO19987

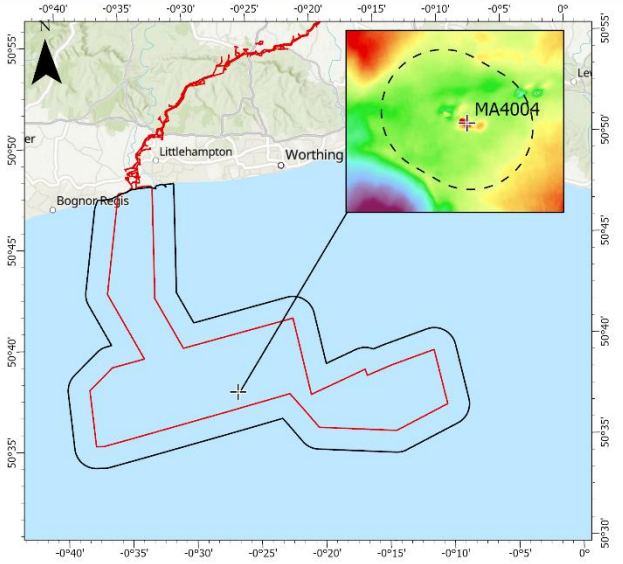
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

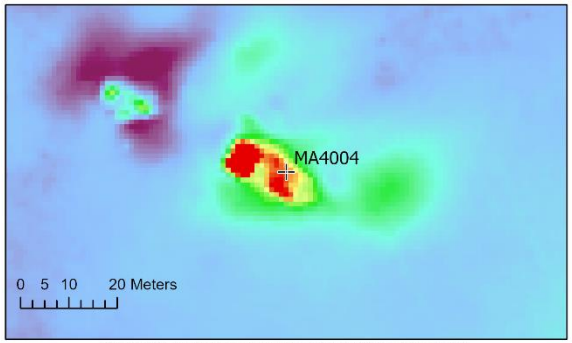
DRAWING NUMBER: Graphic 16.1.E-18

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

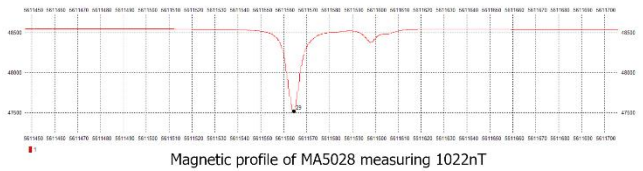
Rampion 2 WIND FARM

Graphic 16.1.E-19 MA0024



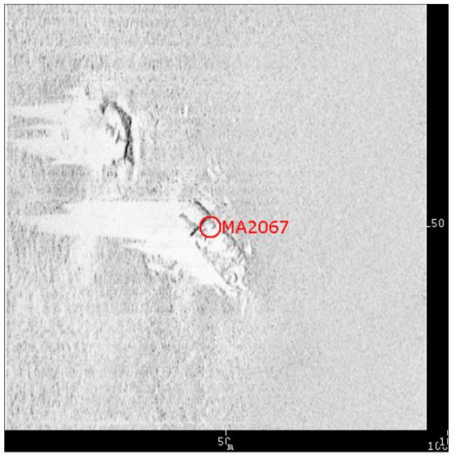


Multibeam bathymetry image of MA4004 looking north



Magnetic profile of MA5028 measuring 1022nT

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0024**
	Wreck ID	**19993**
	SSS ID	MA2067
	MBES ID	MA4004
	MAG ID	MA5028
Geophysical notes		**MA0024** The broken remains of a vessel over an area approximately 60 x 8m, with extended shadow suggesting a height of approximately 4m above the seabed with a magnetic return of 1022nT.
Build	Type	Steam Ship
	Construction	Steel
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Side scan sonar image MA2067 with 70° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0024

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0024 - Unknown wreck, UKHO19993

VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

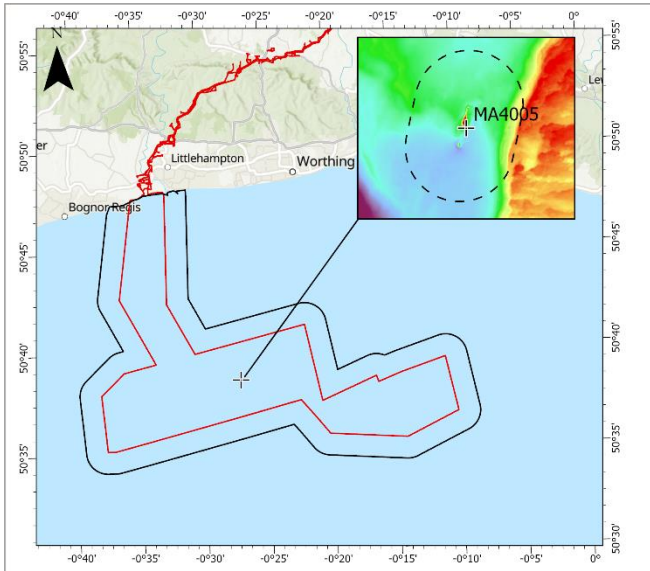
DRAWING NUMBER: Graphic 16.1.E-19

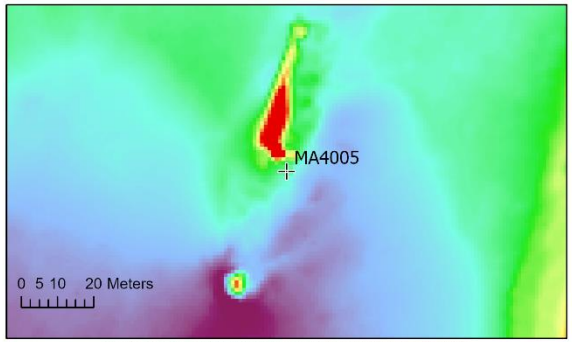
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

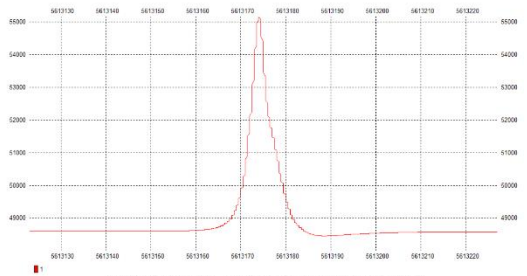
MARITIME ARCHAEOLOGY

Graphic 16.1.E-20 MA0025

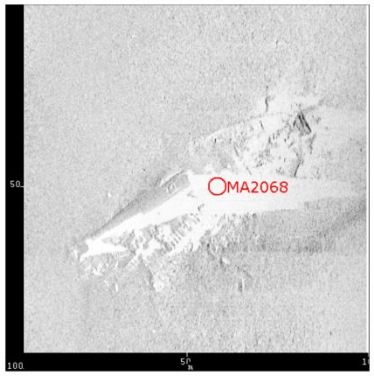




Multibeam bathymetry image of MA4005 looking north



Magnetic profile of MA6275 measuring 6783nT



Side scan sonar image MA2068 with 80° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0025**
	Wreck ID	**20010**
	SSS ID	MA2068
	MBES ID	MA4005
	MAG ID	MA6275
Geophysical notes		**MA0025** The semi-coherent remains of a partially buried vessel measuring approximately 74m in length and 20m width, with an extended shadow suggesting debris and super-structure with a height of 5m above the seabed with a magnetic return of 6783nT. This correlates with the English cargo vessel SS *Jaffa*, sunk on the 2nd of February 1918.
Build	Type	Passenger/Cargo, steam ship
	Construction	Steel
	Dimensions (m)	79.3 x 10.7 x 4.9
	Shipyard	Scott J. & Co., Kinghorn
Loss	Cause	Torpedoed by German submarine *UC-30*.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0025

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0025 - SS Jaffa, UKHO20010

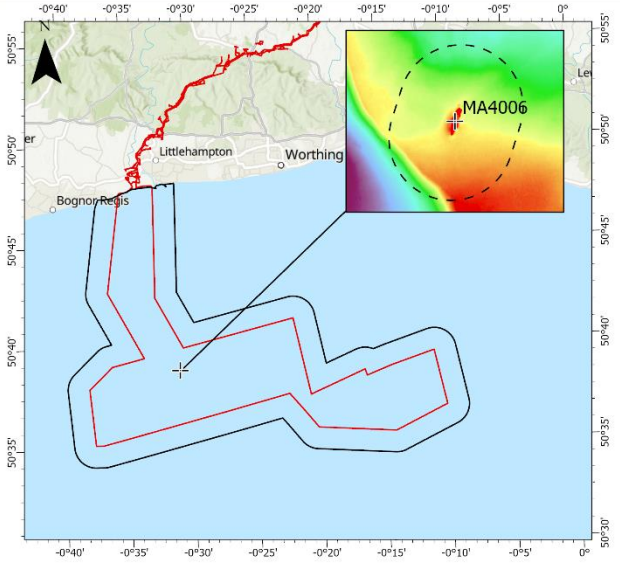
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

