

Inch Cape Offshore Wind Farm

New Energy for Scotland

Offshore Environmental Statement:

VOLUME 2G

**Appendix 17A: Cultural Heritage and
Marine Archaeology Baseline**



INCH CAPE OFFSHORE WIND FARM

APPENDIX 17A: CULTURAL HERITAGE AND MARINE ARCHAEOLOGY BASELINE

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INCH CAPE OFFSHORE WIND FARM

APPENDIX 17A: CULTURAL HERITAGE AND MARINE ARCHAEOLOGY BASELINE

Report ref.: 85340.01

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APPENDIX 17A: CULTURAL HERITAGE AND MARINE ARCHAEOLOGY BASELINE

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Summary

WA Coastal & Marine (WA) was commissioned by Natural Power on behalf of Inch Cape Offshore Limited (ICOL), to carry out a baseline study of the cultural heritage potential of the Development Area and the associated Offshore Export Cable Corridor in order to inform an Environmental Impact Assessment. The proposed development is located in the central North Sea to the east of the Fife, Angus and Aberdeenshire coast. The Offshore Export Cable Corridor extends from the Development Area to a landing point on the shore in the vicinity of Cockenzie and Seton Sands in East Lothian.

This Technical Appendix comprises a cultural heritage baseline study and cultural heritage assessment of geophysical data within an Archaeological Study Area (ASA). The ASA comprises the Wind Farm and OSP's encompassed within a 1km buffer around the Development Area. This buffer has been added to account for both the potential of scour and sedimentation beyond the proposed development footprint, the low accuracy of offshore cultural heritage records and the potential for cultural heritage features outside the proposed development footprint to extend over larger areas than currently known. The ASA has been divided into the Development Area ASA and the Offshore Export Cable Corridor ASA where necessary.

The methodology adopted for this report reflects best practice in carrying out archaeological desk-based assessments, as codified by the Institute for Archaeologists (IfA).

Four broad types of features of cultural heritage interest may be present in the ASA:

- Submerged prehistoric sites and landscapes;
- Shipwrecks and material associated with maritime activity;
- Aircraft crash sites and associated material; and
- Intertidal archaeological features.

Updated records of known cultural heritage features were obtained from the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) and SeaZone. There are no statutory designations within the ASA.

The results of the assessment of the geophysical data for the Development Area identified 135 anomalies of potential archaeological interest and the potential for derived archaeological artefacts within a later deposit of the Forth Formation identified to the north-west of the Development Area. Of these anomalies 131 are identified within the sidescan sonar, magnetometer and multibeam bathymetry data. Four are known wrecks, one is an area of debris which could potentially be an uncharted wreck and the remaining 126 anomalies are either items of debris, dark reflectors or magnetic contacts. There are four recorded wrecks and obstructions which do not have a geophysical anomaly visible at their location.

The results of the assessment of the geophysical data for the associated Offshore Export Cable Corridor identified 378 anomalies of potential archaeological interest. Of these anomalies 376 are identified within the sidescan sonar and magnetometer data. Two are known wrecks and the remaining 374 anomalies are either items of debris, dark reflectors or

magnetic contacts. There are two recorded wrecks and obstructions which do not have a geophysical anomaly visible at their location.

The potential for the presence of prehistoric features of cultural heritage interest within the Project footprint has been assessed through a review of the geophysical data and other available sources. A low potential for Palaeolithic/Mesolithic material in reworked contexts has been identified.

The intertidal part of the Offshore Export Corridor was also considered for this report. A total of 10 known cultural heritage features have been identified in this area. In addition there is a high potential for further archaeological remains to be present.

INCH CAPE OFFSHORE WIND FARM

APPENDIX 17A: MARINE ARCHAEOLOGY AND CULTURAL HERITAGE BASELINE TECHNICAL REPORT

Report ref.: 85340.01

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This report was commissioned by Natural Power on behalf of ICOL. WA Coastal & Marine would like to thank Andrew Precious and Nancy McLean for their co-operation during the compilation of this report as well as SLR Consulting.

SeaZone records were provided by Natural Power, and National Monuments Record of Scotland records were obtained from RCAHMS. The geophysical data were acquired by IX Surveys and Osiris. The Development Area dataset was acquired by IX Survey Ltd between August and October 2010 and sidescan sonar, sub-bottom profiler (sparker), magnetometer and multibeam bathymetry data were assessed. The Offshore Export Cable Corridor and Nearshore Cable Corridor datasets were acquired by Osiris Projects in March 2012 and August/September 2012 respectively.

WA Coastal & Marine is grateful to the staff of all the above organisations for their co-operation during the project.

John McCarthy and Stephen Lancaster carried out the assessment and compiled this report. Kitty Foster prepared the illustrations. The geophysical data were processed and interpreted by Rachel Chester, David Howell and Genevieve Shaw. Jonathan Benjamin managed the project for WA Coastal & Marine and quality assurance was conducted by Stephanie Arnott, Dan Atkinson and Jonathan Benjamin.

Data Usage and Copyright

Details of maritime sites were obtained from the National Monument Record for Scotland. The information supplied is © Crown copyright or © RCAHMS copyright. Supplied under licence number 111121. Details of Wrecks and Obstructions were obtained from the United Kingdom Hydrographic Office (UKHO) (30/08/2012).

