East Anglia ONE
Offshore Windfarm

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Archaeological Assessment of Geophysical Data

Nearshore Cable Route
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1.1 Introduction

1.1.1 Background

1. Wessex Archaeology (WA) were contracted by East Anglia ONE Limited (EAOL) to undertake an archaeological assessment of geophysical data acquired from the nearshore section of the East Anglia ONE offshore cable route. This was undertaken as part of continued assessments ahead of the proposed East Anglia ONE offshore windfarm development, and specifically in advance of geotechnical ground investigations planned to be undertaken within the study area.

2. EAOL plan to undertake a series of geotechnical ground investigations at various locations within the nearshore area of the offshore cable route, including vibrocores and Cone Penetration Tests (CPT). The ground investigations will include both *in-situ* testing and removal of soil samples for laboratory analysis.

3. This assessment aims to inform the proposed geotechnical sampling locations by identifying both any possible seabed anomalies and palaeogeographic features of archaeological potential, and relates directly to the previously produced Method Statement associated with the acquisition of geotechnical samples form the nearshore area (WA 2015).

4. The proposed East Anglia ONE offshore cable route extends from the proposed wind farm site to landfall at Bawdsey Beach, Suffolk. The study area for this assessment comprises a polygon up to approximately 950m offshore, and then an additional narrow corridor extending approximately another 2.9km further along the planned cable route (**Figure 1**).

5. The geophysical data assessed included sidescan sonar (SSS), marine magnetometer, multibeam echosounder (MBES) and sub-bottom profiler (SBP) data acquired by Aspect Land and Hydrographic Surveys Ltd. (ALHS) during August 2015. The study area as illustrated in **Figure 1** was created by drawing a boundary around the approximate extents of the MBES data coverage.

1.1.2 Aims and Objectives

6. The aim of the assessment was to undertake an archaeological assessment of the provided geophysical data within the study area. This was to be achieved through the following objectives:

- To assess the geophysical data acquired by ALHS in order to identify whether any material of archaeological potential is located on the sea bed;
- To identify any evidence for palaeolandscape features of archaeological potential within the study area;
- To compare the results with the previous East Anglia ONE offshore cable route DBA and geophysical assessment, known archaeological sites and previous work undertaken in the region;
- To propose future mitigation for any identified material of archaeological interest, and inform the positioning of the proposed geotechnical samples.

1.2 Methodology

1.2.1 Data Sources

7. A number of data sources and additional information were utilised during this assessment. These included:

- Geophysical survey data acquired by ALHS in August 2015;
- Previous Environmental Statement (ES) and geophysical assessment report produced for the East Anglia ONE offshore cable route (WA 2012), and the Method Statement (MS) created specifically for the nearshore geotechnical program (WA 2015);
- Background British Geological Survey (BGS) information and other previous work undertaken in the wider area (e.g. Cameron *et al.* 1992, EMU 2009);
- Historic Environment Record (HER), National Monuments Record (NMR) and United Kingdom Hydrographic Office (UKHO) records relating to the study areas and immediate surroundings.

1.2.2 Geophysical Data – Technical Specifications

8. The geophysical survey data were acquired by ALHS during August 2015, on board the survey vessel *Remote Sensor*. The data comprised SSS, MBES, marine magnetometer and SBP (chirp and boomer) data sets.

9. The SSS data were acquired by ALHS using an Edgetech 4125-P towfish, operated at 900kHz and 30m range per channel within most of the study area and 50m range per channel along the narrow offshore corridor. The data were digitally recorded using Edgetech Discover software and provided to WA as *.xtf* files.

10. The magnetometer data were acquired by ALHS using a Geometrics G-882 caesium vapour magnetometer. The data were digitally recorded using Geometrics MagLog software and provided to WA as both *.EDT* and gridded *.XYZ* files.

11. The SBP data were acquired by ALHS using both a Knudsen Pinger chirp system and an Applied Acoustics AA200 surface towed boomer. The data from both systems were digitally recorded and provided to WA as *.sgy* files.

12. The MBES data were acquired by ALHS using an R2Sonic 2024 multibeam echo sounder system, with motion corrections supplied by a Kongsberg Seatex MRU 5 unit. The data were digitally recorded and provided to WA as 0.5m gridded *.XYZ* files.

13. All positions were recorded and expressed in British National Grid coordinates.

1.2.3 Geophysical Data – Data Quality

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

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

Table 1: Criteria for assigning Data Quality Rating

15. The SSS data were rated as 'Variable' using the above criteria. Offshore, the data were generally good with features clearly visible, although the full 50m range was not achieved with the high frequency used within the offshore corridor. The data quality deteriorated towards the shore, presumably due to the shallower water depths. Resolution decreased, and features became increasingly difficult to identify and were often obscured by effects such as wash for the vessel's propellers.

16. Additionally, the seabed was found to contain numerous natural features, ranging from large mounds and outcrops of underlying geology to a high number of small rocks and boulders. Due to both the data quality problems and the highly variable natural seabed conditions, it cannot be guaranteed that all anomalies of archaeological potential will have been identified.