DRAWING NUMBER: **Graphic 16.1.E-20**

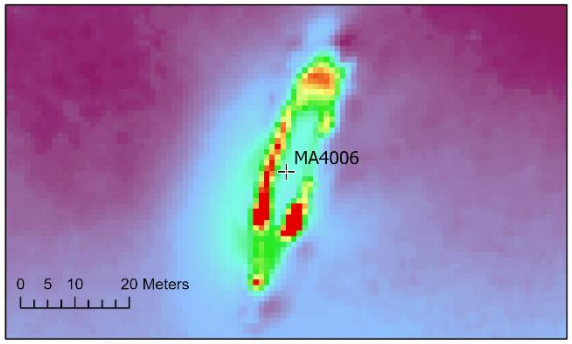
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

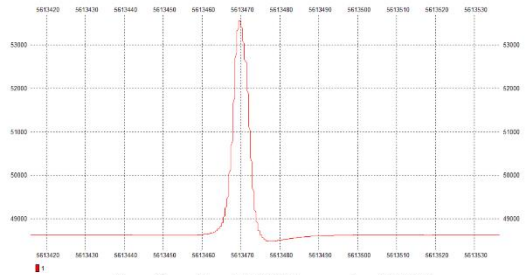
Graphic 16.1.E-21 MA0026



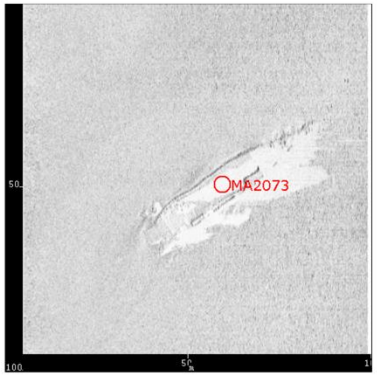
Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0026**
	Wreck ID	**20020**
	SSS ID	MA2073
	MBES ID	MA4006
	MAG ID	MA6203
Geophysical notes		**MA0026** The semi-coherent remains of a partially buried vessel measuring approximately 55m in length and 10m width, with an extended shadow suggesting debris and super-structure with a height of 3m above the seabed with a magnetic return of 5079nT. This correlates with the remains of a tank landing craft.
Build	Type	Landing craft
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown



Multibeam bathymetry image of MA4006 looking north



Magnetic profile of MA6203 measuring 5079nT



Side scan sonar image MA2073 with 72° heading

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0026

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0026 - Unknown wreck, UKHO20020

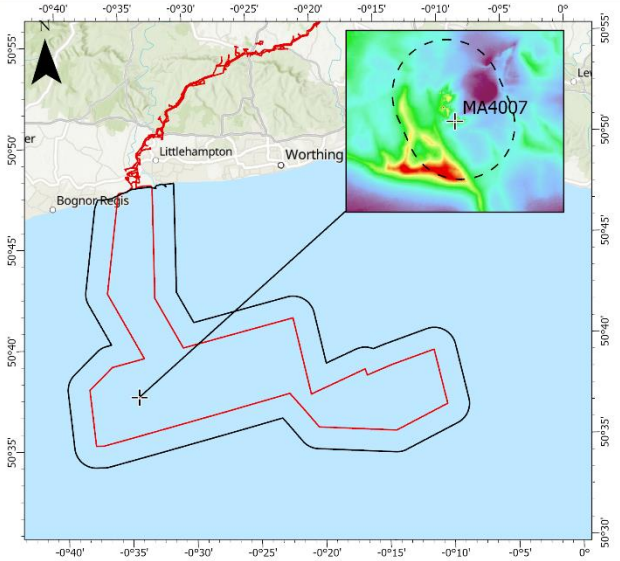
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

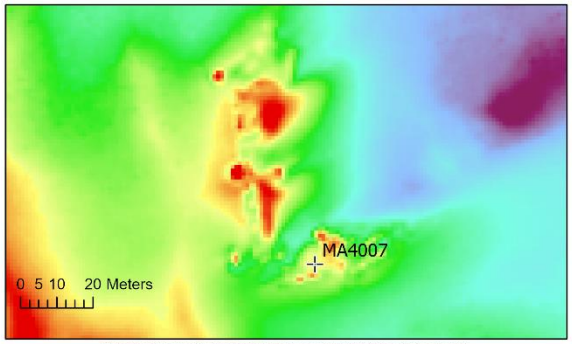
DRAWING NUMBER: Graphic 16.1.E-21

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

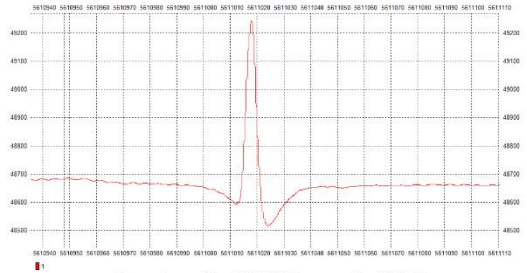
Rampion 2 WIND FARM

Graphic 16.1.E-22 MA0027

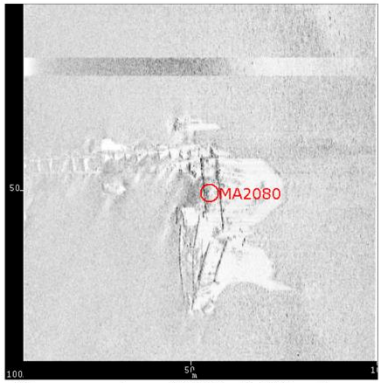




Multibeam bathymetry image of MA4007 looking north



Magnetic profile of MA6265 measuring 728nT



Side scan sonar image MA2080 with 74° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0027**
	Wreck ID	**19988**
	SSS ID	MA2080
	MBES ID	MA4007
	MAG ID	MA6265
Geophysical notes		**MA0027** Three sets of parallel linear hard reflectors with associated shadows suggesting a height of approximately 2.5m above the seabed, and a partially buried ladder-like anomaly, contained within an area of approximately 55 x 50m with a magnetic return of 728nT. This correlates with a wreck believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges on which they were towed.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0027

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0027 - Mulberry Harbour bridge sections, UKHO19988

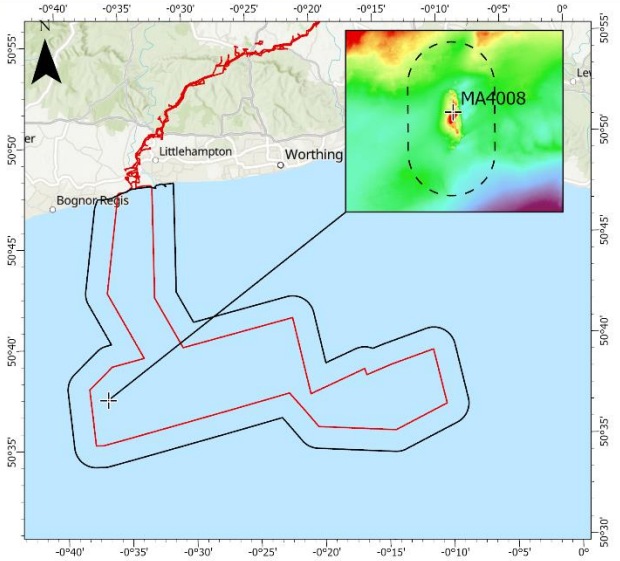
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

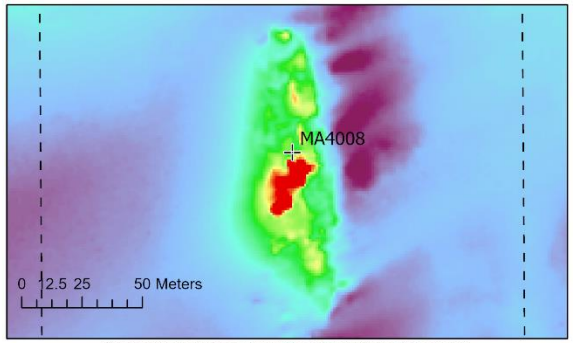
DRAWING NUMBER: Graphic 16.1.E-22

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

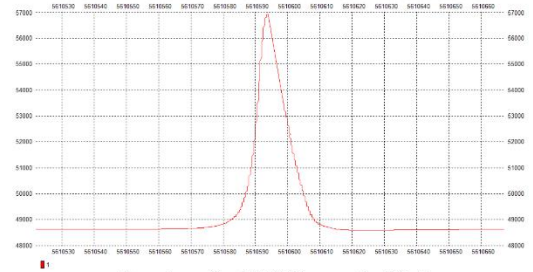
Rampion 2 WIND FARM

Graphic 16.1.E-23 MA0029

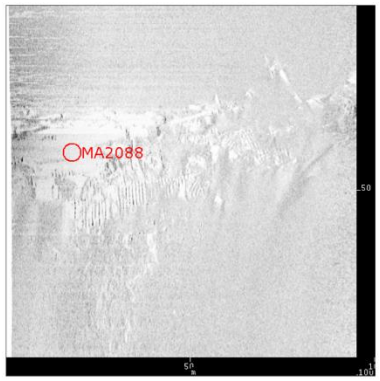




Multibeam bathymetry image of MA4008 looking north



Magnetic profile of MA6243 measuring 439nT



Side scan sonar image MA2088 with 74° heading

Location	***Coordinate System***	UTM84-30N
Wreck IDs	MA ID	**MA0029**
	Wreck ID	**19984**
	SSS ID	MA2088
	MBES ID	MA4008
	MAG ID	MA6243
Geophysical notes		**MA0029** The scattered debris of a wreck over an area of approximately 90 x 20m with a magnetic return of 439nT. This correlates with the English armed cargo vessel SS *War Helmet*, sunk on the 19th of April 1918.
Build	Type	Passenger/Cargo, steam ship
	Construction	Steel
	Dimensions (m)	135.6 x 17.7 x 12.2
	Shipyard	Asano Shipbuilding Co, Tsurami
Loss	Cause	Torpedoed by German submarine *UB-75*.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0029