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Acronyms

Anno Domini	AD
Before Christ	BC
Before Present	BP
British Geological Survey	BGS
Collaborative Offshore Wind Research Into the Environment	COWRIE
Differential Global Positioning System	DGPS
Institute for Archaeologists	IfA
Joint Nautical Archaeology Policy Committee	JNAPC
Last Glacial Maximum	LGM
Marine Isotope Stages	MIS
Marine Study Area	ASA
Mean High Water Springs	MHWS
Mean Low Water Springs	MLWS
Ministry of Defence	MoD
Offshore Service Platform	OSP
Quality Integrated Navigation System	QINSy
Royal Commission on the Ancient and Historical Monuments of Scotland	RCAHMS
Real Time Kinematic	RTK
Two-Way Travel Time	TWTT
United Kingdom Hydrographic Office	UKHO
Ultra-Short Baseline	USBL
Wessex Archaeology	WA

INCH CAPE OFFSHORE WIND FARM

APPENDIX 17A: CULTURAL HERITAGE AND MARINE ARCHAEOLOGY BASELINE

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17A.1 INTRODUCTION

17A1.1 PROJECT BACKGROUND

Wessex Archaeology (WA) was commissioned by Natural Power on behalf of Inch Cape Offshore Limited (ICOL), to carry out cultural heritage assessments for the Inch Cape Offshore Wind Farm Project. This report comprises one element of that assessment and is a baseline study of Marine Archaeology and Cultural Heritage data within the Development Area and Offshore Export Cable Corridor including a review of marine geophysical data. The Inch Cape Offshore Wind Farm is located in the central North Sea to the east of the Fife, Angus and Aberdeenshire coast. The Offshore Export Cable Corridor runs from the Development Area to a landing point on the shore in the vicinity of Cockenzie and Seton Sands in East Lothian (**Figure 17A.1**). The Archaeology Study Area (ASA) defined in this report includes a one kilometre buffer and also includes cultural heritage assets in the intertidal zone up to Mean High Water Springs (MHWS). These can be divided into the Development Area ASA and Offshore Export Cable Corridor ASA where necessary. A full definition of boundaries is given in Para 17A2.2.

17A1.2 AIMS AND OBJECTIVES

The aim of this report was to review the known and potential archaeological resource within the Development Area and the Offshore Export Cable Corridor. The objectives of the cultural heritage baseline study were to:

- provide an overview of the existing archaeological environment; and
- provide a cultural heritage review of marine geophysical data.

This report does not contain details of cultural heritage assets considered for setting impacts. Full details of those assets can be found in the Chapter 17: Marine Archaeology and Cultural Heritage.

17A1.3 LEGISLATIVE BACKGROUND

A full outline of all UK, Scottish and International maritime legislation and policy guidance relevant to the archaeological assessment can be found in summary in **Annex I**.

17A.2 METHODOLOGY

17A2.1 INTRODUCTION

This assessment was carried out in a manner consistent with available guidance, including the Joint Nautical Archaeology Policy Committee (JNAPC), the Collaborative Offshore Wind Research Into the Environment (COWRIE) *Code of Practice for Seabed Development: Historic Environment Guidance for the Renewable Energy Sector* (WA 2007), the COWRIE *Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy* (Oxford Archaeology 2008) and the Institute for Archaeologists (IfA) *Standard and Guidance for Desk Based Assessment* (Institute for Archaeologists 2008).

Although much of this assessment is derived from desk-based (*i.e.* secondary) sources, it has also included the archaeological interpretation by WA of primary geophysical data collected by IX Survey Ltd. In 2010 and Osiris Projects in 2012, the results of which are integrated into this report. Full details of the assessment of these surveys are given in Section 17A2.5.

17A2.2 STUDY AREA

The study area consists of two Archaeological Study Areas (ASAs). These are the Development Area ASA (containing the Wind Farm and the OSPs) and the Offshore Export Cable Corridor ASA. Each of these has been created by buffering their respective areas by one kilometre (**Figure 17A.1**).

The ASA also includes part of the intertidal zone between Mean Low Water Springs (MLWS) and Mean High Water Springs (MHWS) (**Figure 17A.2**). It is necessary to include the intertidal zone as it falls under the marine planning regime. Cultural heritage assets above MHWS will be analysed as part of a separate planning application.

The extent of the Intertidal Study Area was defined early on in the project and differs slightly from the width of the offshore part of the Offshore Export Cable Corridor ASA but does contain all projected construction impacts including a buffer of at least 500m.

The MHWS and MLWS used in this report are derived from Ordnance Survey OpenData. The dataset used is regularly updated administrative boundary mapping for Great Britain (England, Scotland and Wales) provided by the Ordnance Survey as part of the Boundary-Line Open Data dataset. Boundary-Line is captured at 1:10000 scale. The data was originally provided in BNG and for that part of the ASA which lies below the MLWS mark the data has been converted into UTM30N (using the OSGB_1936_To_WGS_1984_Petroleum transformation).

The ASA was buffered in order to capture additional data that would:

- assist in placing the historic environment in context within the proposed development area;
- improve the probability of locating heritage assets that might fall within the development area but have poorly spatially constrained records. The buffer ensures that archaeological sites close to or just beyond the boundaries of the scheme, which might be affected by the development, are included in the assessment.

Reference was also made to the wider region beyond the ASA to provide context for the archaeological and historic environment of the area that may be impacted by the proposed development. In addition a buffer of 500m was added to the geophysical survey of the Development Area and this has also been reviewed. No such buffer was used for the Offshore Export Cable Corridor.