17. The magnetometer data were rated as 'Good' using the above criteria, with very little background noise and data spiking observed and small anomalies clearly visible.

18. The MBES data were rated as 'Good' using the above criteria, with seabed features and objects clearly visible within the data. Some weather effects (e.g. vessel roll) were observed, along with some differences in tidal corrections between individual lines, but these did not detrimentally affect the data to a significant degree.

19. The SBP data were rated as 'Good' using the above criteria, with features and internal geological structures clearly visible in the data. Both sub-bottom profiler data sets were assessed alongside each other during interpretation, but the boomer data were deemed to be of better quality and more suitable for archaeological assessment and so most interpretation was undertaken within this data set.

1.2.4 Geophysical Data – Processing

20. The SSS data were processed by WA using Coda Geosurvey software. This allows 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 site, 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.

21. A mosaic of the SSS data is produced during this process to assess the quality of the sonar towfish positioning. This process allows the position of anomalies to be checked between different survey lines and for the layback values to be further refined if necessary. During data processing, it was found that the offset information was included within the data files, and so no further layback adjustments were necessary.

22. The form, size and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature and therefore of 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 as a result of past impacts from, for example, dredging or fishing.

23. The magnetometer data were processed by WA using Geometrics MagPick software in order to identify any discreet magnetic contacts which could represent buried metallic debris or structures such as wrecks. This software enables both the visualisation of individual lines of data and gridding of data to produce a magnetic anomaly map.

24. The data files were first despiked and then smoothed, to try and eliminate any data spikes that may have been present. A trend was then fitted to the resulting data, and the trend values subtracted from the smoothed values. This was carried out in an attempt to remove natural variations in the data (such as diurnal variation in magnetic field strength and changes in geology). The processed data were then gridded to produce a map of magnetic anomalies, and individual anomalies tagged and images taken in a similar process to that undertaken for the SSS data.

25. The SBP data were processed by WA using Coda Seismic+ software. This software allows the data to be visualised with user selected filters and gain settings in order to optimise the appearance of the data for interpretation. The software then allows an interpretation to be applied to the data by identifying and selecting sedimentary boundaries and shallow geological features that might be of archaeological interest.

26. The SBP data were interpreted with a two-way travel time along the z-axis. In order to convert from two-way travel time to depth, the velocity of the seismic waves was estimated to be 1,600ms^{-1}. This is a standard estimate for shallow, unconsolidated sediments.

27. Any small reflectors which appear to be buried material such as a wreck site covered by sediment were also recorded, the position and dimensions of any such objects noted in a gazetteer, and an image of each anomaly acquired. It should be noted that anomalies of this type are rare, as the sensors must pass directly over such an object in order to produce an anomaly.

28. The MBES data were analysed to identify any sea bed structures that could be shipwrecks or other anthropogenic debris, and to provide a vertical reference for the SBP data. The data were gridded at 0.3m and analysed using IVS Fledermaus software, which enables 3-D visualisation of the acquired data and geo-picking of seabed anomalies.

1.2.5 Geophysical Data – Anomaly Grouping and Discrimination

29. 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.

30. 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, a magnetic anomaly and multiple SSS anomalies.

31. Once all the geophysical anomalies and desk-based information have been grouped, a discrimination flag is added to the record in order to discriminate against those which are not thought to be of an archaeological concern. For anomalies located on the sea bed, these flags are ascribed as follows:

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

Table 2. Criteria Discriminating Relevance of Sea Bed Features to Proposed Project

32. All the sites that have been identified are presented in **Appendix I** and are discussed in this report. Recommendations have been made for mitigation measures should the sites be impacted by the proposed geotechnical works.

33. 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.

34. Any sites which are located outside of the defined study area, either previously recorded in known databases (e.g. HER) or identified during this geophysical assessment, are deemed beyond the scope of the current assessment and are subsequently not included in this report.

1.3 Palaeogeographic Assessment

1.3.1 Geological and Prehistoric Baseline

35. The study area is located just off the coast of Bawdsey Beach, Suffolk, within the southern North Sea basin. The background geology of the study area is dominated by the London Clay Formation, which is generally Lower Eocene (c. 54 – 51Ma) in age but also includes the older, Upper Paleocene (*c.* 54.5 – 54Ma) Harwich Member (Cameron *et al.* 1992). This is a thick, regional deposit of stiff dark or bluish grey clayey silts, silty clays and clays which is present across much of the southern North Sea.

36. Dewatering of the London Clay Formation over time has created numerous small scale extensional faults which are generally obvious within seismic data and are very characteristic of this unit. The upper surface of the London Clay Formation is erosional, and the unit is unconformably overlain by Pleistocene and Early Holocene sediments.

37. The Pleistocene history of the southern North Sea is dominated by repeated glacial/interglacial cycles and the effects of the associated rises and falls in relative sea level, which has resulted in large areas of the southern North Sea being periodically exposed as a terrestrial environment. This is also represented in the geological record, with distinct terrestrial landscape features being present along with deposits of marine sediment.