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0029 - SS War Helmet, UKHO19984

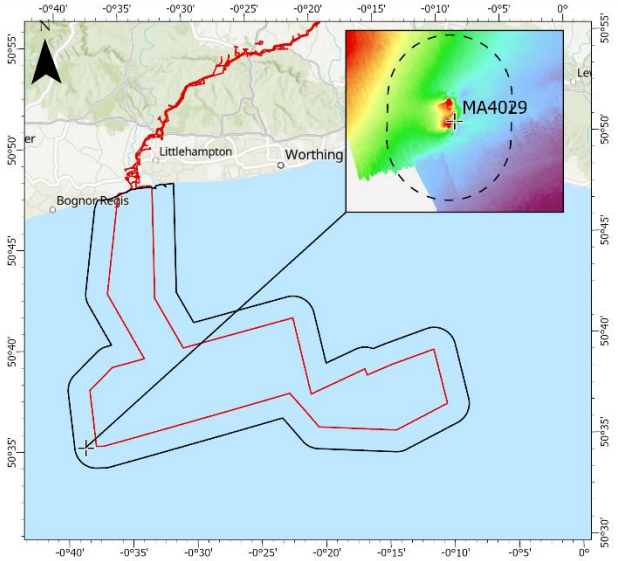
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

DRAWING NUMBER: **Graphic 16.1.E-23**

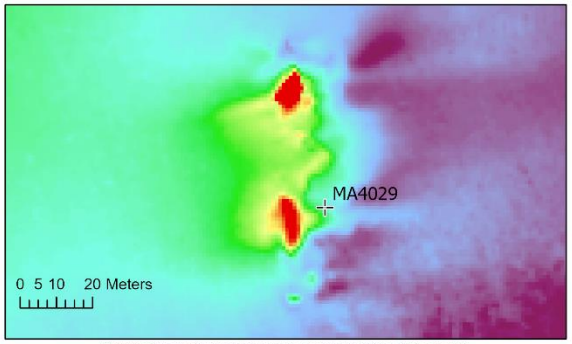
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

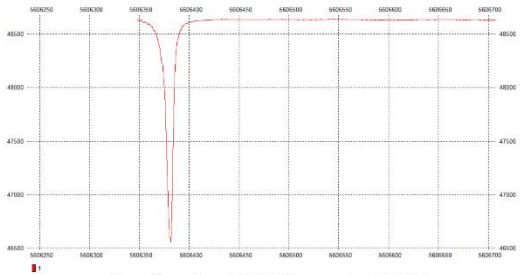
Graphic 16.1.E-24 MA0030



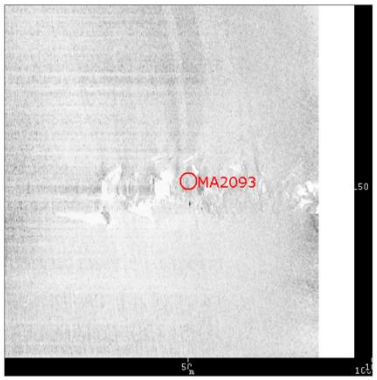
Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0030**
	Wreck ID	**19947**
	SSS ID	MA2093
	MBES ID	MA4029
	MAG ID	MA6489
Geophysical notes		**MA0030** A cluster of features concentrated within an area measuring 60 x 15m with a magnetic return of 2072nT. This correlates with the wreck of the Welsh cargo vessel SS *Afon Dulais*, sunk on the 20th of June 1942.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	63.4 x 10.1 x 4
	Shipyard	Dundee Shipbuilding Co. Ltd., Dundee
Loss	Cause	Stuck by a mine.



Multibeam bathymetry image of MA4029 looking north



Magnetic profile of MA6489 measuring 2072nT



Side scan sonar image MA2093 with 255° heading

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0030

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0030 - SS Afon Dulais, UKHO19947

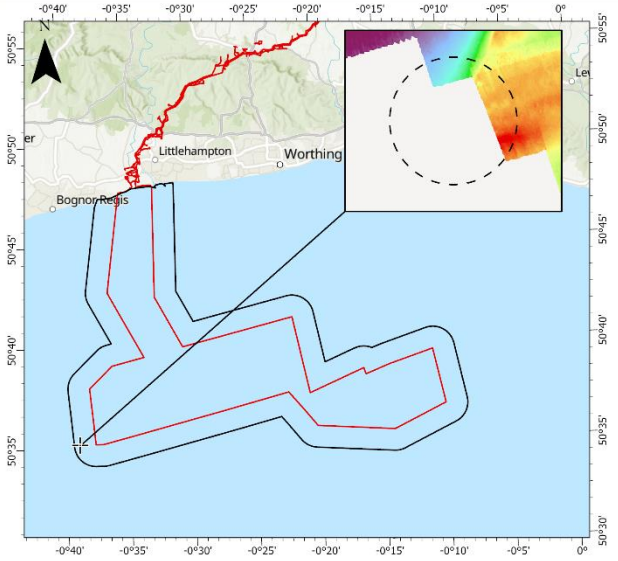
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

DRAWING NUMBER: Graphic 16.1.E-24

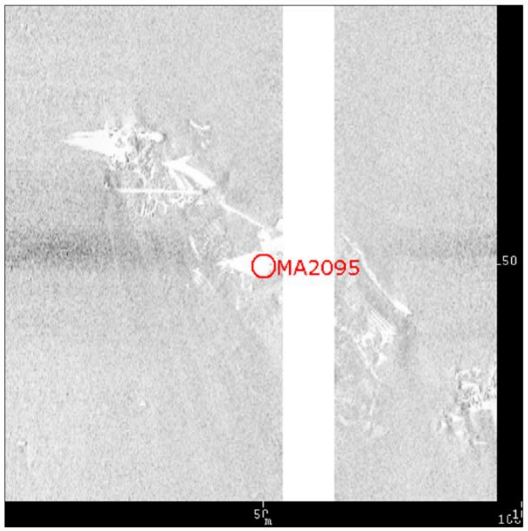
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Graphic 16.1.E-25 MA0032



Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0032**
	Wreck ID	**19948**
	SSS ID	MA2095
	MBES ID	-
	MAG ID	-
Geophysical notes		**MA0032** The scattered debris of a wreck over an area of approximately 91 x 14m. This is the potential wreck of the British cargo vessel SS *Lightfoot*, sunk on the 16th of March 1918. It is located outside of the ES area, but within the ASA.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	81.7 x 11.6 x -
	Shipyard	John Crown & Sons Ltd., Sunderland
Loss	Cause	Torpedoed by German submarine *UB-30*.



