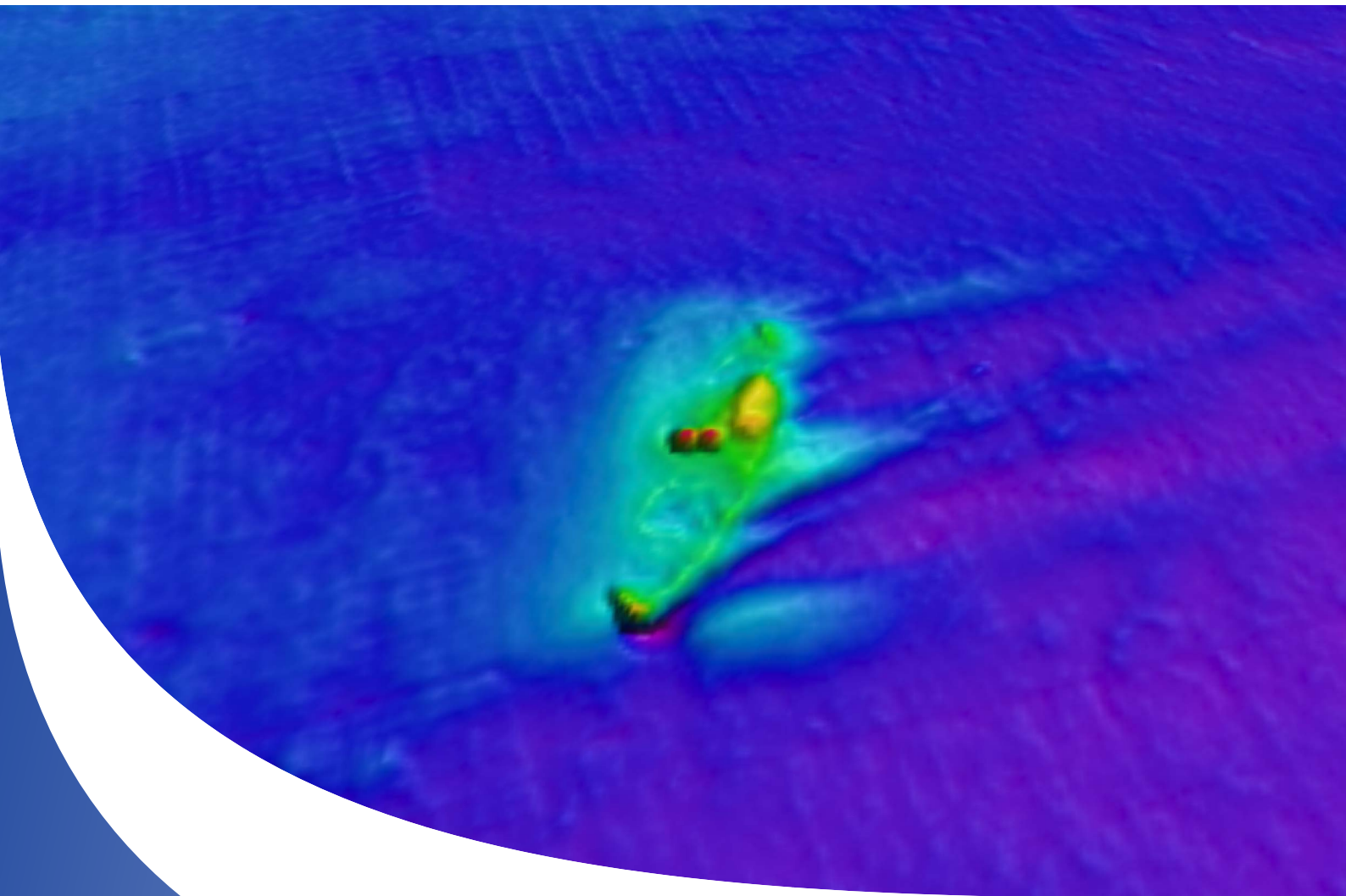




# Aggregate Area 473/2 Annual Monitoring Report

Archaeological Assessment of Geophysical Data



Ref: 106782.01  
March 2017



## **Aggregate Area 473/2**

### **Annual Monitoring Report Archaeological Assessment of Geophysical Data**

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# Aggregate Area 473/2

## Annual Monitoring Report

### Archaeological Assessment of Geophysical Data

#### Contents

Summary.....	iii
Acknowledgements.....	iv
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 Project background .....	1
1.2 Previous work .....	1
1.3 Seabed geology .....	3
1.4 Aim.....	3
<b>2 METHODOLOGY.....</b>	<b>3</b>
2.1 Introduction .....	3
2.2 Data sources .....	3
2.3 Technical specifications .....	3
2.4 Data quality .....	4
2.5 Processing .....	4
2.6 Anomaly grouping and discrimination .....	5
<b>3 RESULTS .....</b>	<b>6</b>
3.2 Within the Licence Area .....	6
3.3 Outside Licence Area.....	8
<b>4 MITIGATION .....</b>	<b>10</b>
<b>5 REFERENCES.....</b>	<b>12</b>
<b>APPENDIX I: ANOMALIES OF POSSIBLE ARCHAEOLOGICAL POTENTIAL – AREA 473/2...13</b>	

#### Figures

- Figure 1: Location map  
Figure 2: Anomalies of archaeological potential and exclusion zones

#### Sheets

- Sheet 1: WA ID 7004 and 7005 (UKHO 20693 and 20713)  
Sheet 2: WA ID 7007 (UKHO 20342 and 20713)

#### Tables

- Table 1: Delimiting coordinates for Area 473/2  
Table 2: Criteria for assigning data quality rating  
Table 3: Criteria for discriminating archaeological importance of features



Table 4: Anomalies of archaeological potential in Area 473/2  
Table 5: Types of anomalies identified in Area 473/2



# Aggregate Area 473/2

## Annual Monitoring Report

### Archaeological Assessment of Geophysical Data

#### Summary

Wessex Archaeology was commissioned by Fugro EMU Limited to undertake an archaeological assessment of geophysical survey data as part of the heritage annual monitoring process for aggregate extraction Areas 473/2. The data comprised sidescan sonar and multibeam bathymetry data acquired by Fugro EMU Limited during November 2016.

The overall aim of this report is to provide an archaeological review of the effects of dredging upon known archaeological sites and previously identified geophysical anomalies that may potentially be of archaeological interest; and to assess the areas for any new anomalies that may be of potential archaeological interest.

A total of 15 anomalies of archaeological potential have been identified across the Study Area for Aggregate Area 473/2. Three of the anomalies identified (**7004**, **7005** and **7007**) have been discriminated as A1 (anthropogenic origin of archaeological interest). These anomalies were classified as wreck material within all previous archaeological assessments of the area.

Anomalies **7004** and **7005** are located within the Licence Area. A current 150 m Archaeological Exclusion Zone is already in place around these anomalies and it is recommended that this is maintained.

Anomaly **7007** is outside the Licence Area and, therefore, no Archaeological Exclusion Zone is recommended at this time.

The remaining 12 anomalies were discriminated as A2 (uncertain origin of possible archaeological interest). No AEZs are recommended for these anomalies at this time. One debris anomaly (**7006**) has been identified within the existing 150 m Archaeological Exclusion Zone and is believed to be associated with wreck anomalies **7004** and **7005**.

All the anomalies are currently situated outside the main area of dredging and, as such, are unlikely to be impacted. However, if this were to change, avoidance would be recommended where feasible.

It is recommended that if any objects of possible archaeological interest are recovered during dredging operations from Areas 473/2, that they should be reported using the established Marine Aggregate Industry Protocol for *Reporting Finds of Archaeological Interest* (BMAPA and English Heritage 2005).



## **Aggregate Area 473/2**

### **Annual Monitoring Report Archaeological Assessment of Geophysical Data**

#### **Acknowledgements**

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



## Aggregate Area 473/2

### Annual Monitoring Report Archaeological Assessment of Geophysical Data

#### 1 INTRODUCTION

##### 1.1 Project background

1.1.1 Wessex Archaeology (WA) was commissioned by Fugro EMU Limited (Fugro) to undertake an archaeological assessment of geophysical survey data as part of the heritage impact annual monitoring process implemented for aggregate extraction in Area 473/2, located in the English Channel, approximately 29 km south west of Beachy Head, East Sussex (**Figure 1**).