38. Although it has been interpreted that the study area has only directly experienced one glaciation (during the Anglian Period – *c.* 488,000 – 423,000 BP), this event, and subsequent glacial/interglacial cycles, had an effect on the preservation and state of sediment units within the study area.

39. The Pleistocene sediments within the study area and surrounding region generally comprise the remains of widespread fluvial systems such as channel deposits and river terrace sands and gravels. Due to the relatively well preserved sequence of Pleistocene sediments within this area of the southern North Sea, the locations and histories of a number of these fluvial systems over time has been interpreted.

40. Of particular relevance is a large channel feature previously identified by bathymetric surveys extending from the entrance of Harwich Harbour, situated approximately 10km southwest of the study area. The characteristics of the channel suggest it is a river system incised during a glacial period and associated sea level lowstand (EMU 2009). This feature, visible on multibeam bathymetry data as an underfilled channel, has been found to represent a large fluvial braid-plain; a river system containing multiple channels and tributaries extending in a relatively linear fashion eastwards from the coast until it reaches a break in slope east of the Greater Gabbard sand bank (Emu 2009).

41. This channel is interpreted to be a multi-period feature originally dating from the Cromerian (*c.* 760,000 – 478,000 BP) and reactivated at subsequent sea level lowstands through to Late Glacial/Holocene development (Dix and Sturt 2010). It is also interpreted to be the original route of the Thames-Medway river system, which was gradually pushed further south to its present location, initially during the Anglian glaciation due to the advancing of the ice front (Emu 2009).

42. Previous work associated with the East Anglia ONE cable route (WA 2012) has identified a buried palaeochannel extending southeast from the mouth of the River Deben, just to the southwest of the study area. This palaeochannel was likely a tributary of the larger channel system identified east of Harwich Harbour, and as such the study area has the potential to contain associated deposits of a similar age.

43. The earliest direct evidence for Hominin activity in the UK was identified at the Lower Palaeolithic sites of Happisburgh, on the Norfolk coast, and Pakefield, on the Suffolk coast, dating from *c.* 8000,000 and 700,000 BP respectively (Parfitt *et al.* 2005; 2010). These sites are both located within sediments of Cromerian age, suggesting they are potentially contemporary with the initial phase of the Thames – Medway river system east of Harwich Harbour, of which the River Deben was potentially a part.

44. Closer to the study area, the foreshore, cliffs and hinterland at Clacton-on Sea (Essex) comprises an important Middle Pleistocene site and is a designated geological Site of Special Scientific Interest (SSSI). Channel sediments from the area are also an important site for the Lower Palaeolithic Clactonian flint industry, and have yielded a rare wooden spear alongside lithic artefacts. The site dates from the Hoxnian interglacial period (*c.* 423,000 - 380,000 BP) (WA 2011), and the type site for the Hoxnian (the Hoxne Brick Pit) is located a relatively short distance inland outside of Diss, Suffolk.

45. The site identified within these channel deposits suggests occupation along the main Thames-Medway valley after the retreat of the Anglian ice sheet, and the discovery of the wooden spear suggests active hunting was taking place. The presence of these artefacts suggests similar activities may have been taking place within similar environments in the wider area at this time, such as around the River Deben.

46. After warming of the climate and retreat of the ice sheet at the end of the Pleistocene, a terrestrial environment still existed within region around the Study Area into the Early Holocene. Evidence of this environment has been identified from the foreshore at Jaywick (Essex), where layers of peat dating from the Early Holocene are present along with a preserved land surface from which Mesolithic artefacts have been recovered (WA 2011). It is possible that the now submerged environment of which the study area was a part was occupied up until the final marine transgression.

47. With the end of the last glacial period, sea levels began to rise and previously incised coastal channels were flooded to create estuaries. Configurations roughly approximating current coastlines are thought to have been reached by the mid-Holocene (*c.* 5,000 BP) (EMU 2009).

1.3.2 Palaeogeographic Assessment Results

48. The assessment of the sub-bottom profiler data has revealed two shallow geological units within the study area. The lowest, dominant unit has been interpreted as the London Clay Formation. This is a regional unit present across large areas of the southern North Sea and southern England and comprises stiff, dewatered silty marine clays (Cameron *et al.* 1992).

49. The unit exhibits characteristic small scale internal faulting, which was clearly observed within the sub-bottom profiler data. The effect of this faulting was also visible within the magnetometer data, where a number of linear magnetic anomalies were observed forming a polygonal pattern. This is also characteristic of the polygonal fault structure within the London Clay.

50. The London Clay Formation is interpreted as being Eocene in age, and as such is too old to be of archaeological potential.

51. Overlying the London Clay Formation is a deposit of modern seabed sediment, which ranges from a thin veneer (<1m thick) towards the shoreline to thicker areas of sand waves further offshore. This unit is considered to be of low archaeological potential in itself, but has the potential to cover archaeological sites (e.g. wrecks) in areas of mobile sand waves.