17A2.3 CHRONOLOGY

The term Before Present (BP) is used throughout this report when describing the age of archaeological events which occurred through the Palaeolithic to the Mesolithic period. The BP time scale is predominantly used to report raw radiocarbon ages which cannot be directly correlated with a calendar date due to the inconsistency of ¹⁴C levels within the atmosphere. The exception to this is the Mesolithic period, the radiocarbon ages for which can be correlated with a calendar date (9,500-5,500 BP, 8,500-4,000 BC). BP dates are commonly calculated in years before 1950. From the Mesolithic period onwards, the time scales Before Christ (BC) and *Anno Domini* (AD) are used.

Geological time, prior to periods of archaeological interest, is expressed in millions of years (Ma). Major glacial and interglacial stages are also referred to in terms of Marine Isotope Stages (MIS) to facilitate correlation with other sources.

17A2.4 DESK - BASED ASSESSMENT

The methodology adopted for the desk-based assessment reflects best practice as codified by the Institute for Archaeologists (IfA) *Standard and Guidance for Archaeological Desk-based Assessment* (IfA 1994, revised 2011). The approach also reflects the requirements of Environmental Assessment arising from European Council Directive 85/337/EEC and later directives, codified in Directive 2011/92/EU.

Cultural heritage features have been split into three groups. Records of known intertidal features of cultural heritage interest are given a numerical sequence beginning **WA 1000**. These are listed in **Annex II** of this Technical Appendix. Only those terrestrial features of cultural heritage interest which clearly extend into or are entirely contained within the intertidal zone have been included. Known cultural heritage features such as harbours and walls which abut or define the MHWS are also included in this report. Below the MLWS mark, marine features of cultural heritage interest have been split into two groups. Records with known locations were combined with the results of the geophysical survey and were given a numerical sequence (**WA 7000**). These are listed in **Annex III**. Casualties are points used by RCAHMS to store reports of shipping casualties. These records are referred to by their Canmore ID (RCAHMS) numbers and are listed in **Annex IV**.

Sources

The following data and archives were consulted during the baseline data gathering phase:

- The United Kingdom Hydrographic Office (UKHO) Wreck Database for records of shipwrecks and navigational hazards;
- SeaZone Hydrosatial data;
- Maritime records held by RCAHMS, including shipping and aircraft casualties;
- Modern Admiralty and geological charts relevant to the Study Areas;
- The Ministry of Defence (MoD) with respect to the Protection of Military Remains Act 1986;
- Written sources, including academic papers and other offshore wind farm environmental statements that are in the public domain; and
- Secondary sources (e.g. Larn & Larn 1998) relating to known and potential wreck sites and other archaeological remains, held by WA.

Data on intertidal cultural heritage features has been derived from the Monuments of East Lothian database (03/05/2012) and the archive of the sites, monuments and buildings of

Scotland's past maintained by RCAHMS (received 18/11/2011). Data from Historic Scotland was also downloaded (03/05/2012) including Battlefields, Conservation Areas, Scheduled Monuments and Listed Buildings.

The data were incorporated into an ESRI Arcview 9.3/10 GIS work space where geospatial data, from the project database and local mapping sources, were compared and contrasted to investigate the extent and character of sites. Information that could not be mapped was compiled in a project archive and used qualitatively.

17A2.5 MARINE GEOPHYSICAL ASSESSMENT

The geophysical surveys were carried out to identify landscape features and geophysical anomalies of potential cultural heritage interest within the ASA. WA carried out an archaeological assessment of three sets of marine geophysical data, one dataset for the Development Area, one dataset for the main part of the Offshore Export Cable Corridor, and one dataset for the nearshore component of the Offshore Export Cable Corridor. The Development Area dataset was acquired by IX Survey Ltd between August and October 2010 and sidescan sonar, sub-bottom profiler (sparker), magnetometer and multibeam bathymetry data were assessed. The offshore and nearshore datasets were acquired by Osiris Projects in March 2012 and August/September 2012 respectively and the sidescan sonar, sub-bottom profiler (sparker), magnetometer and multibeam bathymetry data were also assessed. As the datasets were acquired by different survey companies and at different times under different survey conditions they have been assessed and described separately in terms of their technical survey specifications and data quality.

The objectives were as follows:

- To locate, identify and characterise any previously unrecorded features of cultural heritage interest within the ASA, and confirm the presence and condition of any known features of cultural heritage interest; and
- To identify the presence of any sedimentary deposits of archaeological potential.

Data Sources

The sidescan data were assessed for quality and were rated as 'Average' using the following criteria (Table 17A.1):

Table 17A.1: 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.

For the Development Area, a coarse grid was run in favourable weather conditions with infill lines being run in more marginal conditions (IX Survey 2011). No major issues were noted to have affected the data quality.

The magnetometer data were variable with some files missing or having large gaps of navigation and/or magnetic amplitude readings.

The sub bottom profiler data were of good quality data throughout.

As stated above, a buffer of 500m was added to the geophysical survey of the Development Area and this has also been reviewed. No such buffer was used for the Offshore Export Cable Corridor. For both the nearshore and main Offshore Export Cable Corridor surveys, a corridor of between 300m and 1100m was surveyed, with line spacing of 40m, 50m or 75m used depending on water depth (Osiris 2012). Four separate cable route site approach options were surveyed offshore where the cable corridor meets the Development Area, and five separate landfall options were also surveyed (though only the two options under consideration at the time of assessment - Option 1a and Option 2a have been assessed in this report) (**Figure 17A.1**).