1.1.2 The Study Area for the Licence Area, as provided by Fugro, is delimited by the following coordinates (WGS 84 UTM Zone 31N):

**Table 1** Delimiting coordinates for Area 473/2

<b>Easting</b>	<b>Northing</b>
316121	5596324
315837	5597407
321706	5598945
321990	5597862

1.1.3 The data comprised sidescan sonar (SSS) and multibeam echosounder (MBES) data acquired by Fugro on 26 and 27 November 2016. The geophysical survey data assessed for this report covers the Study Area for Area 473/2 as provided by the client (**Figure 1**). The survey extents are based on the overlap of SSS and MBES data coverage.

1.1.4 As required by the licence conditions for the dredging area, geophysical monitoring surveys are undertaken in order to ascertain any changes to the archaeological baseline. This report presents the archaeological assessment of the most recently acquired geophysical survey data for the area (year 10).

##### 1.2 Previous work

1.2.1 In 2002 WA undertook a desk-based assessment (DBA) in support of a licence application for Area 473/2. The DBA included an assessment of known, suspected and potential archaeological sites. All previous work was undertaken using the former study area name: Area 473 East.

1.2.2 The DBA (WA 2002) compiled and reviewed documentary records of known archaeological sites and assesses the potential for new sites to be discovered. The reviewed material consisted of:

- records of wrecks, obstructions and casualties (documented losses) from the National Monuments Record (NMR);





- the Receiver of Wreck at the Marine and Coastguard agency was approached with regards to reports of historic wrecks;
- records of wrecks and obstructions collated by the UK Hydrographic Office (UKHO);
- records of Palaeolithic and Mesolithic finds from the East Sussex Sites and Monuments Record (ESSMR);
- the Ministry of Defence (Naval staff Directorate) were consulted with regard to the existence of war graves within the Study Area;
- marine geophysical and geotechnical data provided by the client;
- various secondary sources relating to the palaeoenvironment and to the Palaeolithic and Mesolithic archaeology of Northern Europe;
- secondary sources relating to known and potential wreck sites and casualties.

- 1.2.3 In 2006 an archaeological assessment of geophysical data was undertaken by WA in preparation for aggregate extraction within Areas 473/2, 474/2 and 475 (WA 2006). Geophysical datasets assessed for this report consisted of SSS and sub-bottom profiler data, provided by Hanson Aggregates Marine Limited., alongside a geotechnical examination of grab samples. The archaeological assessment of geophysical data aimed to locate, assess and report on the position, character and nature of known and newly discovered archaeological sites.
- 1.2.4 Subsequently Year 4 archaeological monitoring was undertaken by EMU (2011), Year 6 annual monitoring was undertaken by Sea Change Heritage Consultants (2013).
- 1.2.5 A Year 8 (WA 2015) archaeological monitoring assessment was undertaken by WA within Aggregate Area 473/2 and 474/2, and most recently, Year 9 (WA 2016) archaeological monitoring was undertaken by WA for Areas 473, 474 and 475. Geophysical datasets assessed for both these reports comprised SSS and MBES data acquired by Fugro. The archaeological assessment of geophysical data aimed to locate, assess and report on the position, character and nature of known and newly discovered archaeological sites.
- 1.2.6 There are six finds reported in accordance with the British Marine Aggregate Producers Association (BMAPA) *Protocol for Reporting Finds of Archaeological Interest* records within Area 473/2, indicating evidence of maritime and aviation activity remains within the Study Area; all reported since 2005. These included two finds found at the same time (2010-2011) but not necessarily associated with one another: a cannonball and burnt timber (Cemex\_0368). The cannonball has a large dent, either from impact or manufacturing fault. The burnt timber is likely to have come from a ship, but this has not been proven. Another cannonball was reported in May 2011 (Hanson\_0359). Research showed this was likely to have been fired from a 32-pounder or demi-cannon.
- 1.2.7 A weight, dated as post medieval, was reported 2012-2013 (Hanson\_0489) located south-west of the centre of the Licence Area.
- 1.2.8 Two modern pieces of debris were also reported within Area 473/2. Half an iron artillery shell (Hanson\_0089) was reported 2006 – 2007. A copper alloy hinge (Hanson\_0179) was reported in June 2009 and is presumed, but not confirmed, to have come from a vessel.



### 1.3 Seabed geology

1.3.1 According to the British Geological Survey (BGS) the seabed sediments within the Study Areas consist of sandy gravel and muddy sandy gravel (BGS Sheet Sea Bed Sediments, 50°N-00°E and East Channel Association 2003). The underlying Tertiary sediments are the Middle Eocene Barton formation (Hamblin *et al.* 1992). The overall nature of the seabed was relatively flat with no significant bathymetric expressions.

### 1.4 Aim

1.4.1 The aim of this report is to:

- Confirm the presence of known or previously located marine sites of archaeological potential and to comment on their apparent character;
- Identify, locate and characterise hitherto unrecorded marine sites of archaeological potential;
- Comment on the effects of dredging on known archaeological sites; and
- Provide recommendations for archaeological mitigation.

## 2 METHODOLOGY

### 2.1 Introduction

2.1.1 The methodology adopted for this assessment conforms to the Standard and Guidance for Archaeological Desk-based Assessment published by the Chartered Institute for Archaeologists (CIfA 2014) and the BMAPA and English Heritage (2003) Marine Aggregate Dredging and the Historic Environment guidance note.

### 2.2 Data sources

2.2.1 The primary data set was the geophysical data acquired by Fugro. The data comprised SSS and MBES data acquired by Fugro between 26 and 27 November 2016 at 95 m line spacing with cross lines every 500 m.

2.2.2 The SSS data were provided as high and low frequencies in *.xtf* format and the MBES data were provided as a single *.txt* file. Only the high frequency SSS data were assessed by WA.

2.2.3 Further background information was obtained from previous archaeological investigations as detailed in Section 1.2.

2.2.4 A United Kingdom Hydrographic Office (UKHO) search for wrecks and obstructions was also undertaken as part of this assessment.

### 2.3 Technical specifications

2.3.1 The geophysical data were acquired by Fugro on board survey vessel RV *Discovery* between 26 and 27 November 2016. The data were acquired with a line spacing of 95 m with cross lines spaced every 500 m.

2.3.2 The SSS data were acquired using an Edgetech 4200 dual frequency SSS towfish and transceiver, operated at both high (600 kHz) and low (300 kHz) frequencies simultaneously, at a range of 114 m. Positioning for the SSS towfish was achieved with an USBL system. The SSS data were provided as high and low frequencies in *.xtf* format.



- 2.3.3 The MBES data were acquired using a Kongsberg EM 2040 MBES system operated at 400 kHz. The data were processed in QINSy and reduced to Chart Datum (CD), Newhaven. The data were digitally recorded, gridded to 1 m cell size and provided to WA in a single .txt file.
- 2.3.4 A Fugro Starfix system with G2+/HP/XP corrections was used to provide primary positioning for the survey. The secondary positioning system used was an Applanix POS MV DGSS.
- 2.3.5 For this survey all positions were recorded and expressed in WGS 1984, UTM Zone 31N.

## 2.4 Data quality

- 2.4.1 The geophysical data used for this report were assessed for quality and their suitability for archaeological purposes, and rated using the following criteria.

**Table 2** Criteria for assigning data quality rating

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

- 2.4.2 The high frequency SSS data have been rated as 'Average' using the above criteria. The data were acquired at a range of 114 m and was subject to some weather interference. The positioning of some lines has also been affected. Visibility did not extend to the end of the 114 m range. Large and upstanding objects were visible however, smaller objects were difficult to identify. Overall the data were considered suitable for archaeological interpretation.
- 2.4.3 The MBES data were rated as "Good" using the above criteria. The 1 m gridding ensured relatively small features were visible, and relatively few weather and tidal artefacts were present within the data. The dataset was considered suitable for archaeological interpretation.

## 2.5 Processing

- 2.5.1 The high frequency SSS data were processed by WA using Coda GeoSurvey software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were initially scanned to give an understanding of the geological nature of the area and were then interpreted for any objects of possible anthropogenic origin. This involves creating a database of anomalies within Coda by tagging individual features of possible archaeological potential, recording their positions and dimensions, and acquiring an image of each anomaly for future reference.