52. No palaeogeographic features (e.g. fluvial channels or associated deposits) were identified within the study area.

1.4 Sea Bed Features Assessment

1.4.1 Archaeological Baseline

53. From the period following the marine transgression and inundation of the surrounding region, the archaeological potential of the study area relates solely to coastal and maritime activities.

54. This potential includes the wrecks of vessels associated with trade along the east coast and those lost during wartime conflicts, both of which are common within UK waters. Less common, but still potentially present within the study area, are the remains of aircraft lost within the vicinity.

55. A full baseline of the maritime archaeological potential of the study area is provided in the associated method statement (WA 2015).

1.4.2 Sea Bed Features Assessment Results

56. A total of 30 anomalies of possible archaeological potential were identified within the study area. These anomalies have been characterised as follows:

Archaeological Discrimination	Number of Anomalies	Interpretation
A1	5	Anthropogenic origin of archaeological interest.
A2	25	Uncertain origin of possible archaeological interest.
A3	0	Historic record of possible archaeological interest with no corresponding geophysical anomaly.
Total	**30**	

Table 3. Anomalies of Archaeological Potential within the Study Area

57. Furthermore, these anomalies can be classified by probable type, which can aid in interpreting archaeological potential and importance:

Anomaly Classification	Number of Anomalies
Debris / Debris Field	8
Dark Reflector	3
Magnetic	19
Total	**30**

Table 4. Types of Anomalies Identified within the Study Area

58. Full descriptions of all identified anomalies are provided in **Appendix I**, and their distribution is illustrated in **Figure 2**.

59. Of the 30 identified anomalies, five have been designated as of high archaeological potential (A1 in Table 2). Anomalies **7030** and **7031** are pieces of debris measuring approximately 4.5 x 2.2 x 0.5m and 6.2 x 2.4 x 0.9m respectively. They are both also associated with large magnetic anomalies (135nT and 869nT respectively), and so are likely to be ferrous in nature.

60. These two anomalies have been interpreted as possible anchors, and are illustrated in **Figure 3**. The possible age of these anchors is currently unknown, and they could be relatively modern or much older. It is due to their obviously anthropogenic nature and possibility to be relatively old that they have been assigned a high archaeological potential rating.

61. These anomalies correlate with features **73110** and **73109** that have been identified during a previous phase of work (WA 2012). They were not previously described as possible anchors, but the better data quality and higher resolution of the current data set has made this interpretation possible.

62. The remaining three anomalies of high archaeological potential are all magnetic in nature, without any associated sidescan sonar or multibeam bathymetry contacts. These are **7022**, **7040** and **7041** (measuring 99nT, 355nT and 222nT respectively), and all potentially represent large pieces of buried ferrous debris. Although no sea bed anomalies have been identified at these locations, they have been classified as high archaeological potential due to their large magnetic amplitudes.

63. The remaining 27 anomalies are classified as of uncertain origin with possible archaeological interest (A2 in Table 2). Anomalies **7029**, **7036**, **7037** and **7046** are interpreted as possible individual pieces of debris, with sizes ranging from 1.1 x 0.2 x 0.4m (7036) to 6.0 x 0.2 x 0.2m (7037). Anomaly **7036** is associated with a 12nT magnetic anomaly and so is likely to be ferrous in nature, while the rest are likely to be non-ferrous.

64. Anomalies **7026** and **7043** are characterised as relatively small concentrations of irregular dark reflectors with shadows, measuring 7.2 x 4.5 x 0.5m and 9.3 x 4.8 x 0.2m respectively. Neither has been associated with a magnetic anomaly, and both have been interpreted as possible small non-ferrous debris fields.

65. Anomalies **7032**, **7039** and **7044** have been classified as dark reflectors. These are anomalies which are less certain in nature, and could be natural features or individual small pieces of debris. No magnetic anomalies have been associated with these anomalies, and so any debris present at these locations is likely to be non-ferrous.

66. The remaining 16 anomalies (see **Appendix I** for full list) are all solely magnetic in nature, without any associated sidescan sonar or multibeam bathymetry contacts. These range in from 8nT to 78nT in amplitude and possibly represent pieces of buried ferrous debris, although the smaller anomalies could also represent natural features.

67. One previously identified magnetic anomaly (**72902**, WA 2012) is located within the study area but has not been identified within the geophysical data. This was a large magnetic anomaly (228nT) that was not associated with any sidescan sonar or multibeam bathymetry contacts and so was interpreted to possibly represent buried ferrous debris. On review of the current, higher resolution dataset, it is likely that this anomaly was a natural feature or a data artefact and as such is not included in the present gazetteer.

1.5 Discussion, Conclusions and Recommendations

68. No palaeogeographic features of archaeological potential were identfied within the study area. However, it is recommended that all geotechnical logs be provided to WA for geoarchaeological assessment to support the geophysical interpretation. Should any deposits of archaeological potential be identified then further work may be required following WA's standard five stage geoarchaeological assessment procedure.

69. A number of features of archaeological potential have been identified on the seabed. With respect to the proposed geotechnical locations, locations **NRS-02** and **NRS-07** (**Figure 1**) are situated close to identified anomalies.