Side scan sonar image MA2095 with 69° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0032

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0032 - SS Lightfoot, UKHO19948

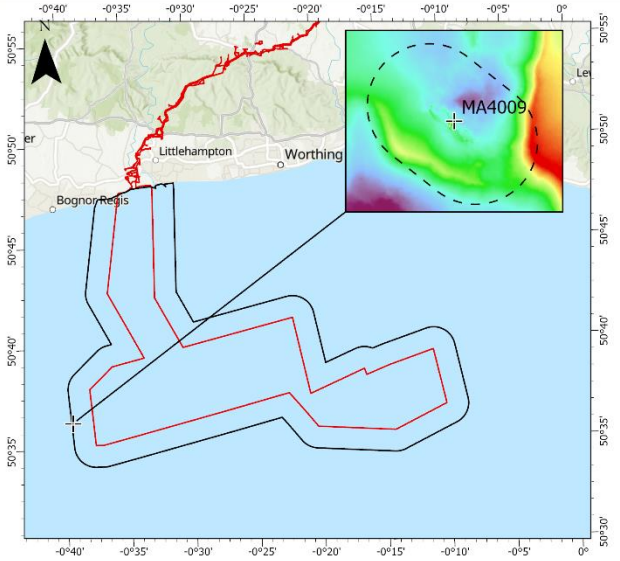
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

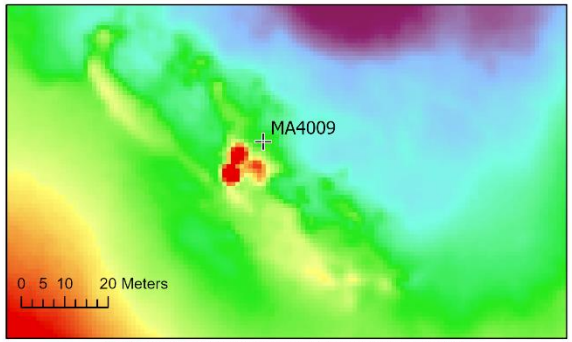
DRAWING NUMBER: Graphic 16.1.E-25

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

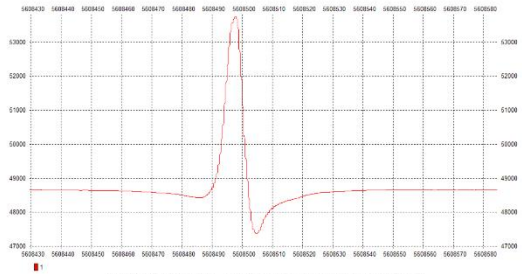
Rampion 2 WIND FARM

Graphic 16.1.E-26 MA0033





Multibeam bathymetry image of MA4009 looking north



Magnetic profile of MA6325 measuring 6401nT

Side scan sonar image MA2097 with 243° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0033**
	Wreck ID	**19971**
	SSS ID	MA2097
	MBES ID	MA4009
	MAG ID	MA6325
Geophysical notes		**MA0033** The semi-coherent partially buried remains of a wreck measuring approximately 83m in length and 15m width, with extended shadow suggesting the remains of super-structure including two boilers with a magnetic return of 6401nT. This correlates with the Scottish cargo vessel SS *Gartland*, sunk on the 3rd of January 1918.
Build	Type	Cargo, steam ship
	Construction	Unknown
	Dimensions (m)	91 x 12.2 x 6.1
	Shipyard	Readhead John & Sons Ltd., South Shields
Loss	Cause	Torpedoed by German submarine *UB-30*.

LEGEND
- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0033

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0033 - SS Gartland, UKHO19971

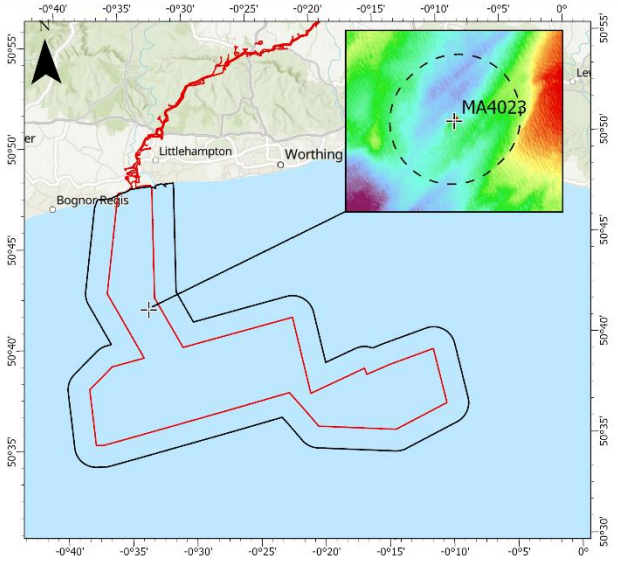
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

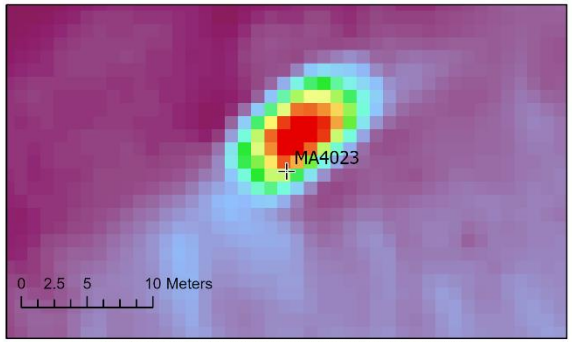
DRAWING NUMBER: Graphic 16.1.E-26

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

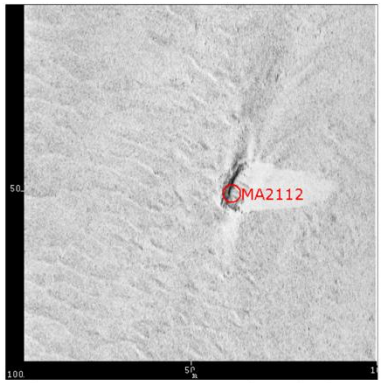
Graphic 16.1.E-27 MA0034





Multibeam bathymetry image of MA4023 looking north

Magnetic profile of MA5889 measuring 538nT



Side scan sonar image MA2112 with 254° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0034**
	Wreck ID	**20075**
	SSS ID	MA2112
	MBES ID	MA4023
	MAG ID	MA5889
Geophysical notes		**MA0034** Ovate anomaly with extended shadow, measuring approximately 14.5m in length and 7m width, sitting 3m above the seabed with a magnetic return of 538nT. This is potentially the wreck of a vessel carrying a cargo of metal bars.
Build	Type	Unknown
	Construction	Unknown
	Dimensions (m)	Unknown
	Shipyard	Unknown
Loss	Cause	Unknown

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0034

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0034 - Unknown wreck, UKHO20075

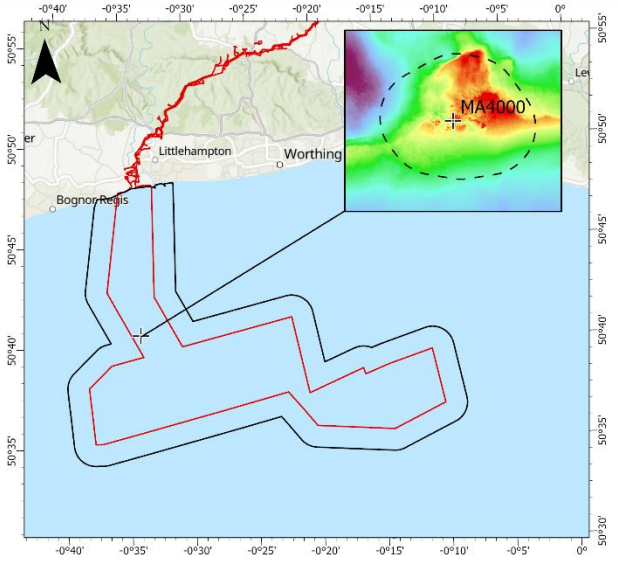
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

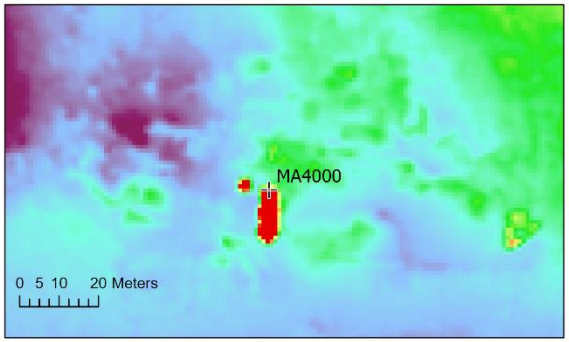
DRAWING NUMBER: Graphic 16.1.E-27

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

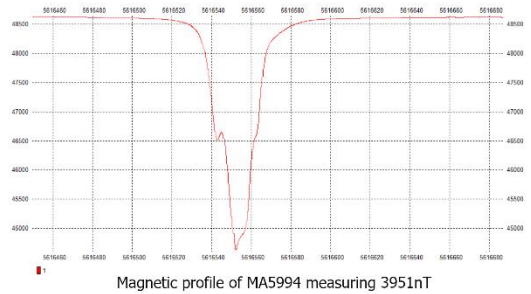
Rampion 2 WIND FARM

Graphic 16.1.E-28 MA0036

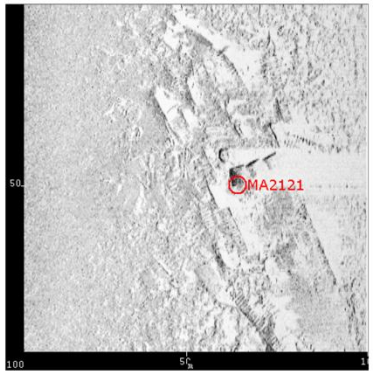




Multibeam bathymetry image of MA4000 looking north



Magnetic profile of MA5994 measuring 3951nT



Side scan sonar image MA2121 with 74° heading

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0036**
	Wreck ID	**20055**
	SSS ID	MA2121
	MBES ID	MA4000
	MAG ID	MA5994
Geophysical notes		**MA0036** Coherent remains of a steel plated cargo ship approximately 120m in length and 30m width. Super-structure including three boilers remains with a magnetic return of 3951nT. This is the potential wreck of the English cargo vessel SS *Glenlee*, torpedoed and sunk in 1918.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	122.01 x 16.15 x 7.39
	Shipyard	Charles Connell & Co. Ltd., Scotstoun
Loss	Cause	Torpedoed by German submarine *UB-57*.