- 2.5.2 A mosaic of the SSS data is produced during this process to assess the quality of the sonar towfish positioning. Corrected navigation had been applied to the raw data using the USBL system and was left unaltered by WA.
- 2.5.3 The form, size, and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature, and therefore of its potential archaeological interest. A single, small, but prominent anomaly may be part of a much more extensive feature that is largely buried. Similarly, a scatter of minor anomalies may define the edges of a buried but intact feature, or it may be all that remains of a feature as a result of past impacts from, for example, dredging or fishing.
- 2.5.4 The MBES data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. The results were correlated with the SSS interpretation. The data were analysed using Fledermaus software, which enables 3-D visualisation of the acquired data and geo-picking of seabed anomalies.

## 2.6 Anomaly grouping and discrimination

- 2.6.1 The previous section describes the initial interpretation of all available geophysical data sets, which were conducted independently of each other. This inevitably leads to the possibility of any one object being the cause of numerous anomalies in different data sets and apparently overstating the number of archaeological features in the Study Area.
- 2.6.2 To address this fact, the anomalies were grouped together, allowing one ID number to be assigned to a single object for which there may be, for example, a UKHO record, multiple SSS anomalies and a MBES anomaly.
- 2.6.3 All geophysical anomalies that were identified in previous monitoring reports were also grouped at this stage.
- 2.6.4 Once all the geophysical anomalies have been grouped, a discrimination flag is added to the record in order to discriminate against those which are not thought to be of an archaeological concern. These flags are ascribed as follows:

**Table 3** Criteria for discriminating archaeological importance of features

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

- 2.6.5 In order to provide direct comparison with previous monitoring reports (EMU 2011, Sea Change 2013) the A1 discrimination can be considered to be High Potential (defined as an anomaly representing an object or site of anthropogenic origin and of likely archaeological interest); A2 discrimination can be considered to be of medium potential (defined as an anomaly representing an object or site of likely anthropogenic origin that would require further investigation in order to clarify its origin and establish its archaeological potential) or of low potential (defined as an anomaly representing an object or site of possible anthropogenic origin and unknown archaeological interest that does not require further investigation); A3 discrimination can be considered as low potential. Discrimination, potential and descriptions of the anomalies are provided in **Appendix I**.



- 2.6.6 Anomalies that were identified within the geophysical data but located outside the Study Area as provided by Fugro are considered outside the limits of this assessment and have been removed from the final gazetteer.
- 2.6.7 The grouping and discrimination of information at this stage is based on all available information and is not definitive. It allows for all features of potential archaeological interest to be highlighted, while retaining all the information produced during the course of the geophysical interpretation and desk-based assessment for further evaluation should more information become available.

### 3 RESULTS

- 3.1.1 The results of this assessment are collated in gazetteer format and detailed in **Appendix I** and are illustrated in **Figure 2**. Where anomalies have been identified within the previous WA monitoring report (2016) their previous number has been retained. Newly identified anomalies have been issued a new number starting with 7025.
- 3.1.2 Fifteen anomalies of archaeological potential have been interpreted within this area (**Figure 2**). These anomalies are discriminated as follows:

**Table 4** Anomalies of archaeological potential in Area 473/2

Archaeological Discrimination	Number of anomalies	Interpretation
A1	3	Anthropogenic origin of archaeological interest
A2	12	Uncertain origin of possible archaeological interest
<b>Total</b>	<b>15</b>	

- 3.1.3 These anomalies of potential archaeological interest have been classified by probable type, which can further aid in assigning archaeological potential and importance:

**Table 5** Types of anomalies identified in Area 473/2

Anomaly Classification	Number of Anomalies Inside Licence Area	Number of Anomalies outside Licence Area	Total Number of Anomalies
Wreck	2	1	3
Debris	1	3	4
Rope/chain	1	1	2
Seafloor Disturbance	0	1	1
Dark Reflector	1	4	5
<b>Total</b>	<b>5</b>	<b>10</b>	<b>15</b>

- 3.1.4 There were 27 geophysical anomalies identified in previous monitoring reports (WA 2016; WA 2015; Sea Change 2013) as features of possible archaeological potential located within the Study Area. Sixteen of these anomalies were grouped with features identified in the current dataset by WA and have been retained in this report. Eleven anomalies were not observed within this 2016 dataset (WA 2016; WA 2015; Sea Change 2013). This could be due to anomalies being interpreted as natural features by WA within this dataset or burial in the surrounding sediment. All previous anomalies are represented in **Figure 2**.

### 3.2 Within the Licence Area

- 3.2.1 Two of the anomalies identified within the Licence Area (**7004** and **7005**) have been classified as A1 - Anthropogenic origin of archaeological interest. These have been previously identified as two halves of the same wreck in years 8 and 9 (WA 2015 and 2016; WA 7004 and 7005), year 6 (Sea Change 2013; SC\_0001) and year 4 (EMU 2011;



EMU\_Area473\_0031a and b). They have been previously recorded as having high potential.

- 3.2.2 From this most recent dataset anomaly **7004** has been identified in the SSS data as a long angular object with some appearance of internal parallel structure, measuring 30 x 8 x 4.3 m, lying on a north-west to south-east alignment in a general depth of 38 m CD. The anomaly is observed as a long tapering mound within the MBES data. There is significant sediment build-up along the south-west and north-east sides of the wreck and scour to the east which could obscure observation of further attached structure or surrounding debris (**Sheet 1**).
- 3.2.3 The central position for anomaly **7005** lies approximately 30 m SSW from the central position of anomaly **7004**; however, from the echosounder data it can be inferred that the extents of each section are approximately 13 m apart. This smaller section of the wreck measures 14.5 x 4.5 x 2.5 m, on a NNW-SSE alignment in a general depth of 39 m CD. Anomaly **7005** was observed as a distinct smaller elliptical mound within the echosounder data with sediment build-up at the centre of the east and west sides, with scouring to the north, east and south (**Sheet 1**).
- 3.2.4 A distinct seabed depression is observed between the two pieces of wreck with a maximum depth of 0.7 m observed immediately to the south-east of **7004**. As this is likely to be the position of the vessel break-point, this area may contain associated debris that is not visible within the geophysical data due to size or burial.
- 3.2.5 The difference in general depth from the previous annual report would suggest that more of the wreck would be buried. The overall dimensions for the smaller section **7005** have decreased suggesting increased burial of the site but this may also suggest some degradation of the internal structure. However, the overall dimensions for the larger section **7004** have slightly increased. This could suggest some degradation and spread of the main structure, or this may also suggest that there are complex processes of sediment accretion and erosion occurring across the site.
- 3.2.6 Both anomalies **7004** and **7005** are associated with the location of a UKHO record (UKHO 20693) reported by divers to be the wreck of a German minelaying submarine.
- 3.2.7 The UKHO record of German minelaying submarine UC 65 (UKHO 20713) is located approximately 2 km east of these wreck anomalies. However, previous assessments WA (2015; 2016) proposed that anomalies **7004** and **7005** represent the wreck of the submarine UC 65.
- 3.2.8 The UKHO record shows that the UC 65 had similar original dimensions (52.7 m x 5.2 m) to the total recorded from anomalies 7004 and 7005 and previous diving reports for the UC 65 have recorded its having broken into two pieces (McCartney 2003). As such, anomalies 7004 and 7005 are associated with the recorded position of UKHO 20693 but with the recorded details of UKHO 20713.
- 3.2.9 The UC 65 was a World War I German minelaying Submarine with a formidable service history having sunk 103 ships on 11 patrols. UC 65 was built by Blohm and Voss, Hamburg and was commissioned on 8th July 1916 (McCartney 2003). Furthermore, it was a rare casualty of an enemy submarine, having been torpedoed and sunk by British Submarine HMS C15 on 3rd November 1917 (Messimer 2002, 304).
- 3.2.10 A current 150 m Archaeological Exclusion Zone (AEZ) exists around the extents of the wreck boundary. From the MBES data it can be observed that dredging operations have



taken place up to 46 m to the west and south from the wreck extents, although these are known to be historical and the evidence of dredging is the same as in 2015 (year 8).