70. Location **NRS-02** is situated approximately 28m WSW of anomaly **7030**, an interpreted anchor classified as of high archaeological potential. The proposed geotechnical location is a sufficient distance from this feature at present, but should the sampling locations change then the presence of this feature (and nearby **7031**) should be taken into account.

71. Location **NRS-07** is situated approximately 28m SE and 17m SW of magnetic anomalies **7022** and **7021** respectively. As these are magnetic anomalies, no associated features have been identified on the seabed at these locations. However, the

geotechnical contractor should be aware of the possibility for pieces of buried ferrous debris to be present in the vicinity, especially close to location **7022** which is a large magnetic anomaly and classified as of high archaeological potential.

72. No known recorded wrecks or obstructions or historic records are located within the study area.

1.6 References

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2 Appendix I

2.1 Sea Bed Features of Archaeological Potential

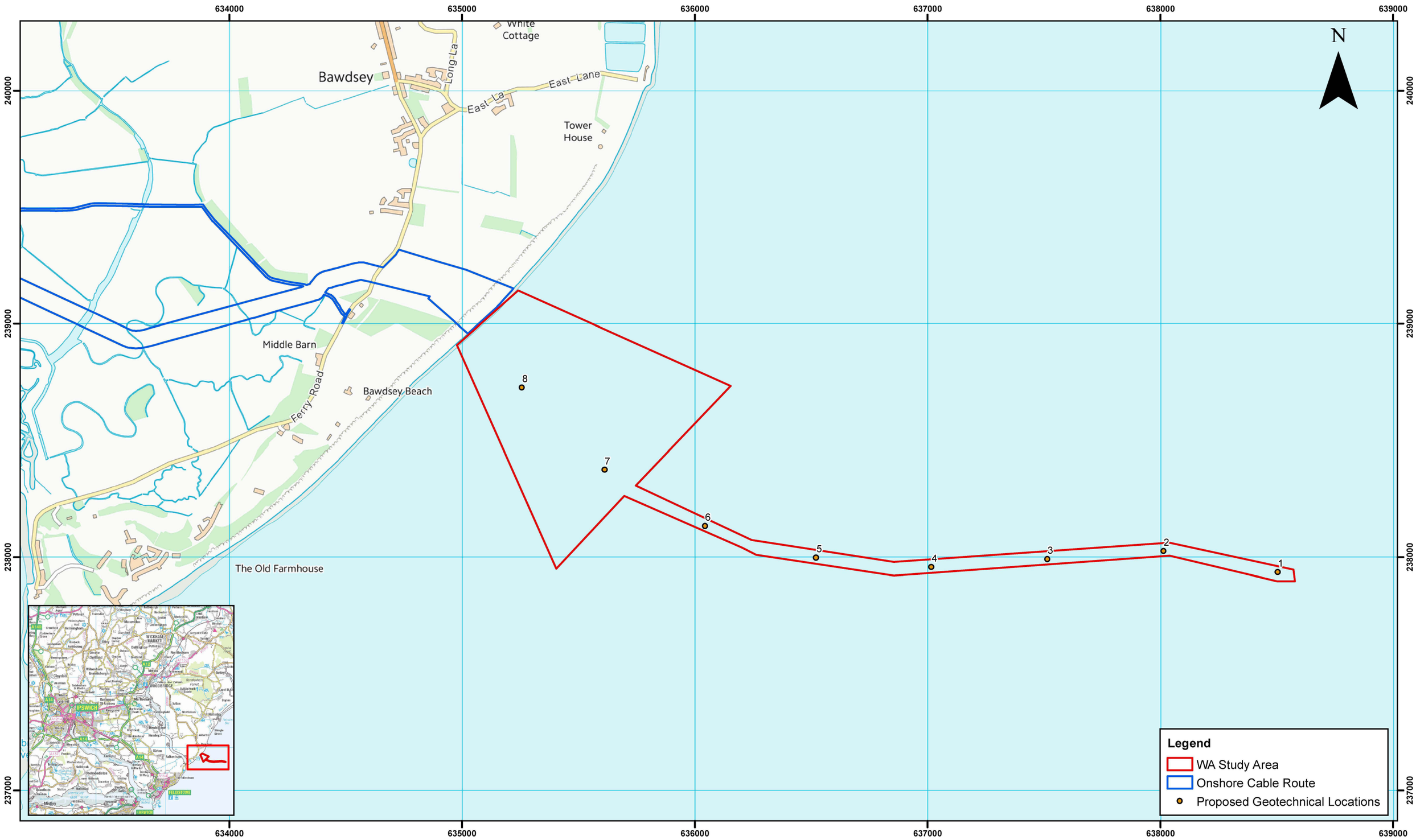
WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Mag Amp (nT)	Notes
7020	Magnetic	638190	238006	A2	-	-	-	10	Small magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Could be the result of slight data spiking, or represent a small piece of buried ferrous debris.
7021	Magnetic	638024	238039	A2	-	-	-	13	Relatively small but distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.
7022	Magnetic	637988	238035	A1	-	-	-	99	Large, distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line. Located in an area of mobile seabed sediment, and possibly represents a large piece of buried ferrous debris.
7023	Magnetic	637289	237991	A2	-	-	-	26	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Located in an area of mobile seabed sediment and possibly represents a buried piece of ferrous debris.
7024	Magnetic	637081	237958	A2	-	-	-	12	Relatively small but distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.
7025	Magnetic	636337	238035	A2	-	-	-	42	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Located in an area of mobile seabed sediment and possibly represents a buried piece of ferrous debris.
7026	Debris Field	635493	238059	A2	7.2	4.5	0.5	-	Relatively small cluster of rounded dark reflectors with distinct shadows, but without an associated magnetic anomaly. Could be a natural feature but appears different to other natural features identified within the study area. Possible small area of non-ferrous debris.

WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Mag Amp (nT)	Notes
7027	Magnetic	635442	238208	A2	-	-	-	30	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line. Located in an area of mobile seabed sediment and possibly represents a buried piece of ferrous debris.
7028	Magnetic	635680	238310	A2	-	-	-	26	Distinct magnetic anomaly identified on more than one survey line, but without an associated sidescan sonar or multibeam bathymetry contact. Possible piece of buried ferrous debris.
7029	Debris	635716	238341	A2	3.7	0.6	0.2	-	Elongate dark reflector with shadow, but without an associated magnetic anomaly. Possible piece of non-ferrous debris.
7030	Debris	635639	238383	A1	4.5	2.2	0.5	135	Two distinct, short, linear dark reflectors with shadow, joined at right angles to form a 'T' shape, associated with a large magnetic anomaly. Probable ferrous debris, likely to be an anchor.
7031	Debris	635668	238371	A1	6.2	2.4	0.9	869	Distinct, short, linear dark reflector with shadow and associated with a very large magnetic anomaly. Probable ferrous debris, located approximately 30m from 6069 and possibly another anchor.
7032	Dark Reflector	635825	238466	A2	2.4	1.3	0.6	-	Distinct, rounded dark reflector with large shadow but no associated magnetic anomaly. Could be non-ferrous debris or a natural feature.
7033	Magnetic	635856	238469	A2	-	-	-	16	Relatively small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.
7034	Magnetic	635971	238567	A2	-	-	-	78	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line. Possible buried piece of ferrous debris.
7035	Magnetic	635973	238617	A2	-	-	-	23	Relatively small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.
7036	Debris	635974	238796	A2	1.1	0.2	0.4	12	Relatively small but distinct, elongate dark reflector with shadow and small associated magnetic anomaly. Possible small piece of ferrous debris.
7037	Debris	635621	238664	A2	6.0	0.2	0.2	-	Short, linear dark reflector with shadow but no associated magnetic anomaly. Possible piece of non-ferrous debris.
7038	Magnetic	635737	238674	A2	-	-	-	23	Relatively small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.

WA_ID	Classification	Easting	Northing	Archaeological Discrimination	L (m)	W (m)	H (m)	Mag Amp (nT)	Notes
7039	Dark Reflector	635774	238851	A2	0.8	0.4	0.3	-	Small but distinct dark reflector with shadow but without an associated magnetic anomaly. Could be natural or non-ferrous debris.
7040	Magnetic	635226	238537	A1	-	-	-	355	Large, distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line, although located approximately 40m from similar feature 7041. Possibly represents a large piece of buried ferrous debris.
7041	Magnetic	635206	238571	A1	-	-	-	222	Large, distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line, although located approximately 40m from similar feature 7040. Possibly represents a large piece of buried ferrous debris.
7042	Magnetic	635428	238625	A2	-	-	-	17	Relatively small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris.
7043	Debris Field	635499	238833	A2	9.3	4.8	0.2	-	Relatively small area of irregular dark reflectors with shadows, some short linears, but without an associate magnetic anomaly. Identified on more than one survey line. Possible small area of non-ferrous debris.
7044	Dark Reflector	635591	238837	A2	1.6	0.6	0.3	-	Small but distinct dark reflector with shadow but without an associated magnetic anomaly. Could be natural or non-ferrous debris.
7045	Magnetic	635214	238819	A2	-	-	-	8	Small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris, although could be a natural feature.
7046	Debris	635320	238995	A2	2.9	0.1	0.1	-	Short, linear dark reflector with shadow but no associated magnetic anomaly. Possible piece of non-ferrous debris.
7047	Magnetic	634995	238893	A2	-	-	-	33	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line. Possible buried piece of ferrous debris.
7048	Magnetic	635057	238943	A2	-	-	-	8	Small but distinct magnetic anomaly, only identified on one survey line and without an associated sidescan sonar or multibeam bathymetry contact. Possible small piece of buried ferrous debris, although could be a natural feature.
7049	Magnetic	635078	238985	A2	-	-	-	47	Distinct magnetic anomaly without an associated sidescan sonar or multibeam bathymetry contact. Only identified on one survey line. Possible buried piece of ferrous debris.