The sidescan sonar data were deemed 'Variable' using the above criteria, and ranged from very good quality data offshore to much lower quality data nearshore, where large sections of the data were obscured by sea surface noise due to shallow water depth. A number of records also exhibited a significant amount of systematic noise, interpreted as being either electrical interference or caused by other equipment.

The magnetometer data were deemed 'Good' using the above criteria, though large variations in the background magnetic signal, interpreted as being caused by geological features, made identification of smaller anomalies difficult in some areas.

The sub-bottom profiler (Sparker) data were deemed 'Average' using the above criteria, and the quality of the data differed between lines. However the main issue encountered was the very short record length recorded, which resulted in as little as 15ms (approx. 12m) of sub-seabed data being recorded in some areas.

The multibeam bathymetry data were deemed 'Good' using the above criteria, with seabed features clearly visible.

Technical Specifications

The vessel track plot is illustrated in **Figure 17A.3**.

The geophysical data assessed for the Development Area consisted of sidescan sonar, magnetometer, sub-bottom profiler (Sparker), and swathe bathymetry data. The data were acquired by IX Survey between the 30th August and the 15th October 2010. The survey was conducted over an area of approximately 150km², comprising a total of approximately 1750 line kilometres covering the proposed wind farm scheme area. Line spacing was approximately 150m and the survey lines extended approximately 500m beyond the Development Area acting as a buffer.

The geophysical data assessed for the main part of the Offshore Export Cable Corridor survey consisted of sidescan sonar, magnetometer, sub-bottom profiler (Sparker), and multibeam bathymetry data. The data were acquired by Osiris Projects Between the 21st August and 13th September 2012 on board the vessel MV *Bibby Tethra*. Line spacing was approximately 75m or 50m depending on water depth. No buffer was included in this survey.

The geophysical data assessed for the nearshore part of the Offshore Export Cable Corridor survey consisted of sidescan sonar, magnetometer, sub-bottom profiler (Sparker), and multibeam bathymetry data. The data were acquired by Osiris Projects Between the 14th and 28th March 2012 on board the vessel MV *Lia*. Line spacing was approximately 40m. No buffer was included in this survey.

IX Survey used a Klein 3210 sidescan towfish operating at low and high frequencies, 132 and 445 kHz respectively. A range setting of 200m for low frequency was used. The

sidescan data were digitally recorded as *.cod* files using CODA software and corrected navigation data provided with the sidescan data in *.cnv* file format. The sidescan sonar data for the Development Area was acquired at high and low frequency with a range setting of 200m to cover a line spacing of 150m. The low frequency data was assessed to ensure adequate coverage of the survey area therefore the resolution data was lower than the data assessed for the Offshore Export Cable Corridor. This has made smaller objects more difficult to definitively interpret and characterise as they lack detail and has resulted in a large number of anomalies remaining as dark reflectors as they are not able to be characterised further.

For the main Offshore Export Cable Corridor survey, Osiris used a Klein 3000 dual frequency (100 kHz and 455 kHz) sidescan sonar towfish operated at a maximum range of 100m per channel. The sidescan data were digitally recorded using a Coda DA2000 acquisition unit and provided to WA as *.cod* files. Sidescan sonar positioning was provided by a Sonardyne Scout USBL (Ultra-Short Baseline) system.

For the nearshore part of the Offshore Export Cable Corridor survey, Osiris used a Klein 3000 dual frequency (100 kHz and 455 kHz) sidescan sonar towfish operated at a range of 50m per channel. The sidescan data were digitally recorded using Klein SonarPro software, and were provided to WA as *.xtf* files. Sidescan sonar positioning was provided by a Sonardyne Scout USBL system.

The magnetometer data collected by IX Survey for the Development Area survey were acquired using a Geometrics G882 caesium vapour magnetometer. The data were provided in *.txt* file format.

For both parts of the Offshore Export Cable Corridor surveys, the magnetometer data collected by Osiris were acquired using a Geometrics G882 caesium vapour magnetometer, towed from the back of the sidescan sonar offshore and at a fixed layback of 50m nearshore. The data were digitally recorded using the navigation software and provided to WA as *.xyz* files.

IX Survey acquired the sub-bottom profiler data for the Development Area survey using a GeoResources 1 Kj Sparker system. The data were recorded in a GeoResources proprietary format and also provided in *.sgy* file format. These files were converted to *.cod* format using Coda File Utilities so that they could then be viewed in Seismic+. Corrected navigation was provided by *.cnv* files. The data were provided to WA as processed files. Consequently they could only be viewed and the profiles assessed.

For the main Offshore Export Cable Corridor survey, Osiris acquired the sub-bottom profiler data using an Applied Acoustics Squid 2000 sparker system and a trailing 20 element Hydrophone. The system was operated at a power of 300J at 250ms firing rate. The data were digitally recorded using a Coda DA2000 acquisition unit and provided to WA as *.cod* files. Pinger data were also acquired, but not used as part of the archaeological assessment.

For the nearshore Offshore Export Cable Corridor survey, Osiris acquired the sub-bottom profiler data using a Geo-Resources Geo-Spark 200 surface towed sparker system and a trailing Hydrophone. The system was operated at a power of 100J at 250ms firing rate. The data were digitally recorded using a Coda DA2000 acquisition unit and provided to WA as *.cod* files. Pinger data were also acquired, but not used as part of the archaeological assessment.