- 3.2.11 Three anomalies identified within the Licence Area (**7006**, **7025** and **7026**) have been classified as A2 - Uncertain origin of possible archaeological interest.
- 3.2.12 One of these anomalies (**7006**) has been previously observed in years 8 (WA 2015; WA 7006), year 6 (Sea Change 2013; SC\_0005) and year 4 (EMU 2011; EMU\_Area473\_0030). However, it was not observed in the 2015 dataset (year 9, WA 2016). This anomaly has been previously recorded as having medium potential.
- 3.2.13 Anomaly **7006** has been classified as an individual piece of debris and observed as a small angular object with varying height shadow measuring 3.2 x 0.7 x 0.5 m. This object is located 58 m north-west of the central position of wreck anomaly **7004**, within the current AEZ, and has been interpreted as debris which may be associated with this wreck.
- 3.2.14 The remaining two anomalies (**7025** and **7026**) have not been previously identified.
- 3.2.15 Anomaly **7026** has been classified as rope or chain, identified within the SSS data as a curvilinear object with a slight shadow measuring 34.8 x 0.2 x 0.4 m, and is situated approximately 510 m south-west of **7005**.
- 3.2.16 Anomaly **7025** has been classified as a dark reflector; an object of uncertain origin, measuring 4 x 0.4 x 0.6 m. This anomaly has been interpreted as a piece of possible debris or could be a natural feature and is considered to be of low archaeological potential. Anomaly **7025** is situated approximately 490 m south-west of anomaly **7005**.
- 3.2.17 These two previously unidentified objects could represent previously covered debris of archaeological potential but may also represent modern debris, recently discarded.

### 3.3 Outside Licence Area

- 3.3.1 One anomaly identified outside the Licence Area (**7007**) has been classified as A1 - Anthropogenic origin of archaeological interest. This was previously identified within earlier monitoring reports a wreck in years 8 and 9 (WA 2015 and 2016; WA 7007), year 6 (Sea Change 2013; SC\_0002) and year 4 (EMU 2011; EMU\_Area473\_0042). This anomaly has been previously recorded as having high potential.
- 3.3.2 This vessel has been associated with two different UKHO positions; one for the vessel SS *Caterham* (probably) (UKHO 20342) and one for the German submarine UC 65 (possibly) (UKHO 20713).
- 3.3.3 Anomaly **7007** has been interpreted as a distinct elliptical outline of a wreck with observed measurements of 78 x 19 x 3.1 m, lying at a general depth of 41 m CD and aligned NNE-SSW. The wreck appears upright although it appears mostly buried with significant build-up of sediment observed along the western extents of the wreck, at the south-east end and at the centre of the eastern edge of the wreck. The south-west end of the wreck stands most proud of the seabed and is assumed to be the bow. There is the appearance of some structure; two tall mounds which appear almost central and a larger more rounded mound towards the north end, interpreted as surviving boilers and a possible cabin (**Sheet 2**).
- 3.3.4 The SS *Caterham* was a British cargo ship built by Short Brothers in Sunderland in 1886 with a tonnage of 1777 t and a triple expansion engine with single shaft. Its dimensions measured 83.2 m in length, 11.6 m in width with a 6.1 m draught. This UKHO record



20342 of the SS *Caterham* was more likely to correspond to the observed wreck due to the form being unlike a submarine and the dimensions of the original vessel; 83.2 m x 11.6 m x 6.1 m, being closely resembled by those observed within the geophysical data. However, the UKHO record also states that the wreck was dived in 1993 and identified as a very old steel coaster.

- 3.3.5 In previous monitoring reports WA (2015; 2016) have proposed that due to discrepancies between the original dimensions, dive reports and those features observed in the geophysical data, it is not possible to definitively interpret this wreck as SS *Caterham*.
- 3.3.6 There is a significant decrease in the observed dimensions in this recent 2016 dataset from those previously observed (84.3 x 24.2 x 3.6 m). The general depth of the area also appears shallower and the wreck appears further buried in the surrounding sediment. This suggests that sediment build-up has increased in the area, especially along the western extents. The scour along the eastern extents appears less pronounced.
- 3.3.7 Some possible surrounding debris has been identified and is further described below (**7021**, **7023**, **7030** - **7032**). The sediment build-up around the wreck may inhibit the identification of further debris, and indeed, the surrounding debris field that was visible in the 2015 data has not been identified in the current 2016 dataset (7008; WA 2015; WA 2016).
- 3.3.8 The nine anomalies identified outside the Licence Area (**7000**, **7021**, **7023** and **7027** - **7032**) have been classified as A2 - Uncertain origin of possible archaeological interest.
- 3.3.9 Three of these anomalies (**7021**, **7030** and **7031**) have been classified as individual pieces of debris, and all have been identified in the vicinity of the wreck anomaly **7007**.
- 3.3.10 One of these anomalies (**7021**) has been identified previously (WA 2016). It was observed in the most recent data as a straight edged object with corresponding angular shadow, measuring 2.1 x 0.8 x 0.8 m, and located 58 m to the north-east of the central wreck **7007** position. It was previously observed as a much larger object (6.5 x 1.3 x 0.7 m) and therefore may have become further buried. This anomaly is located 6 m north-east of an anomaly identified in year 6 (SC\_0003; observed as 2 m x 1 m x 0.7 m.) and therefore it is now likely that this may be the same anomaly, despite the previous interpretation.
- 3.3.11 Anomaly **7030** has not been previously identified. It was observed close to the south-east end of the wreck boundary **7007**. This anomaly was observed as an angular object measuring 6.4 x 3.3 x 0.2 m, although height may have been obscured by proximity to wreck, and is interpreted as a possible piece of debris associated with the wreck.
- 3.3.12 Anomaly **7031** has not been previously identified. It was observed approximately 40 m south-east of the central wreck **7007** position. This anomaly was observed as the straight edge of an object with varying shadow, measuring 5.9 x 0.6 x 0.3 m, and is interpreted as a possible piece of debris that may be associated with the wreck.
- 3.3.13 One anomaly (**7032**) has been classified as rope or chain. This anomaly has not been previously identified and was observed as a long curvilinear dark reflector extending north-east from the extents of the wreck **7007**, measuring 132.1 x 0.9 x 0.3 m.
- 3.3.14 One of the anomalies (**7023**) has been interpreted as a seafloor disturbance; a group of dark reflectors of uncertain origin. It was observed in the side scan sonar data as an angular area of indistinct objects of varying size and shape measuring 31 m x 23 m with a maximum height of 0.4 m. The central position of this area is located approximately 90 m



south-west of the central wreck position for anomaly **7007**. This anomaly could be debris or this group of objects may also be natural in origin. This anomaly was originally tentatively associated with a previously identified extensive debris field (WA 2016; 7008) that has not been observed within this dataset and may now be buried.

- 3.3.15 The remaining four anomalies identified outside the Licence area (**7000** and **7027 - 7029**) have all been interpreted as dark reflectors; objects of uncertain origin and are considered to be of low archaeological potential.
- 3.3.16 Anomaly **7000** has been identified in previous assessments (WA 2015; WA 2016). This anomaly was identified within the SSS data as a small curved object measuring 3.5 x 2.3 x 0.7 m. It was previously identified with larger dimensions and therefore appears to have become increasingly buried.
- 3.3.17 The remaining three anomalies (**7027 – 7029**) have not been previously identified and range in size from 2.7 x 0.6 x 0.9 (**7029**) up to 9.2 x 1.9 x 0.7 m (**7028**) and all are interpreted to be possible debris of low archaeological potential or natural features. Full details are provided in **Appendix I**.
- 3.3.18 The recorded position of a further wreck, the SS *Seaford* (UKHO 20332), is located approximately 24 m from the edge of the south-west of this Dredging Licence Area and 320 m from the Study Area. The wreck location was not covered by the survey data. The UKHO record states that it was last observed in 2014 measuring 75 m x 11 m x 6.2 m. This wreck has an existing 100 m Exclusion Zone placed around the extents of this wreck which would impact on the Licence Area for Area 473/2. However, the Exclusion Zone does not impact on the 2017 Study Area and as such is not included in the gazetteer.