Notes

1. Co-ordinates are in British National Grid
2. Positional accuracy estimated ±10m



SCOTTISHPOWER RENEWABLES

Rev	Date	By	Comment
A	07/10/15	KL	First Issue.

Created: KL/KJF
Checked: LT
Verified: LT

1:15,000 Scale @ A3

0 0.125 0.25 0.5 Km

East Anglia Offshore Wind

Study Area Location

Drg No	74549_NCR_01
Rev	A
Date	07/09/15
Figure	1

Datum: OSGB36
Projection: OSNG

Shapefile Ref:

634000 635000 636000 637000 638000 639000

240000 239000 238000 237000

N

Bawdsey
White Cottage
Long La
East La
East Lane
Tower House
Middle Barn
Ferry Road
Bawdsey Beach
The Old Farmhouse

7046 7049 7048 7047 7045 7043 7044 7039 7036 7037 7038 7042 7035 7041 7034 7040 7033 7032 7030 7029 7031 7028 7027 7026 7025 7024 7023 7022 7021 7020

Legend

- WA Study Area
- Onshore Cable Route
- A1 – Anthropogenic origin of archaeological interest
- A2 – Uncertain origin of possible archaeological interest

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A	07/10/15	KL	First Issue.

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1:15,000 Scale @ A3

0 0.125 0.25 0.5 Km

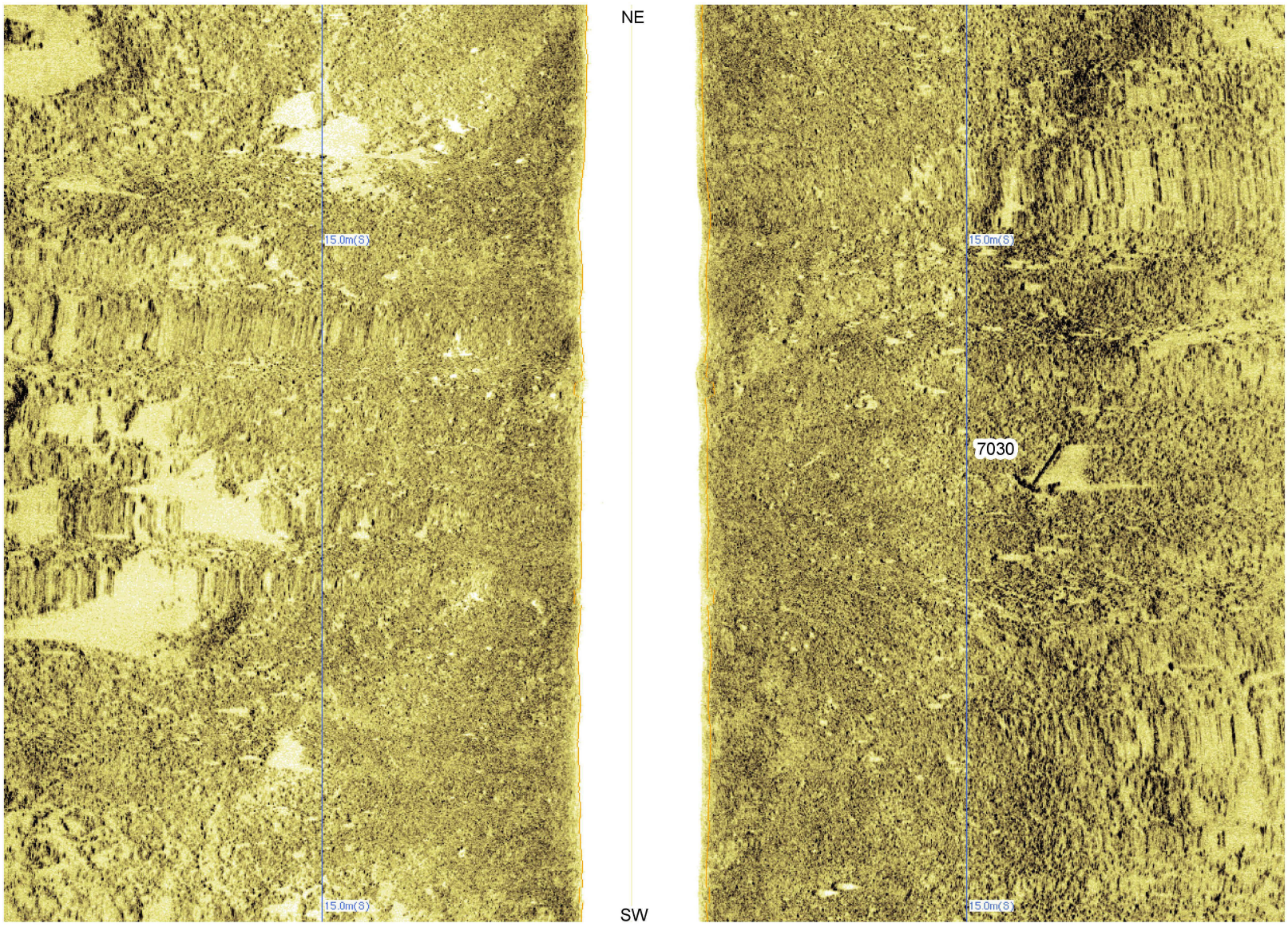
East Anglia Offshore Wind

Sea Bed Features of Archaeological Potential

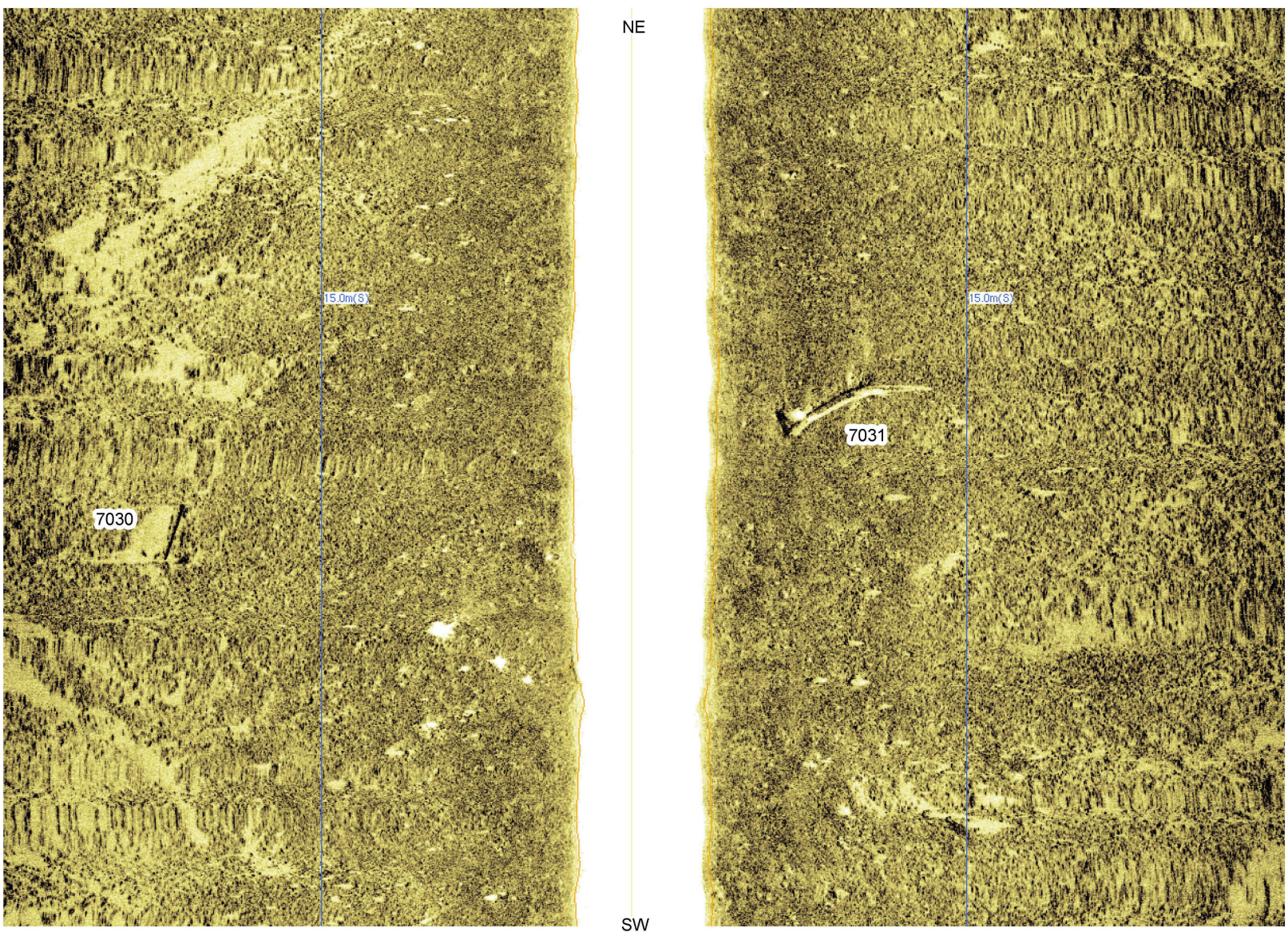
Drg No	74549_NCR_02
Rev	A
Date	07/09/15
Figure	2

Datum: OSGB36
Projection: OSNG

Shapefile Ref:



Anomaly 7030, Possible Anchor (4.5m x 2.2m x 0.5m)



Anomaly 7031, possible Anchor (6.2m x 2.4m x 0.9m)

East Anglia Offshore Wind

Sidescan Sonar Data Examples – Anomalies 7030 and 7031

Rev	Date	By	Comment
A	07/10/15	KL	First Issue.

Created: KL/KJF
Checked: LT
Verified: LT

NTS @ A3

Figure	Date	Rev	Dwg No.	
3	07/10/15	A	74549_03	Datum: N/A Projection: N/A