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0036

PROJECT TITLE
Rampion 2 Offshore Wind Farm

DRAWING TITLE
MA0036 - SS Glenlee, UKHO20055

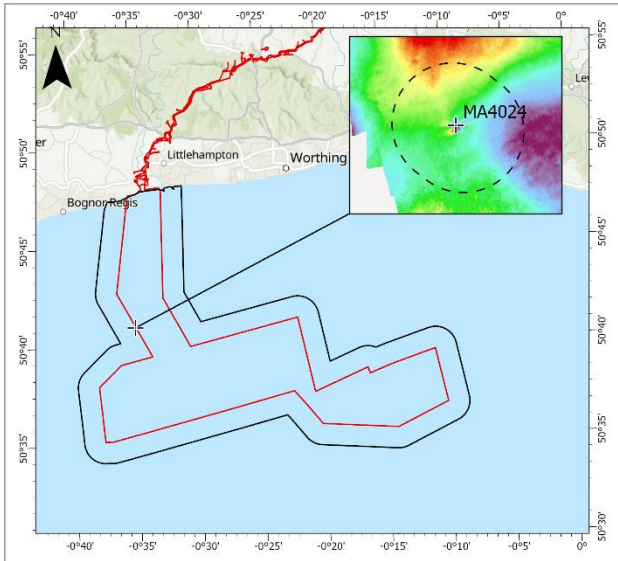
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

DRAWING NUMBER: Graphic 16.1.E-28

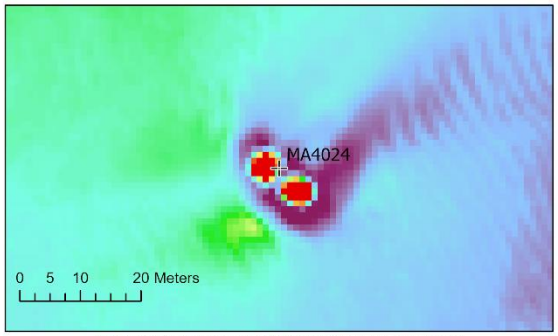
SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

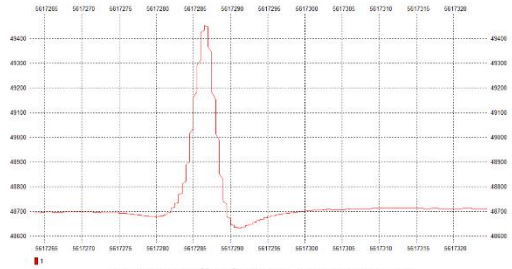
Graphic 16.1.E-29 MA0037



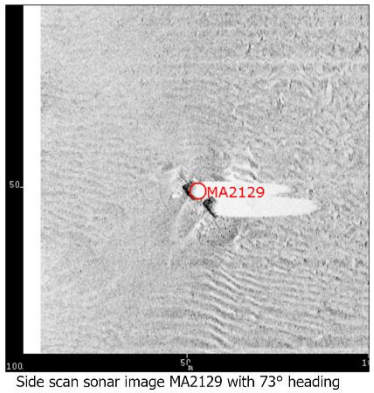
Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0037**
	Wreck ID	**20069**
	SSS ID	MA2129
	MBES ID	MA4024
	MAG ID	MA5931
Geophysical notes		**MA0037** Pair of 'L' shaped anomalies with extended shadows suggesting a height of approximately 4m above the seabed with a magnetic return of 823nT. This is potentially boilers from the wreck of the Scottish cargo vessel SS *Shirala*, sunk on the 2nd of July 1918.
Build	Type	Passenger, steam ship
	Construction	Steel
	Dimensions (m)	125 x 15 x 8.8
	Shipyard	Inglis A. & J. Ltd., Glasgow
Loss	Cause	Torpedoed by German submarine *UB-57*.



Multibeam bathymetry image of MA4024 looking north



Magnetic profile of MA5931 measuring 823nT



Side scan sonar image MA2129 with 73° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0037

PROJECT TITLE: *Rampion 2 Offshore Wind Farm*

DRAWING TITLE: MA0037 - SS Shirala, UKHO20069

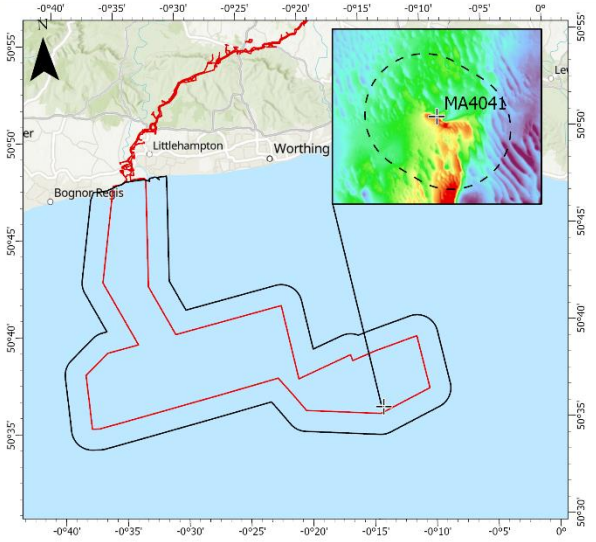
VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

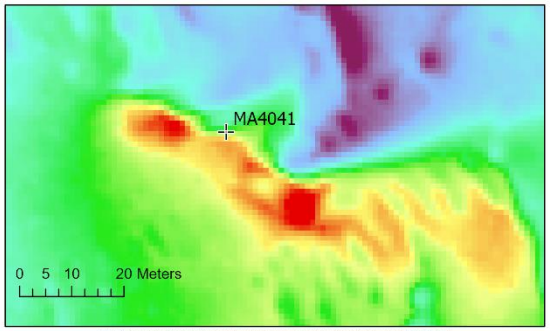
DRAWING NUMBER: Graphic 16.1.E-29

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

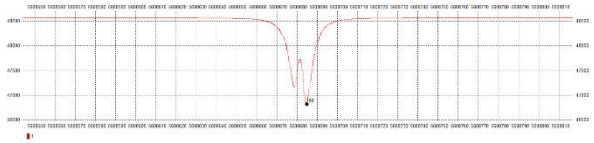
Rampion 2 WIND FARM

Graphic16.1. E-30 MA0062



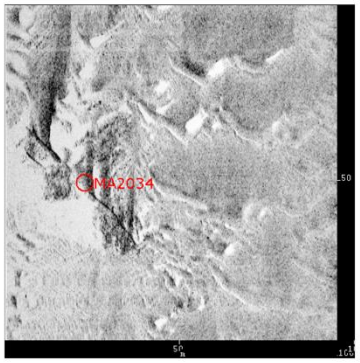


Multibeam bathymetry image of MA4041 looking north



Magnetic profile of MA5097 measuring 1751nT

Location	*Coordinate System*	UTM84-30N
Wreck IDs	MA ID	**MA0062**
	Wreck ID	**19959**
	SSS ID	MA2034
	MBES ID	MA4041
	MAG ID	MA5097
Geophysical notes		**MA0062** Buried hard reflector measuring approximately 47m in length with a magnetic return of 1751nT. This is potentially the wreck of the British cargo vessel SS *Broadhurst*, sunk on the 26th of July 1940.
Build	Type	Cargo, steam ship
	Construction	Steel
	Dimensions (m)	66.1 x 10.4 x 4
	Shipyard	Austin S. P. & Son Ltd., Sunderland
Loss	Cause	Torpedoed by German schnellboot flotilla.