## 4 MITIGATION

- 4.1.1 With regards to mitigation of archaeology the marine planning authority, working with the relevant regulator and advisors, take account of the desirability of sustaining and enhancing the significance of heritage assets and adopt a general presumption in favour of the conservation of designated heritage assets within an appropriate setting (HM Government 2011; DCALG 2012).
- 4.1.2 A total of 15 anomalies of archaeological potential have been identified across the Study Area for Aggregate Area 473/2. Three of the anomalies identified (**7004**, **7005** and **7007**) have been classified as A1 - Anthropogenic origin of archaeological interest. Anomalies **7004** and **7005** are considered to be the wreck of a submarine, possibly the UC 65, and are located within the Licence Area and the ADZ. A 150 m Archaeological Exclusion Zone is already in place and it is recommended that this is maintained in accordance with the current licence.
- 4.1.3 Anomaly **7007** is outside the Licence Area and, therefore, no Archaeological Exclusion Zone is recommended at this time.
- 4.1.4 A further 12 anomalies were identified within Area 473/2 and were classified as A2 - Uncertain origin of possible archaeological interest. No AEZs are recommended for these anomalies at this time. However, debris anomaly **7006** has been identified within the existing 150 m AEZ for wreck anomalies **7004** and **7005**, and within the ADZ.
- 4.1.5 All the anomalies are currently situated outside the main area dredged and, as such, are unlikely to be impacted. However, if this were to change, avoidance would be recommended where feasible.



- 4.1.6 It is recommended that if any objects of possible archaeological interest are recovered during dredging operations from Areas 473/2, that they should be reported using the established Marine Aggregate Industry *Protocol for reporting finds of archaeological interest* (BMAPA and English Heritage 2005).



## 5 REFERENCES

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- Wessex Archaeology 2016 *Aggregate Areas 473, 474 and 475 Annual Monitoring Report: Archaeological Assessment of Geophysical Data*. Unpublished technical report 106781.01



## APPENDIX I: ANOMALIES OF POSSIBLE ARCHAEOLOGICAL POTENTIAL – AREA 473/2

WA ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	External References	Potential Rating
7000	Dark reflector	321381	5598487	A2	3.5	2.3	0.7	Small curved object with bright shadow. Previously observed as a rounded object with irregular bright shadow 8.4 x 1 x 0.6 m.		Low
7004	Wreck	318806	5597854	A1	30	8	4.3	Elongate mound at depth of 38 m CD with varying width and varying height with some sediment build-up either side. Some scour at each end. Aligned NW-SE. Possible second part 13 m to the south-east. Scour in between. Observed as angular object with some internal parallel structure in SSS as 26.5 x 2.5 x 4.3 m. Full extents and finer details obscured by height shadow from surrounding sediment and other section. Observed as a long tapering mound with significant build-up around the centre within MBES data. Previously observed as 27.8 x 7.8 x 4.3 m as the north section of a wreck that appears to be in two parts. At the UKHO location of a German minelaying submarine with a second UKHO position of German minelayer UC 65 located 2km to the east. Probably associated.	UKHO 20693; UKHO 20713; SC_0001; EMU_Area473_0031a	High
7005	Wreck	318820	5597828	A1	14.5	4.5	2.5	Elongate tapering object at 39 m CD. Aligned NNW to SSE. Possibly smaller part of wreck 13 m to south-east. Seems to be surrounded by scour. Observed as angular object with slight internal parallel structure and tall shadow in SSS as 10.1 x 2.4 x 3.6 m. Full extent and finer details obscured by height shadow of other section. Observed as a smaller tapering mound	UKHO 20693; UKHO 20713; SC_0001; EMU_Area473_0031b	High



WA ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	External References	Potential Rating
								in MBES data. Previously observed as 15.1 x 10m x 3.3 m. South section of German submarine wreck, smaller with less clear structure visible.		
7006	Debris	318749	5597865	A2	3.2	0.7	0.5	Straight angular edge of an object with varying height shadow. Probable debris. Not observed in the previous dataset but has been previously identified.	SC_0005; EMU_Area473_0030	Medium
7007	Wreck	321202	5597865	A1	78	19	3.1	Elongate hollow mound in outline of a wreck appearing much buried in surrounding sediment at 41m CD. Aligned NNE - SSW. Some structure apparent; a large mound towards the north end, possibly a cabin, and two block objects towards the centre which could be boilers. Appears almost flush with seabed along western edge. Scour marks around south and along eastern edge. Appears in SSS data as an elliptical outline of a well broken up and partially buried wreck with some internal structure and surrounding debris. Not seen fully in any SSS line. Appears particularly broken up at north-east end. Previously observed as 84.3 x 24.2 x 3.6 m. Some surrounding debris visible. At the UKHO records for SS Caterham 20342 (probably) (original dimensions 83.2m x 11.6m x 6.1m) and Submarine UC 65 20713 (possibly) (original dimensions 52.7m x 5.2m). Both at the same position. Form and dimensions makes this unlikely to be a submarine. However, UKHO record states that divers have identified this wreck as a very old steel coaster.	UKHO 20342; SC_0002; EMU_Area473_0042	High



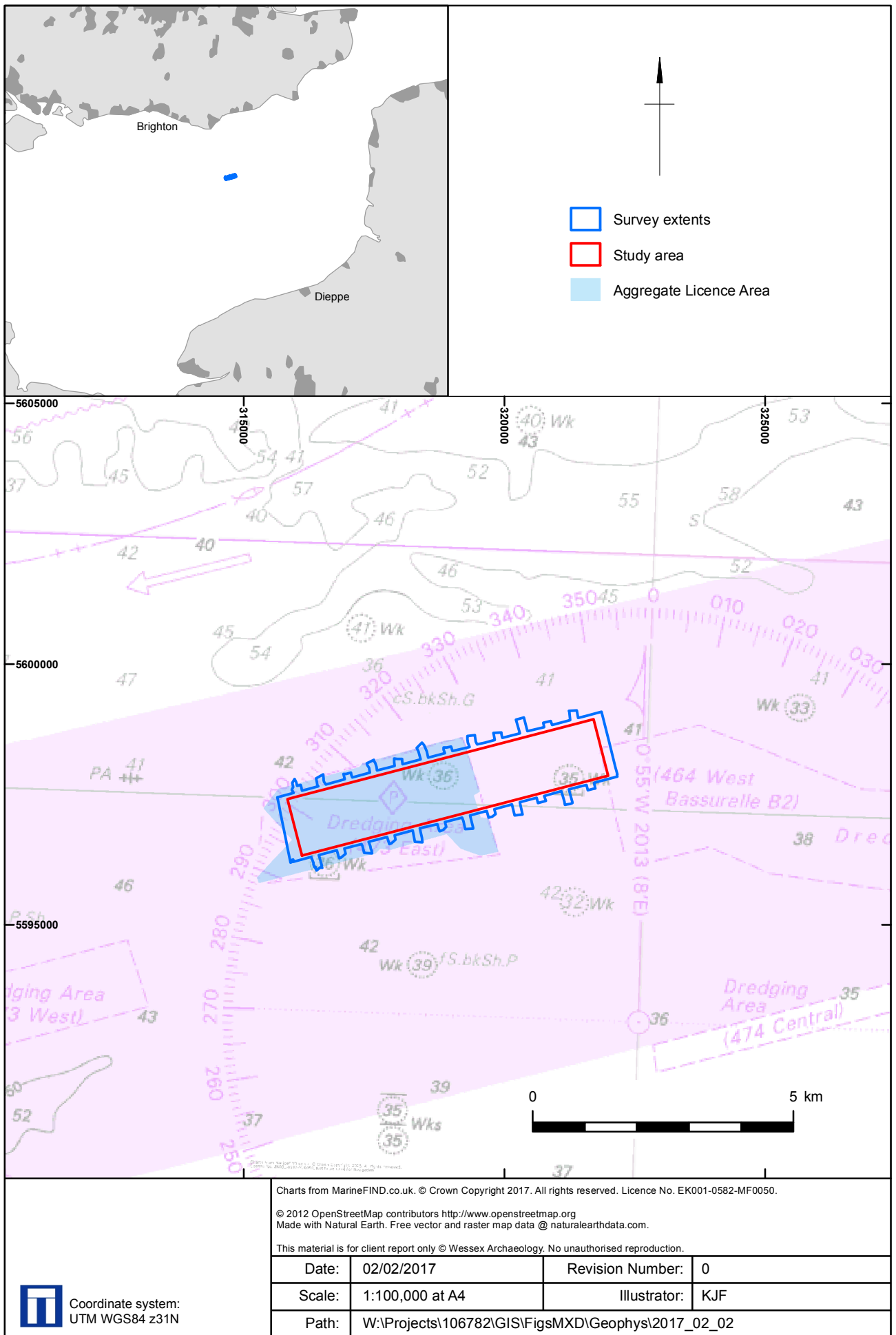
WA ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	External References	Potential Rating
7021	Debris	321255	5597888	A2	2.1	0.8	0.8	Straight edged object with corresponding shadow. Tagged as debris due to proximity of 45 m NE of the wreck. Observed as an elongated depression in the MBES data. Previously observed as 6.5 x 1.3 x 0.7 m.	SC_0003	Medium
7023	Seafloor disturbance	321146	5597796	A2	31	23	0.4	Angular area of indistinct objects, of varying shapes. Could be debris associated with the wreck, however could also be natural. Includes linear features that look attached, possible snagged. Maximum 0.4m in height measured. Observed in this dataset as a particular angular object measuring 5.9 x 1.9 x 0.4 m within an area of small mounds. Possible sediment disturbance as no defined object, but rounded shadow. Could be debris, could be natural. Observed in adjacent lines and observed as small mounds approx. 50 m south-west of the wreck.		Medium
7025	Dark reflector	319097	5597424	A2	4	0.4	0.6	Small object with angular shadow and a possible second object adjacent. Approximately 35 m west of rope. Could be related but quite a distance		Low
7026	Rope/chain	319135	5597426	A2	34.8	0.2	0.4	Curvilinear object with slight bright shadow. Measured as 34.8 m. Possible rope or chain		Medium
7027	Dark reflector	319925	5597549	A2	3.7	2.6	0.6	Small object with possible object directly adjacent with some angular bright shadow. Possible scour		Low
7028	Dark reflector	320131	5598347	A2	9.2	1.9	0.7	Slightly curved object with bright shadow. Could be sediment build-up but looks anomalous		Low
7029	Dark reflector	320690	5597554	A2	2.7	0.6	0.9	Straight edge of an object with slightly varied shadow. Doesn't look stretched.		Low
7030	Debris	321198	5597828	A2	6.4	3.3	0.2	Angular object with slight shadow		Medium