IX Survey acquired the multibeam bathymetry data for the Development Area survey using a RESON SeaBat 8101 multibeam echo sounder operated at 240kHz. The raw data were provided in *.qpd* file format and gridded data as *.txt* files as part of a QINSy (Quality Integrated Navigation System) project. Primary positioning was provided by the Trimble SPS850 Differential Global Positioning System (DGPS) in RTK (Real Time Kinematic)

mode and secondary positioning by the Trimble SPS351 in satellite based augmentation system mode.

For both the main and nearshore Offshore Export Cable Corridor surveys, Osiris acquired the multibeam bathymetry data using a RESON SeaBat 7125 SV2 multibeam echo sounder system operated at a frequency of 400kHz. The data were digitally recorded through QPS QINSy software and provided to WA as .xyz files.

Primary positioning for the Offshore Export Cable Corridor survey was provided by a C-NAV 3050G GPS system and secondary positioning was provided by a Hemisphere Crescent R320 dGPS. Primary and secondary vessel heading and motion corrections were provided by the IXSea HYDRINS and IXSea OCTANS systems.

Primary positioning for the nearshore part of the Offshore Export Cable Corridor survey was provided by a Leica GX 1230 Smartnet RTK GNSS system, and secondary positioning was provided by a C-Nav 3050G GPS system. Primary and secondary vessel heading and motion corrections were provided by an Applanix POS MV 320 RTK Inertial Navigation System and a TSS Meridian Surveyor Gyrocompass.

For all three surveys, all positions were recorded and expressed as WGS84 UTM 30N.

Geophysical Data - Processing

The sidescan sonar data were processed by WA using Coda Geosurvey software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were initially scanned to give an understanding of the geological nature of the area and were then interpreted for any objects of possible anthropogenic origin: the position and dimensions of any such objects were recorded into a gazetteer and an image of each anomaly acquired.

The form, size and/or extent of an anomaly contribute towards an understanding of its potential to be an anthropogenic feature, and therefore to its 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. The application of a ratings system is therefore a means of prioritising sites in order to inform further stages of the interpretation process and on its own is not definitive.

The shallow seismic data were studied in order to detect any in-filled palaeochannels, ravinement surfaces and peat/fine-grained sediment horizons that may have archaeological potential.

The shallow seismic data were processed by WA using Coda Seismic+ software. This software allows the data to be replayed 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 a sedimentary boundary that might be of archaeological interest.

These data were interpreted with Two-Way Travel Time (TWTT) along the z-axis. In order to convert from TWTT to depth the velocity of the seismic waves was estimated to be 1,700 m/s. This is a standard estimate for shallow, unconsolidated sediments and matches the TWTT used by IX Survey to interpret the data (IX Survey 2010b).

Along with features such as buried palaeochannels, any small reflectors which appeared to be buried material, such as a wreck site covered by sediment, were recorded 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.

The magnetometer data were processed by WA using GeoMetrics MagPick software in order to identify any discrete magnetic contacts which could represent buried metallic debris or structures such as wrecks.

The software enables both visualisation of individual lines of data and gridding of data to produce a magnetic anomaly map. A smoothed average of the data was first calculated and then subtracted from the data values in order to remove natural variations in the magnetic field of the site due to factors such as changing geology and water depth.

The multibeam bathymetry data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. The Fledermaus software enables the coverage of both raw and gridded multibeam datasets to be assessed and the 3-D visualisation of the acquired data. The data were provided as raw QINSy files and gridded .xyz files. WA is unable to support the QINSy format and therefore had to focus the assessment on the .xyz files. Geotiffs supplied with the data suggested that it would be possible to grid these files to a reasonably high resolution of 1m to 2m cell size. However, when the .xyz files were processed it became apparent that they only represented a much lower resolution subset of the data. As a result, not every anomaly found in the other datasets could be cross correlated with the multibeam data.

**Geophysical Data – Anomaly Grouping and Discrimination
Seabed Features**

The previous section describes the initial interpretation of all available geophysical datasets 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 datasets and apparently overstating the number of archaeological features in the ASA.

To address this fact, the anomalies were grouped together. This allows 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 sidescan sonar anomalies.

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 archaeological interest. These flags were ascribed as detailed in **Table 2**.

Table 17A.2: Criteria for Discriminating Relevance of Seabed Features to Proposed Scheme

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

All the sites that have been identified from the review of geophysical data within the offshore part of the ASA are presented in **Annex III** and discussed in this report.

The grouping and discrimination of information at this stage is based on all available information and is not definitive. It allows for all features considered of archaeological interest to be highlighted, while retaining all the information produced during the course of the geophysical interpretation for further evaluation should more information become available.

17A.3 CULTURAL HERITAGE BASELINE: SUBMERGED PREHISTORY

17A3.1 PALAEO-GEOGRAPHIC ASSESSMENT

The potential for the presence of submerged prehistoric archaeology within the region is dependent upon the age and nature of the sedimentary units present in the ASA, and is closely related to relative sea-level change through time. Therefore an outline of the relevant known shallow geological, sea-level, and climate change data relating to the region and the impact that they are likely to have on archaeological potential is given below.

An assessment of relative sea-level change is necessary because at various times during prehistory the sea-level may have been low enough for the offshore areas of eastern Scotland in the North Sea Basin to have been dry land, and therefore available for exploitation by humans. This occurred when water that would otherwise be held in oceans and seas was locked into ice sheets during periods of glaciation.

Recent research indicates that hominin (humans and their early ancestors) populations were present in Britain from c. 970,000 BP (Parfitt *et al.* 2010). This is the start of the British Palaeolithic and is the earliest known evidence for hominins in northern Europe.