Side scan sonar image MA2034 with 253° heading

LEGEND

- ES Assessment Boundary
- Marine archaeology study area
- Archaeological Exclusion Zone (100m)
- MA0062

PROJECT TITLE

Rampion 2 Offshore Wind Farm

DRAWING TITLE

MA0062 - SS Broadhurst, UKHO19959

VER	DATE	REMARKS	Drawn	Checked
1	02/10/2022	Final	HA	CH

DRAWING NUMBER: **Graphic 16.1.E-30**

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400,000	A3	WGS84	UTM29N

Rampion 2 WIND FARM

Annex F
Medium potential anomalies

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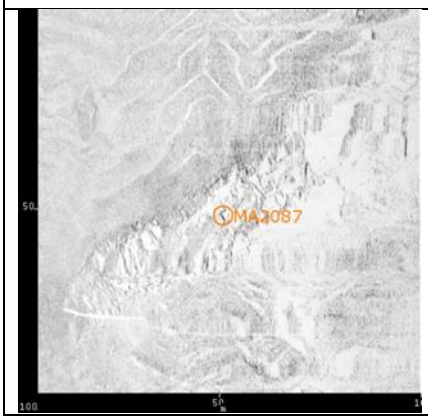
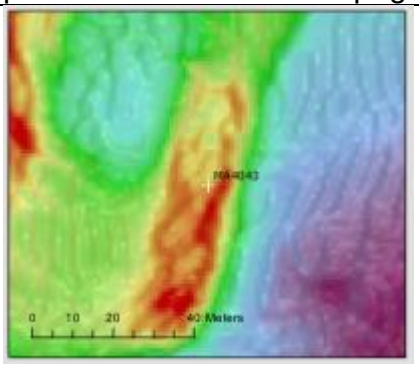
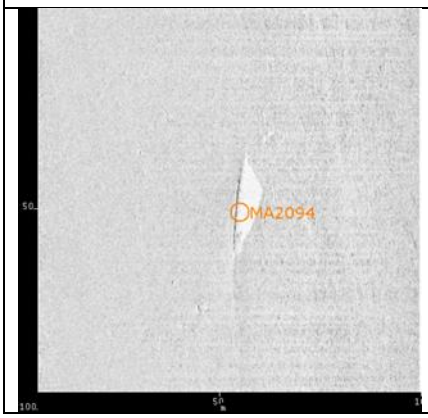
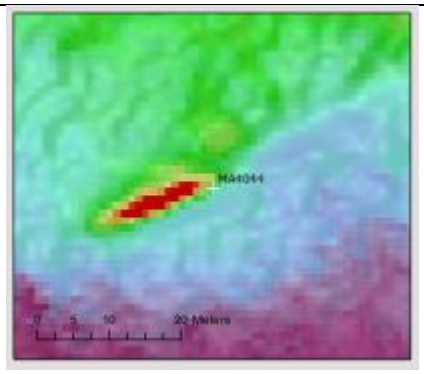
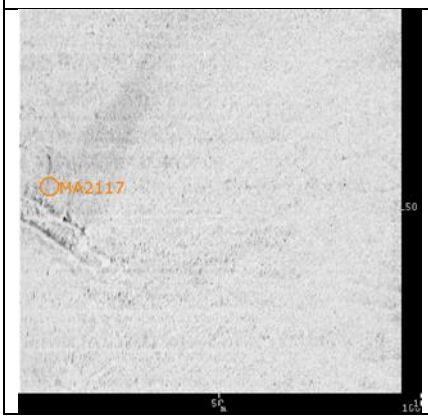
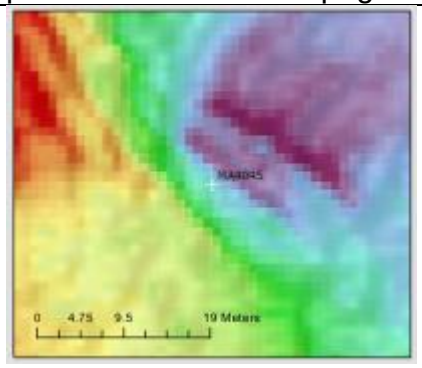
MA0028

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0028**
	SSS ID	MA2087
	MBES ID	MA4043
	MAG ID	-
Geophysical notes		**MA0028** A cluster of features concentrated within an area measuring 70 x 15m; potential wreck or anthropogenic debris.
		

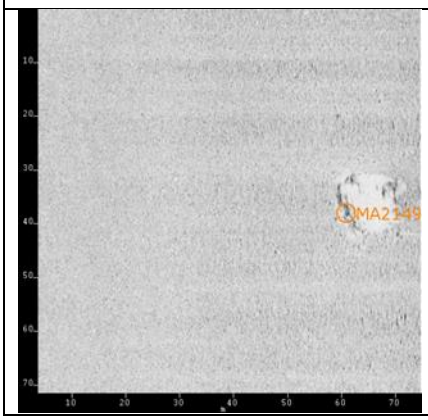
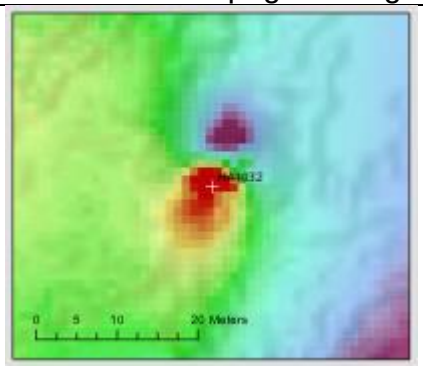
MA0031

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0031**
	SSS ID	MA2094
	MBES ID	MA4044
	MAG ID	-
Geophysical notes		**MA0031** Isolated linear hard reflector with angular shadow; potential anthropogenic debris or sand bar.
		

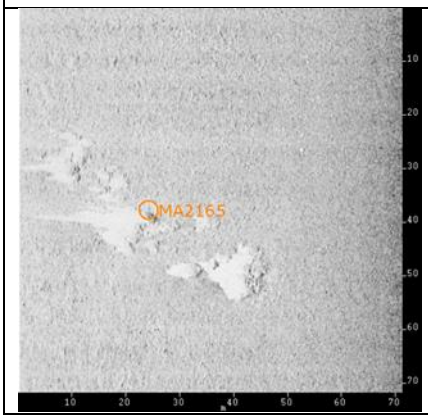
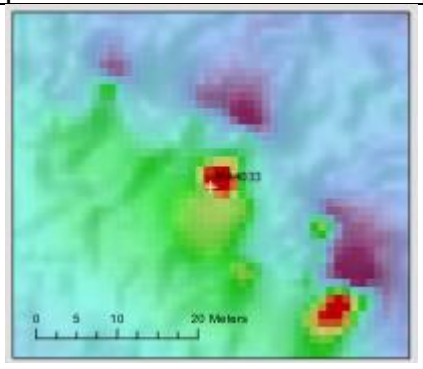
MA0035

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0035**
	SSS ID	MA2117
	MBES ID	MA4045
	MAG ID	-
Geophysical notes		**MA0035** Parallel linear buried reflectors; possible buried anthropogenic debris.
		

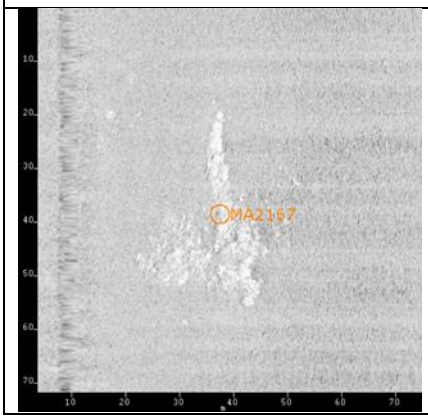
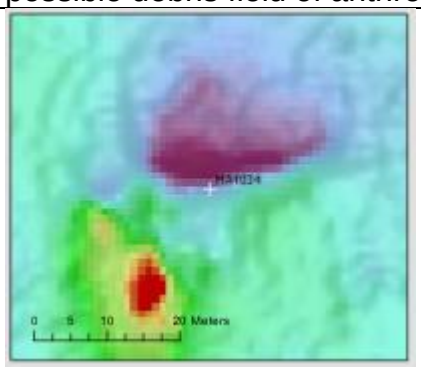
MA0038

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0038**
	SSS ID	MA2149
	MBES ID	MA4032
	MAG ID	-
Geophysical notes		**MA0038** A large isolated curvilinear hard reflector with crater-like depression; possible debris of anthropogenic origin.
		

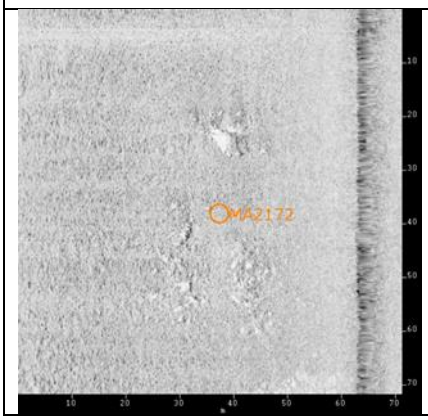
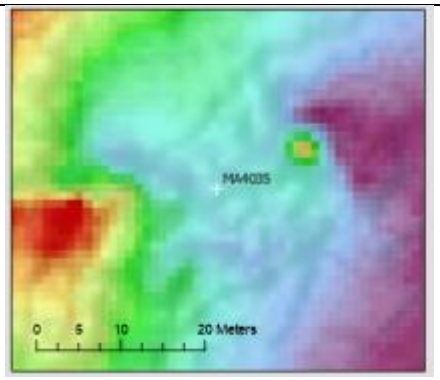
MA0040

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0040**
	SSS ID	MA2165
	MBES ID	MA4047
	MAG ID	-
Geophysical notes		**MA0040** An isolated area of dark reflectors; possible debris field of anthropogenic origin.
		