WA ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	External References	Potential Rating
								visible to directly adjacent the side of the wreck		
7031	Debris	321231	5597838	A2	5.9	0.6	0.3	Straight edge of an object with varying shadow, Tagged due to proximity to wreck; possible debris. Not observed in MBES data. Located approximately 25 m east from edge of the wreck.		Medium
7032	Rope/chain	321242	5597878	A2	132.1	0.9	0.3	Length of curvilinear dark reflector that extends north-east from the wreck. Appears with a lot of shadow towards wreck, could be in scour or hanging from the wreck.		Medium

Notes:

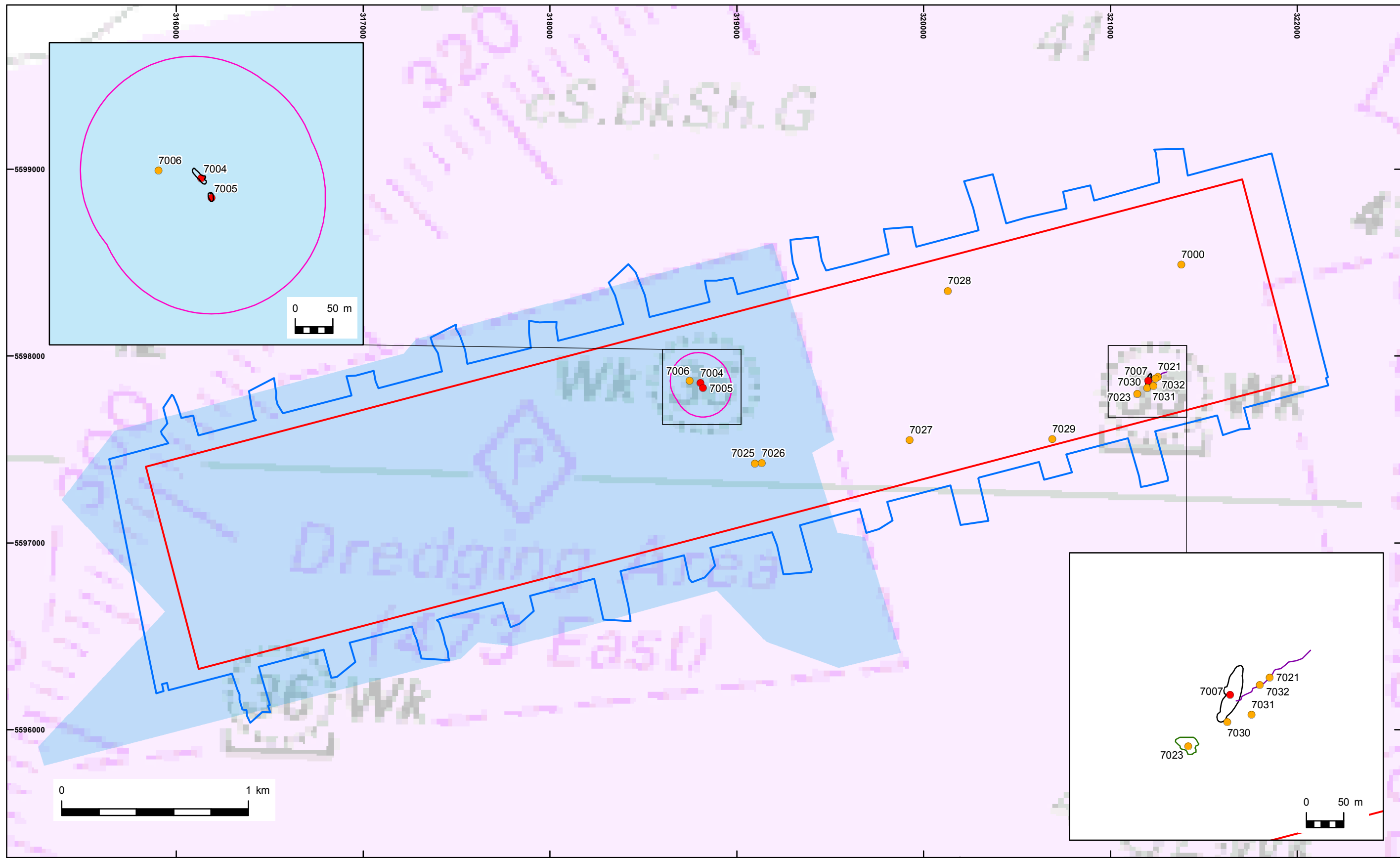
1. All coordinates are in WGS84 UTM Zone 31N
2. Positions are considered accurate to within approximately  $\pm 10$  m
3. Potential ratings based on definitions in Sea Change Heritage Consultants (2013)



Location map

Figure 1





Survey extents	Archaeological Exclusion Zone (150 m)	<b>Seabed feature boundary</b>	<b>Geophysical anomalies</b>
Study area	Seabed feature linear	Seafloor disturbance	A1 - Anthropogenic origin of archaeological interest
Aggregate Licence Area		Wreck	A2 - Uncertain origin of possible archaeological interest