The Lower and Middle Palaeolithic saw a gradual evolution of archaic human lineage from *Homo heidelbergensis*, through to *Homo neanderthalensis* (Neanderthals) c. 35,000 BP (Wenban-Smith 2002). Following this, Neanderthals were gradually replaced in north-west Europe by anatomically modern humans (*Homo sapiens*), at the transition into the Upper Palaeolithic.

Sea-Level Change and Glaciation

There were at least two glacial phases (MIS 14 and 16) during the Cromerian (870,000-480,000 BP). Since then, the Northern European landscape has been shaped by a further three major glaciations which are known as the Anglian (480,000-425,000 BP), Wolstonian (380,000-130,000 BP) and Devensian (70,000-12,000 BP). During these glaciations eastern Scotland would probably have been covered by ice sheets, though the exact extents of ice sheets during different glaciations and the time of maximum extents at different points on the margins of the ice sheets is still the subject of considerable debate (Merritt *et al.* 1995; Shennan and Horton 2002; Ballantyne 2004).

In northern Scotland the Devensian Last Glacial Maximum occurred sometime after 26,000 BP, with deglaciation well advanced by 15,000 BP (Ballantyne 2004); at least six phases of growth and retreat have been identified. By 13,000 BP the ice sheets had completely melted in lowland areas, although there was a brief period of renewed ice cover during the Loch Lomond (Younger Dryas) stadial at about 11-10,000 BP (Ballantyne 2004). Allowing for the uncertainties of isobase mapping, eastern Scotland (Aberdeenshire – Angus, Fife) probably ceased to be covered by the ice sheet at some point between 18,000 and 13,000 BP (Brooks *et al.* 2008, Bradley *et al.* 2011) with more western areas becoming ice free by the Holocene (10,000 BP). Extremely cold paraglacial and periglacial environments would have characterised the glacier-free land moving away from the glacier front, unsuitable for human habitation across the British Isles.

Most of the Scottish continental shelf was covered by ice sheets (Brooks *et al.* 2008, Bradley *et al.* 2011), with glaciers centred on the Scottish West Highlands. During the last glacial significant carving of the continental shelf is recorded by ice streams in offshore locations around Scotland (Stoker *et al.* 2009), including the Development Area (Golledge and Stoker 2006).

Patterns of sea-level change are difficult to reconstruct with any confidence for much of the Pleistocene in Scotland. The evidence base is relatively poor, and modelling of sea-level change is further complicated by the effects of isostatic change caused by the accumulation and wasting of successive ice sheets. It should be noted that the Wee Bankie Formation appears to be a till formed from a terrestrial ice sheet. The distribution of

this formation may give some indication of the extent of terrestrial glacial conditions in areas that are now submerged.

Existing sea-level models suggest that the ASA was inundated by the Holocene, and highlight considerable fluctuations between marine transgression and regression influenced by isostatic readjustment throughout the Late Pleistocene and Holocene, relative sea levels are modelled to have been higher than present day in the Tay Valley at c. 13 ka, 6 ka (Shennan *et al.* 2006) with significant connotation for the distribution of Mesolithic human activity and the relative position of the contemporary coast. Due to glacio-isostatic rebound the sea-level then transgressed to its highest level around 6,000 BP to approximately 7m above the present day shoreline before retreating to current levels. These regional to national scale models indicate that during the Late Upper Palaeolithic and Mesolithic, the ASA was already submerged (Bradley *et al.* 2011).

Geology

The principal geological units in the region of the ASA as mapped by the British Geological Survey (BGS) (Gatliff *et al.* 1994) are tabulated below (**17A.3**).

The Pleistocene and Holocene sedimentary sequence is made up of four units. The Wee Bankie formation is the earliest formation overlying the bedrock. It is a glacial till, deposited in the Upper Pleistocene before the Last Glacial Maximum (LGM) c. 18,000 BP. It ranges in thickness from 5m to 40m and the surface is ridged and uneven. Diagnostic faunal and floral material is present but reworked (and therefore out of context) (Gatliff *et al.* 1994).

The St Abbs Formation is a Late Devensian deposit which post-dates the Last Glacial Maximum. Although the St Abbs Formation as mapped by the BGS does not fall within the ASA, seismic results suggest that a deposit of this unit (**Unit 3**) outcrops in the south-western part of the ASA.

The Forth Formation was deposited in the Late Devensian and Holocene periods. Over most of the ASA, the Forth Formation is undifferentiated, both in the BGS mapping and in the data examined for the geophysical assessment. There is one area where there appears to be a differentiation in the seismic data, and the different layers appear to correspond to two of the known members of the Forth Formation; the Largo Bay Member and the St Andrews Bay Member. These deposits date from approximately 13,500 to 7,000 BP. Recent seabed sediments comprising gravel banks, sand waves and megaripples generally form a thin veneer usually less than 1m thick.