MA0041

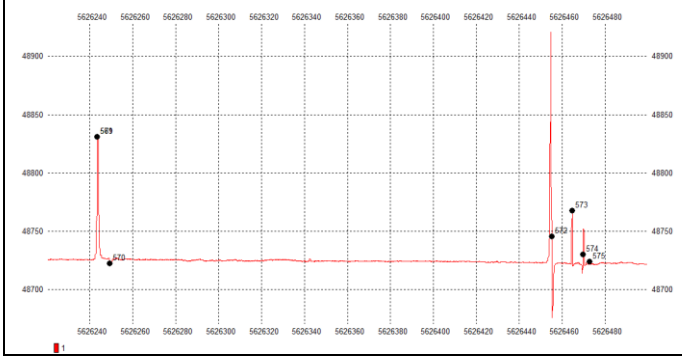
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0041**
	SSS ID	MA2167
	MBES ID	MA4034
	MAG ID	-
Geophysical notes		**MA0041** An isolated area of hard reflectors; possible debris field of anthropogenic origin.
		

MA0042

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0042**
	SSS ID	MA2172
	MBES ID	MA4035
	MAG ID	-
Geophysical notes		**MA0042** Scatters of dark reflectors; possible debris field.
		

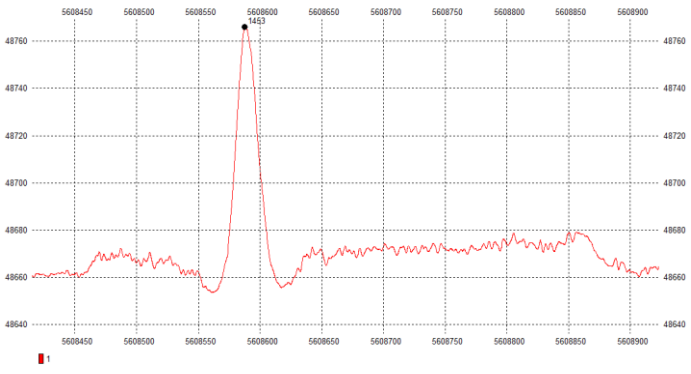
MA0045

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0045**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5501, MA5503
Geophysical notes		**MA0045** Two magnetic anomalies MA5501 (104nT) MA5503 (105nT).



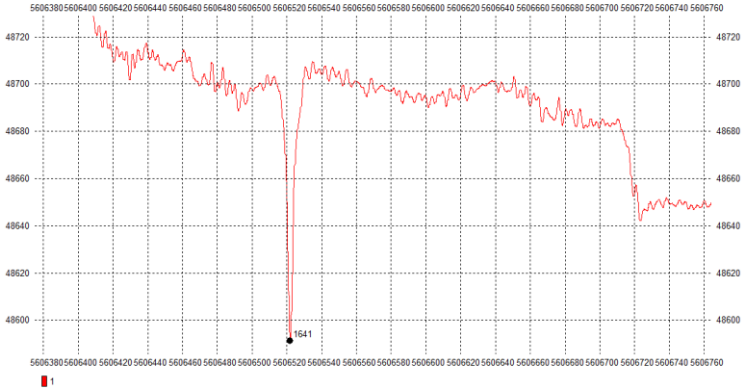
MA0047

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0047**
	SSS ID	-
	MBES ID	-
	MAG ID	MA6298
Geophysical notes		**MA0047** Isolated magnetic anomaly (110nT).



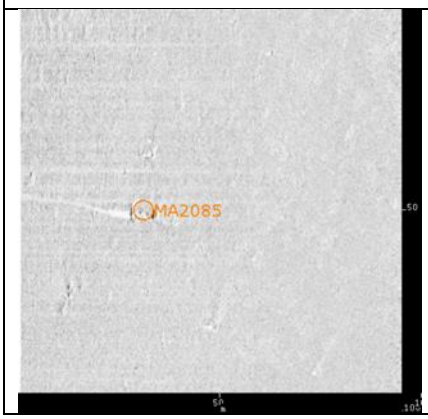
MA0048

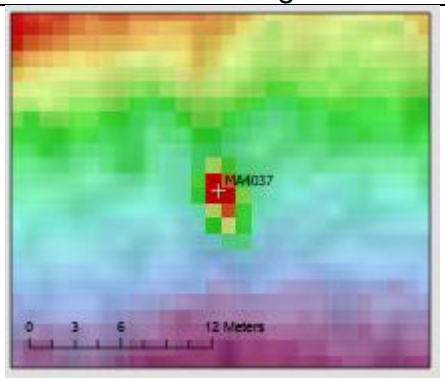
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0048**
	SSS ID	-
	MBES ID	-
	MAG ID	MA6485
Geophysical notes		**MA0048** Isolated magnetic anomaly (112nT).



MA0049

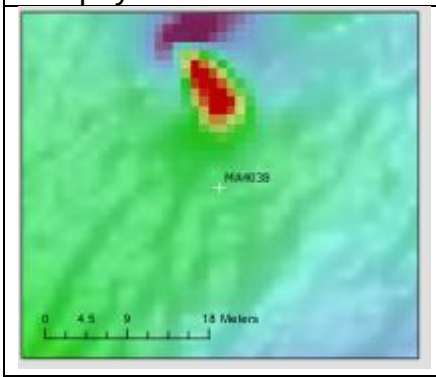
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0049**
	SSS ID	MA2085
	MBES ID	MA4037
	MAG ID	MA6224
Geophysical notes		**MA0049** Pair of linear hard reflectors; potential anthropogenic debris or boulders, associated with magnetic anomaly (115nT).

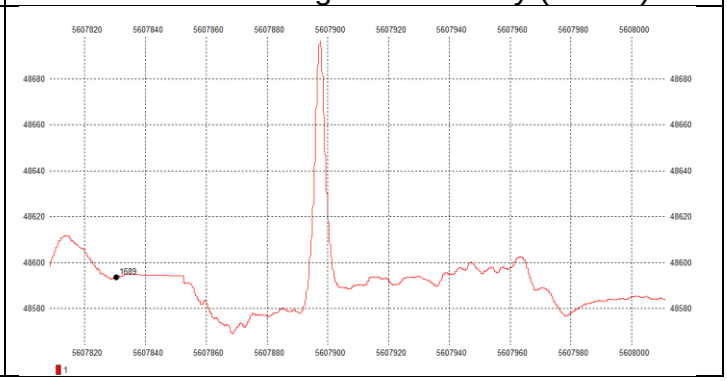




MA0050

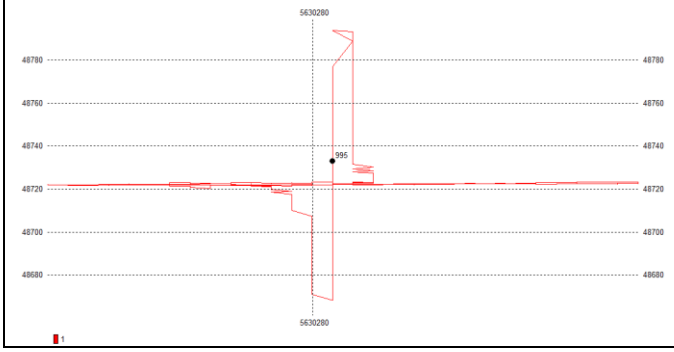
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0050**
	SSS ID	-
	MBES ID	MA4038
	MAG ID	MA6529
Geophysical notes		**MA0050** Isolated magnetic anomaly (116nT).



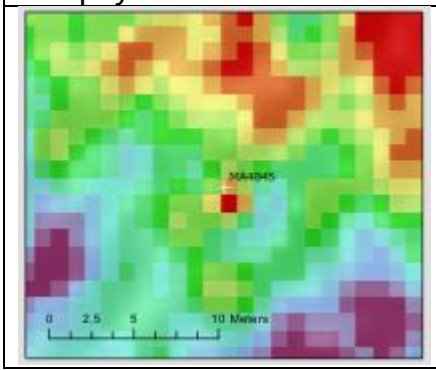
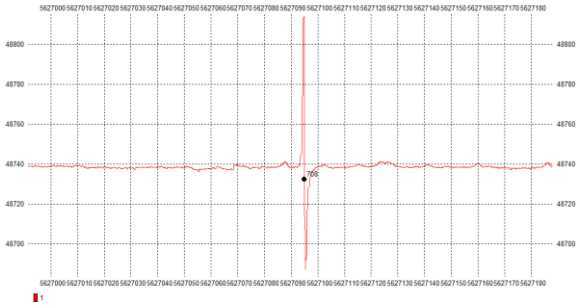


MA0051

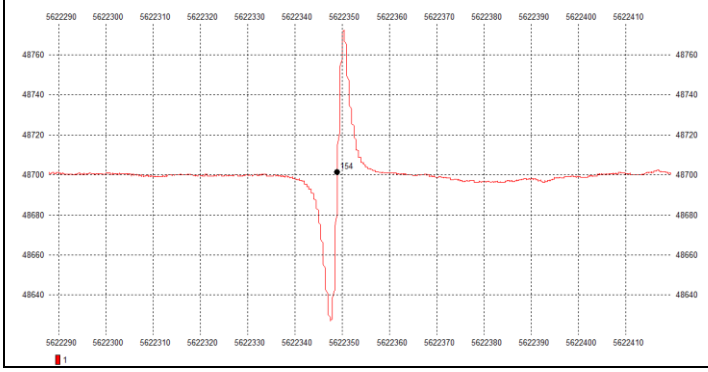
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0051**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5844
Geophysical notes		**MA0051** Isolated magnetic anomaly (125nT).