Coordinate system:  
UTM WGS84 z31N

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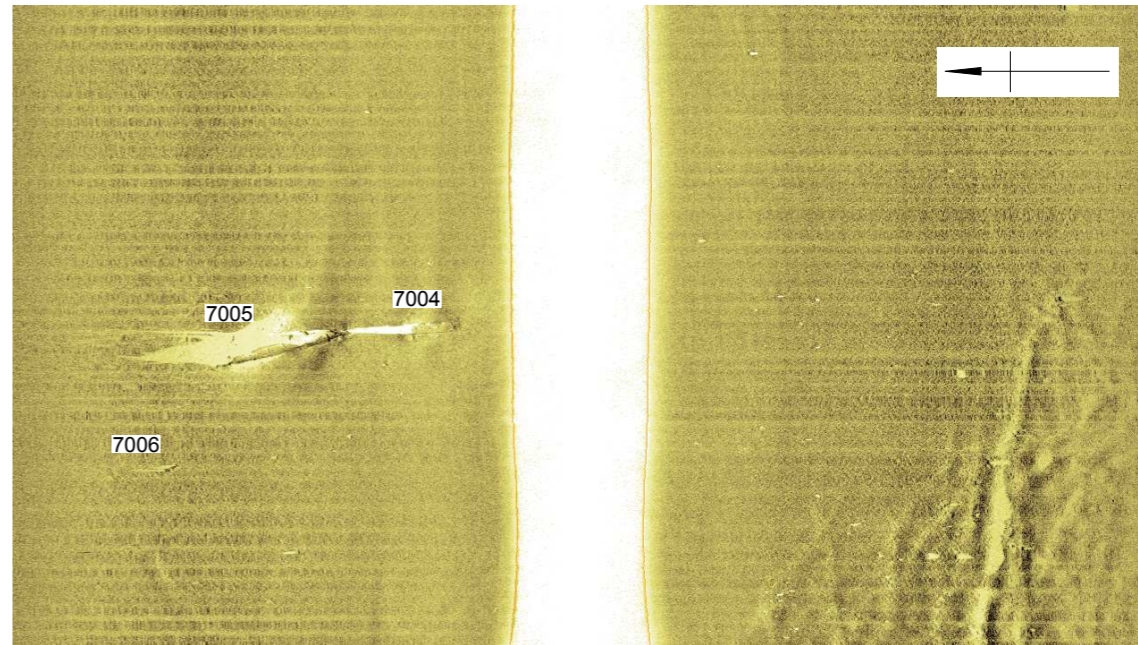
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Anomalies of archaeological potential and exclusion zones

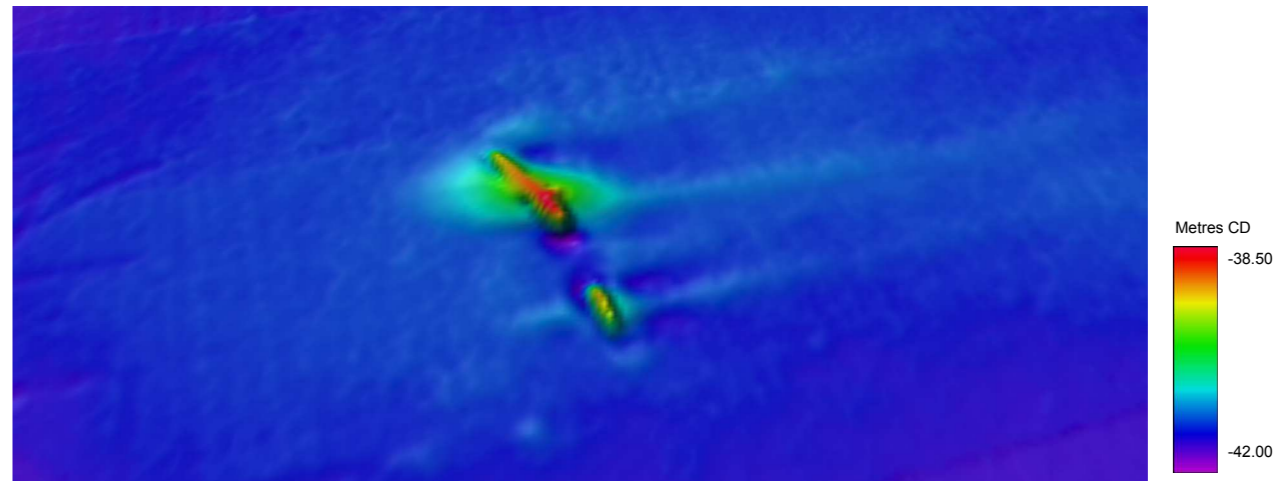
Figure 2

WA ID 7004 and 7005 UC 65 (possibly) (UKHO 20693 and 20713)

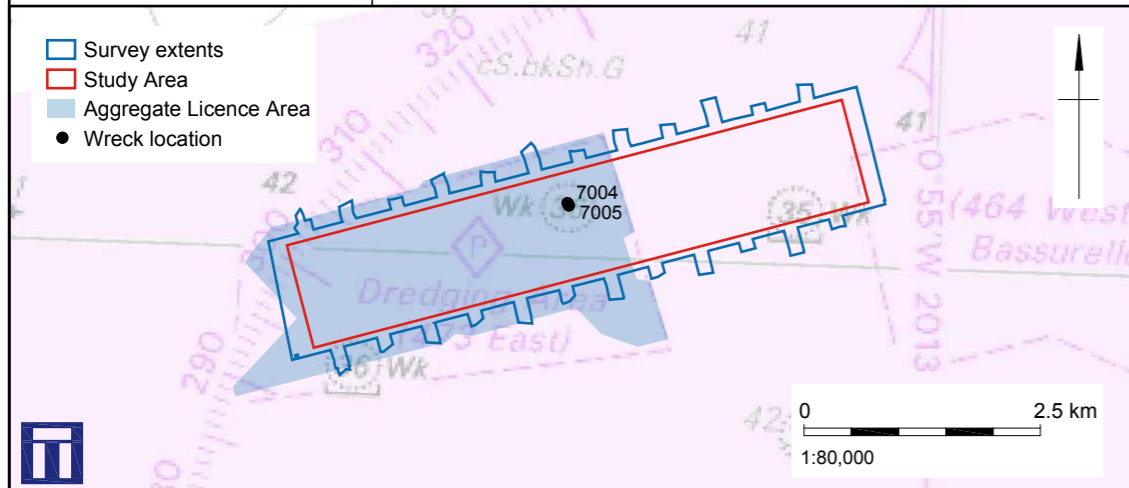
<b>Location</b>		318813 E, 5597841 N (UTM31N)
<b>Archaeological Importance</b>		High
<b>Geophysical survey dimensions and notes</b>		<p>Dimensions: 7004: 30 x 8 x 4.3 m 7005: 14.5 x 4.5 x 2.5 m</p> <p>Observed as two distinct tapered structures lying 13 m apart. Interpreted as a two pieces of the same wreck. Associated with UKHO position (20693) of the wreck of a submarine. Identified as a German minelaying submarine by dive reports.</p> <p>The larger, north-western section (7004) lies orientated north-west to south-east. The appearance of the structure is quite smooth with height increasing towards the south-east end. Consistent with form of a submarine. There is some structure visible but it is not identifiable from this dataset.</p> <p>The smaller section of the wreck (7005) lies approximately 13 m to the south-east at a NNW-SSE alignment. Similar in form to the larger part.</p> <p>There is a significant amount of sediment build-up along both sides of 7004 and a small amount along the east edge of 7005. Furthermore, a depression has formed at the assumed break of the wreck; both factors suggest further associated pieces of debris may be buried in these locations.</p> <p>As further UKHO position (20713) for German minelaying submarine UC 65 (possibly) is located approximately 2km to the east. Would suggest this wreck is that of UC 65 (possibly). Although there is a discrepancy in dimensions this could be accounted for by the break. UC 65 was torpedoed and sunk.</p>
<b>Build</b>	<b>Type</b>	German minelaying submarine
	<b>Construction</b>	Steel
	<b>Dimensions</b>	52.7 m x 5.2 m Displacement: 511 t.
	<b>Shipyard</b>	Blohm & Voss, Hamburg
<b>Loss</b>	<b>Cause</b>	Torpedoed and sunk by British submarine C 15, 3rd November 1917
<b>Extent of Survival</b>		The wreck appears to be upright due to height variation although conning tower is not visible. Broken in two, although assumed this occurred around time of sinking. Previous surveys have suggested the gun has fallen to one side so may be obscured by sediment build-up. The smooth and intact structure suggests high level of preservation although relative recorded width and height of smaller section have decreased since 2015 which could suggest structural collapse or increased burial of the site.