Table 17A.3: The Principal Geological Units in the Region of the ASA

Unit	Description	Chronology	Archaeological Potential
5	Seabed sediments: Gravel banks, sand waves, megaripples. SAND and SANDY GRAVEL, unconsolidated.	Wholly recent Strong currents, especially near coast scour out this unit down to underlying Holocene/Pleistocene deposits or bedrock.	Generally forms a thin veneer usually less than 1m thick or absent. Recent marine sediments therefore not of potential archaeological interest in themselves.
4	Forth Formation: undifferentiated Marine, glaciomarine, fluviomarine and estuarine facies all recorded in this formation	Quaternary: Late Devensian to Holocene	Upper sediments potentially of Mesolithic Age. Proximity to coast and the Forth and Tay estuaries so could contain derived archaeological artefacts alongside important palaeoenvironmental indicators preserved within the silts and clays. A high relative sea level during this time indicates in-situ archaeological artefacts are unlikely.
4b	Forth Formation: St Andrews Bay Member comprises interbedded sands and clays in the west but pebbly muds and shelly sands in the east, overlies Largo Bay Member or older strata.	Quaternary: Late Devensian to Holocene	
4a	Forth Formation: Largo Bay Member includes mud and silty muds in the Firth of Forth which become coarser-grained and pebbly seawards.	Quaternary: Late Devensian to early Holocene	
3	St Abbs Formation: Post-dates the last glacial maxim approx. 18,000 BP. Glaciomarine deposit, weakly laminated muds and silty muds with sporadic pebbles.	Quaternary: Late Devensian Age 18,000 – 13,500 BP. Contemporary with lower parts of the Forth Formation.	Glaciomarine deposit, therefore of low archaeological potential. May contribute to understanding the environmental history of east coast directly after the Last Glacial Maximum
2	Wee Bankie Formation: Basal till. Sheet-like geometry but an uneven, ridged upper surface.	Quaternary: Upper Pleistocene and Holocene	Glacial till deposit therefore of low archaeological potential.
1	Devonian (siltstone, mudstone, sandstones) and Permian to Triassic Age (siltstone, mudstone, sandstones) Bedrock. Channelled and eroded bedrock surface.	C. 312 – 270 million years ago.	Outcrops at seabed occasionally.

As part of the palaeogeographic assessment of the ASA, the geophysical (sub-bottom profiler and multibeam bathymetry) data were analysed for evidence of features of archaeological interest.

17A3.2 SUB-BOTTOM FEATURES

Development Area

Within the Development Area, the general geological sequence is the same as described in Section 17A3.1, though the specific characteristics and relevance to archaeological potential of the Units differs.

The dominant shallow geology in the Development Area is the same as for the north eastern end of the Offshore Export Cable Corridor, and comprises an extensive deposit of **Unit 2** (WBA) overlying the pre-quaternary bedrock. In the Development Area the internal structure of **Unit 2** (WBA) appears more complex, and is characterised by chaotic internal reflectors and occasional possible channel features. However, this apparent increase in complexity could be due to the record length of the sub-bottom profiler data within the Development Area being much longer than that from along the Offshore Export Cable Corridor, so more of the internal structure is revealed. As with the Offshore Export Cable Corridor, this unit is not considered to be of archaeological interest.

A deposit of **Unit 3** (SBB) has been identified located within a channel/hollow cut into **Unit 2** trending approximately NE – SW across the Development Area to the south of the centre (**Figure 17A.6**). As with the Offshore Export Cable Corridor, this Unit is interpreted as being of low archaeological potential, though it could contain palaeoenvironmental material.

Almost exclusively confined to extents of this deposit of **Unit 3** are scattered possible channel features which cut through the Unit and into the underlying **Unit 2** (**Figure 17A.6**). These are interpreted as containing sediments of Unit 4a (FHG). Interpreted along the Offshore Export Cable Corridor as being a glaciomarine/estuarine deposit, **Unit 4a** in the Development Zone is considered to be at least partially fluvial in nature due to the observed incision of these features into the underlying sediment.

The fluvial nature of these features is problematic as they are currently located in water depths of around 50m. Although the features are tentatively dated to the Loch Lomond Stadial (11,000 – 10,000 BP, Gatliff *et al.* 1994), current sea level curves (e.g. Shennan & Horton 2002, Bradley 2011) suggest that even at this time relative sea level within the Tay/Forth area was only up to 10m lower than at present.

However, the features identified in the Development Area are potentially fluvial in nature, and clearly incise into the underlying stratigraphy. Therefore it is possible that fluctuating relative sea levels since the LGM, caused by a combination of global eustatic sea level rise and local isostatic uplift, could have caused brief intermittent periods during which fluvial down-cutting into lower marine sediments occurred. These could later have been infilled with a small amount of fluvial material or, more likely, marine sediment from subsequent marine transgression.

Despite this difference in origin, **Unit 4a** (FHG) in the Development Area is still regarded as being of relatively low archaeological potential, but could contain palaeoenvironmental material.

Existing models of relative sea level change since the LGM are primarily constructed from coastal sediments; making them preferentially sensitive to highstand sea level; relatively few offshore locations are incorporated into the models which are effectively national in scale with some regional to local sensitivity where sufficient high-quality data exists e.g. Arisaig (Shennan *et al.* 2006, Bradley *et al.* 2011).

Where offshore locations have been investigated in the region of the Development Area, e.g. Stoker *et al.* (2008) sea level limiting points have been tentatively identified. For example an estimated lowstand palaeoshoreline between 20-30m below current sea level (inferred from Younger Dryas dated material from the St Andrews Bay Member overlying the St Abbs Formation off the Angus coast. The implication of identifying these estuarine facies is that the lowstand Younger Dryas palaeoshoreline may have been located 5 – 10 km eastward of the present coastline. If this were the case then this could greatly increase the potential zone where early Holocene human activity may have occurred compared to that of existing relative sea level models and therefore where *in situ* archaeology may be preserved although it must be considered unproven at this stage. Estuarine locations with Mesolithic archaeology such as Morton on the North Fife coast hint at the importance of coastal locations in the earlier Holocene in the region. Bearing this palaeo-landscape relationship in mind, the survey data underpinning the Stoker *et al.* (2008) assessment is based on two survey lines in the vicinity of the Development Area and the authors note that resolving the offshore lithozones was difficult at the ASA. The survey data examined in this assessment is of much higher resolution enabling a more detailed investigation and for smaller palaeolandscape features to be identified. The identification of fluvial features of potentially Younger Dryas age is significant with important implications for expanding the early Holocene lowstand baseline and therefore potential area for encountering early prehistoric archaeology, i.e. the starting point for lowstand Late Pleistocene sea level is significantly lower within the outer Tay Estuary than regional-national scale RSL models based on coastal facies indicate. Further work is necessary, and across a wider region to clarify the context of these fluvial features. The information required for such a study is only likely to become available through analysis of large datasets gathered for other wind farms or similar major surveys.