MA0052

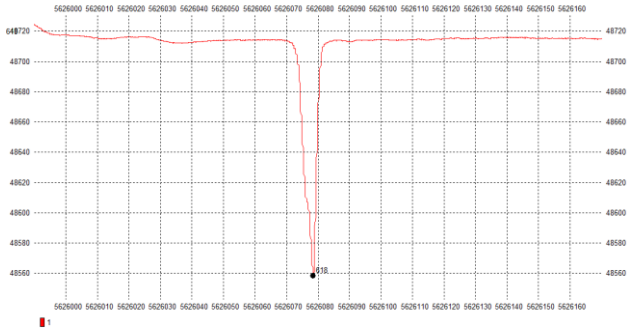
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0052**
	SSS ID	-
	MBES ID	MA4045
	MAG ID	MA5600
Geophysical notes		**MA0052** Isolated magnetic anomaly (126nT).
		

MA0053

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0053**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5202
Geophysical notes		**MA0053** Isolated magnetic anomaly (145nT).
		

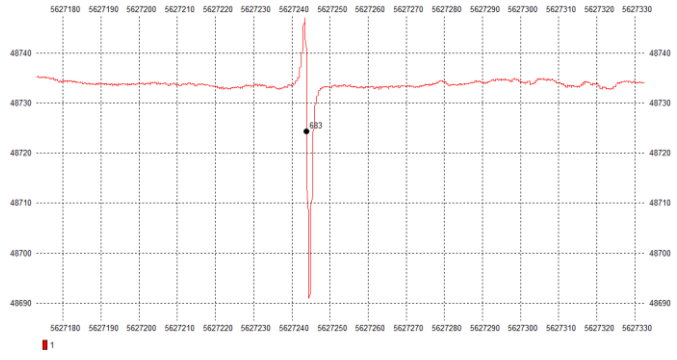
MA0054

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0054**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5537
Geophysical notes		**MA0054** Isolated magnetic anomaly (156nT).

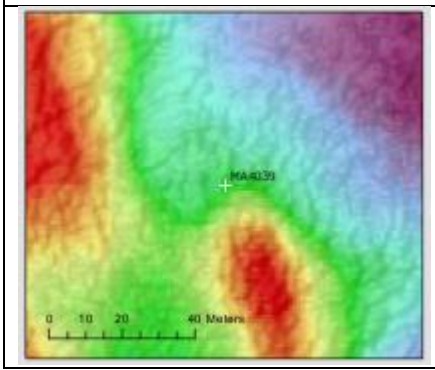


MA0055

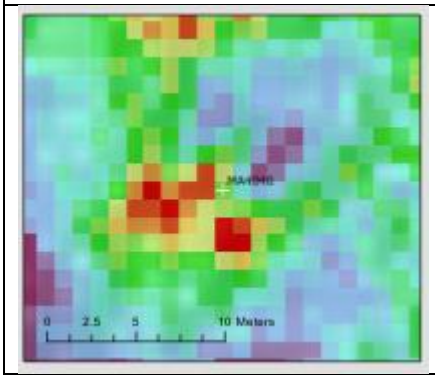
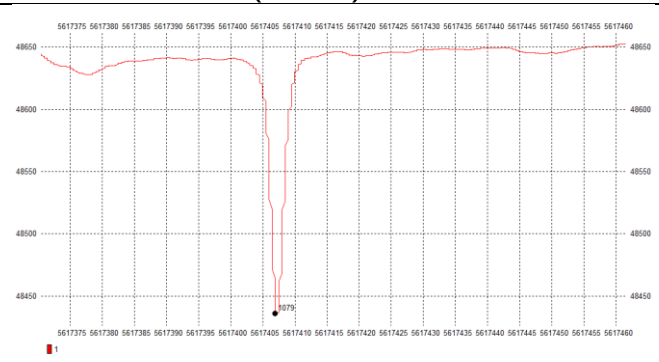
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0055**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5380
Geophysical notes		**MA0055** Isolated magnetic anomaly (165nT).



MA0056

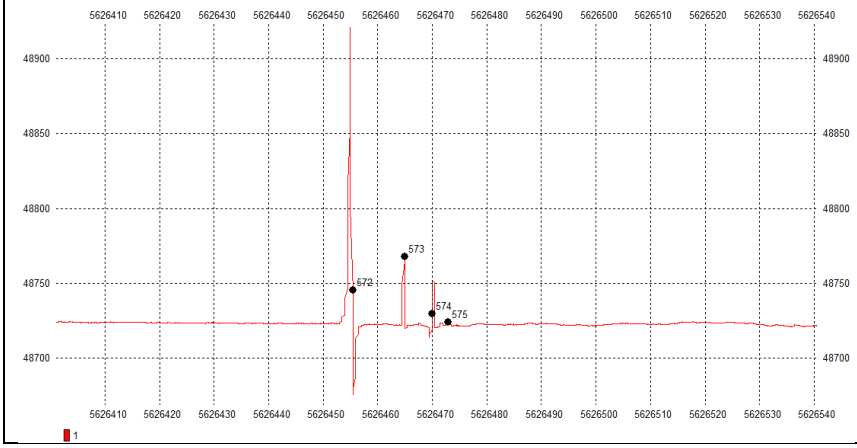
Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0056**
	SSS ID	-
	MBES ID	MA4039
	MAG ID	MA5032
Geophysical notes		**MA0056** Isolated magnetic anomaly associated with seabed reflector (166nT).
		

MA0057

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0057**
	SSS ID	-
	MBES ID	MA4040
	MAG ID	MA5927
Geophysical notes		**MA0057** Isolated magnetic anomaly associated with seabed reflector (209nT).
		

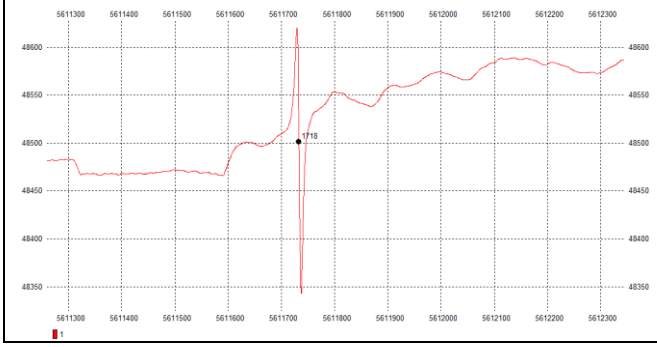
MA0058

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0058**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5504, MA5505, MA5506
Geophysical notes		**MA0058** Three magnetic anomalies MA5504 (245nT) MA5505 (47nT) MA5506 (38nT).



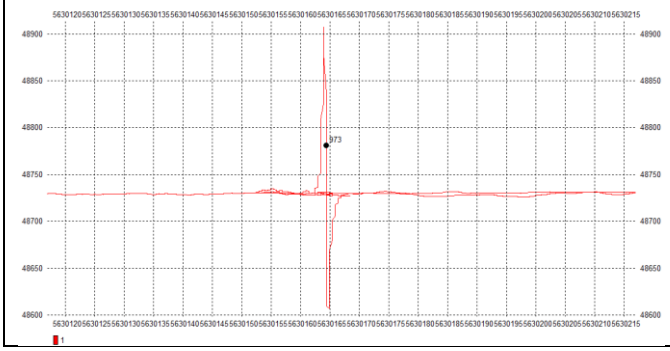
MA0059

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0059**
	SSS ID	-
	MBES ID	-
	MAG ID	MA6556
Geophysical notes		**MA0059** Isolated magnetic anomaly (147nT).



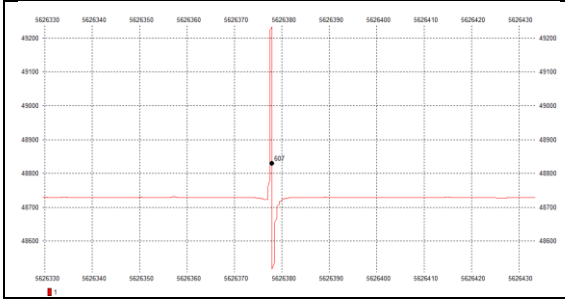
MA0060

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0060**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5823
Geophysical notes		**MA0060** Isolated magnetic anomaly (300nT).



MA0061

Location	***Coordinate System***	UTM84-30N
MA IDs	MA ID	**MA0061**
	SSS ID	-
	MBES ID	-
	MAG ID	MA5529
Geophysical notes		**MA0061** Isolated magnetic anomaly (716nT).



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Rampion 2
WIND FARM