A side-scan waterfall image of wreck 7004, 30 x 8 x 4.3 m and 7005, 14.5 x 4.5 x 2.5 m, facing east



A multibeam echosounder image of wreck 7004 and 7005, facing north, x1 vertical exaggeration

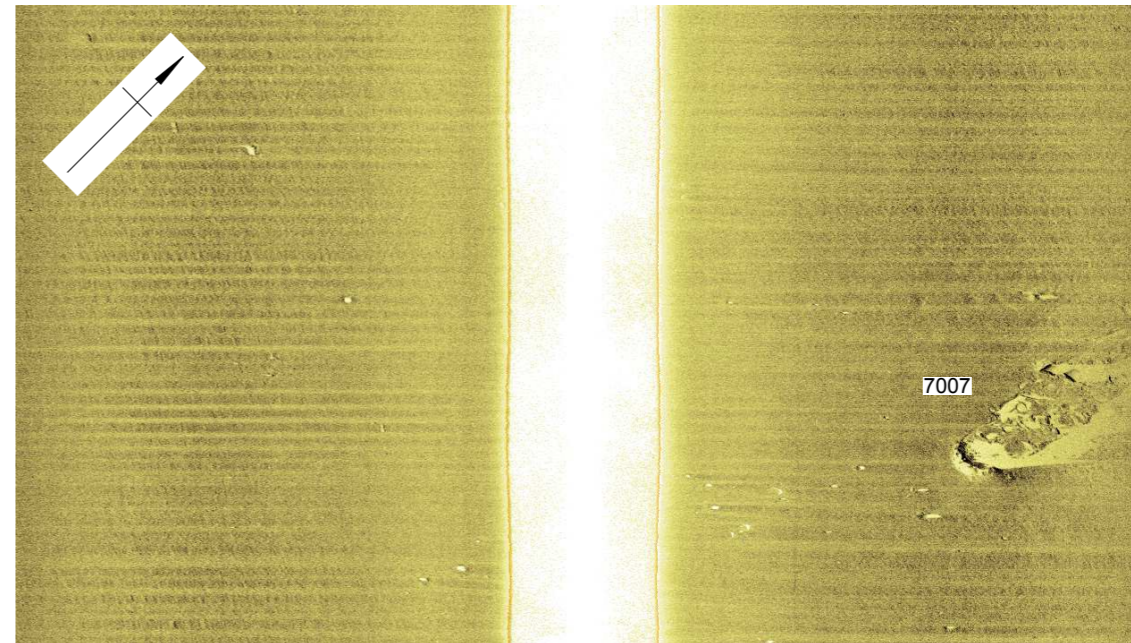


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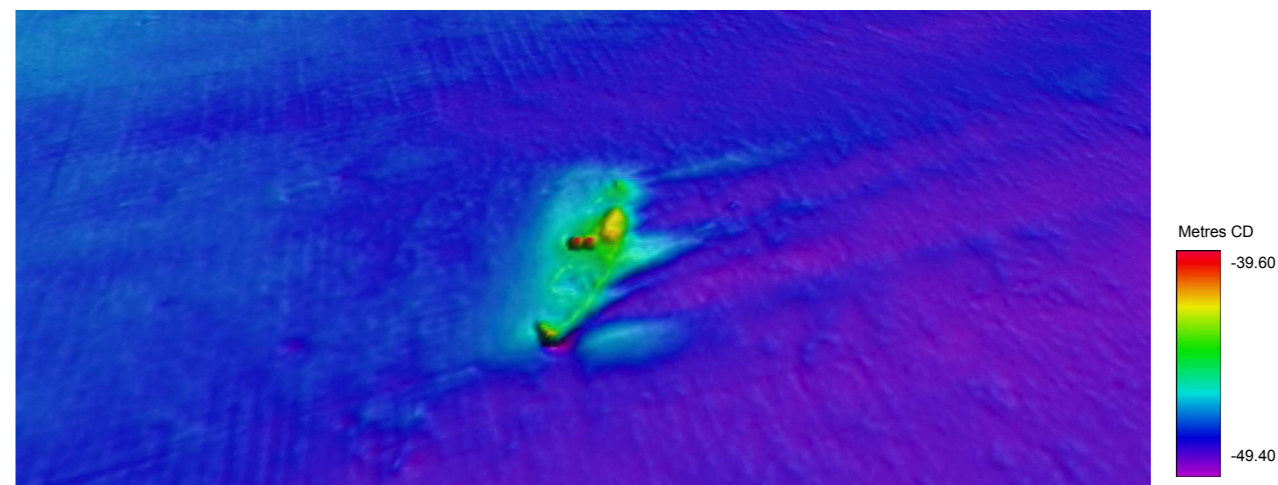
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WA ID 7007 (UKHO 20342 and UKHO 20713)

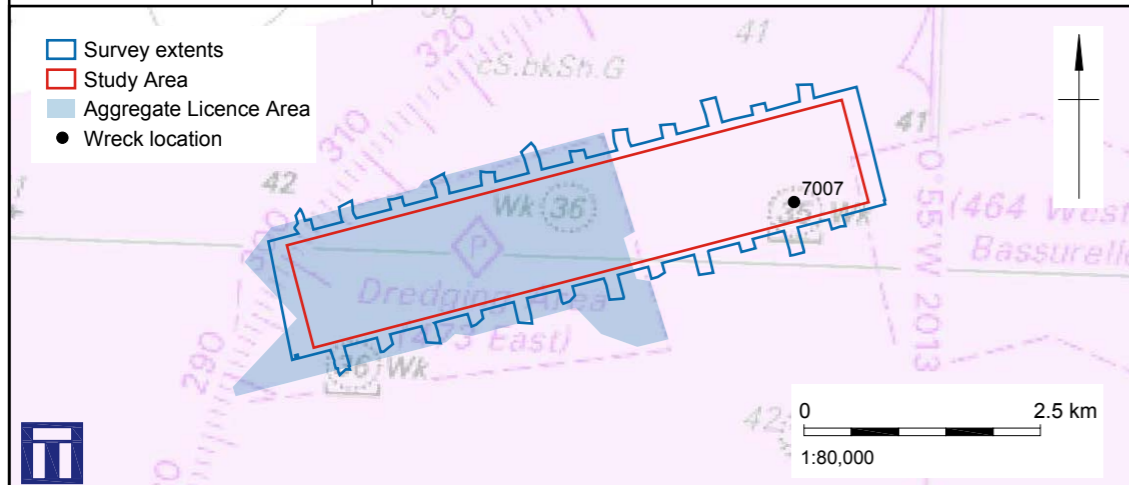
<b>Location</b>		321202 E, 5597865 N (UTM31N)
<b>Archaeological Importance</b>		High
<b>Geophysical survey dimensions and notes</b>		<p>Dimensions: 78 x 19 x 3.1 m</p> <p>Elliptical outline of a vessel clearly visible that appears upright although settled and almost flush with the seabed along the western edge, buried in sediment, and identified in both sidescan sonar and echosounder datasets. The bow is interpreted as the higher point at the SSW end and stern to NNE. Some deck structure appears visible in echosounder data. Two tall mounds visible close together towards centre of the wreck have been identified as possible boilers. A further large angular anomaly to the north-east has been interpreted as a possible cabin.</p> <p>Some surrounding debris is also visible around the eastern extents. A large amount of sediment build-up along western extents and an amount of disturbance along the eastern extents could obscure identification of further debris.</p> <p>The wreck location is associated with the positions of two UKHO records (20342 and 20713). 20713 is the record of UC 65; a German submarine. This wreck is not consistent with the form of a submarine. Record 20342 is for the British steam ship <i>Caterham</i>; which is more consistent with the wreck identified in the data. However, the record details that this position was dived in 1993 and the wreck was identified as an unknown very old steel coaster.</p>
<b>Build</b>	<b>Type</b>	Steel coaster
	<b>Construction</b>	Unknown
	<b>Dimensions</b>	Unknown
	<b>Shipyards</b>	Unknown
<b>Loss</b>	<b>Cause</b>	Unknown
<b>Extent of Survival</b>		<p>The wreck appears upright with significant amount of height and some structure remaining. The vessel outline appears intact although appears almost completely buried along the western side. This may have aided preservation and possibly buried further associated debris.</p> <p>The recorded dimensions are significantly smaller than those observed in 2015 data (84.3 x 24.2 x 3.6 m) which may have been caused by increased sediment build-up along the western extents. It is possible the wreck along the eastern edge is being further uncovered by the sediment. The debris field that was visible to the south in the 2015 data is much reduced in this dataset.</p>



A sidescan waterfall image of wreck 7007, 78 x 19 x 3.1 m, facing north-west



A multibeam echosounder image of wreck 7007, facing north, x1 vertical exaggeration



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