Unit 4b (FHA) is also present within the Development Area (Figure 17A.7), but is more complex in this location compared with the Cable Route. Stoker *et al.* (2008) have identified four different lithozones of **Unit 4b** along the coast of Scotland between Fife Ness and Inverbervie. Of these, it is interpreted that Lithozone 4 has been identified within the Development Area, which itself has two distinct layers.

The lower layer of **Unit 4b** is present as a blanket deposit across much of the Development Area (and in the northernmost part of the Offshore Export Cable Corridor), with the exception of the south eastern corner. It is generally acoustically structureless, though some internal reflectors have been observed, and is generally between 5m and 10m thick.

The upper layer of Unit 4b (or the topset) has only been identified within the north western area of the Development area, and is characterised by numerous sub-parallel internal reflectors cutting into, and occasionally through, the lower layer (**Figure 17A.6**).

Together, these two layers of **Unit 4b** are interpreted as being the youngest deposits of a prograding shoreline sequence, deposited in shallow marine conditions since the LGM, with radiocarbon dates suggesting deposition between 12,500 Cal BP and 1,294 Cal BP (Stoker *et al.* 2008). However, the older date was obtained from a single sample and seems spurious, possibly indicating it has been reworked, which suggests the Unit may actually have been deposited between 5,681 Cal BP and 1,294 Cal BP.

Sedimentological analysis has also indicated that this section of **Unit 4b** comprises mainly reworked older material, so the potential for in-situ archaeological artefacts to be present is relatively low. However, given the age of the deposit, there is potential for **Unit 4b** to contain derived archaeological artefacts within the Development Area. Additionally the Unit has been proven to contain a rich assemblage of palaeoenvironmental material (Stoker *et al.* 2008) potentially important for reconstructing local relative sea level change.

Unit 4 (undifferentiated) is overlain by a thin veneer of Holocene seabed sediment (**Unit 5**) across the Development Area, which, as with the Offshore Export Cable Corridor, is interpreted as being of low archaeological potential.

Offshore Export Cable Corridor

All of the previously described geological units were identified along the Offshore Export Cable Corridor, though the route itself can broadly be divided into two sections (**Figure 17A.4**).

In the south-western section of the Offshore Export Cable Corridor, the St Abbs Formation (SBB, **Unit 3**) was found to directly overlie the pre-Quaternary bedrock (**Unit 1**), although some very small, isolated deposits of the Wee Bankie Formation (WBA, **Unit 2**) may be present. Overlying the bedrock, extensive deposits of the Forth Formation (**Unit 4**) have been observed. Two different members of the Forth Formation have been identified, and attributed to the lower Largo Bay Member (FHG, **Unit 4a**) and the upper St. Andrew's Bay Member (FHA, **Unit 4b**). This stratigraphy is illustrated in **Figure 17A.5**.

Unit 3 (SBB) is a generally seismically transparent deposit observed filling hollows within the bedrock surface, although some faint, poorly defined, sub-parallel internal reflectors have been identified. The Unit is generally located beneath **Unit 4**, although possibly outcrops close to the shore along the Landfall Option 1 and Option 2a routes. **Unit 3**, interpreted as a glaciomarine deposit of Late Devensian age (Gatliff *et al.* 1994), is deemed to be of relatively low archaeological potential though it could contain palaeoenvironmental material.

Unit 4a (FHG) is characterised by stronger sub-parallel internal reflectors and is also generally observed filling hollows within the upper surfaces of the bedrock and **Unit 3**. **Unit 4a** is interpreted as being a glaciomarine/estuarine deposit (Gatliff *et al.* 1994) and, whilst the archaeological potential of the unit is relatively low, it could contain material of palaeoenvironmental potential.

Unit 4b (FHA) is a thicker blanket deposit generally overlying **Unit 4a**, and is characterised by sub-parallel internal reflectors. **Unit 4b** is interpreted as being an estuarine/marine deposit, and radiocarbon dates obtained by Stoker *et al.* (2008) from between Fife Ness and Inverbervie indicates it is likely to date from between 12,500 Cal BP and 1,294 Cal BP.

This places the deposition of **Unit 4b** within the chronological range of human occupation of Britain since the Last Glacial Maximum. The location of this Unit, which is relatively close to shore within the outer Forth Estuary, suggests the potential for derived archaeological artefacts to be present within this Unit. Relative sea level curves for the Tay/Forth area (Bradley 2011), however, suggest the Offshore Export Cable Corridor was a fully marine environment at the time Unit 4b was deposited, indicating the potential for the presence of *in-situ* archaeological artefacts is low.

Large deposits of Forth Formation have been identified in the south-western section of the Offshore Export Cable Corridor occasionally punctuated by outcrops of pre-quaternary bedrock at seabed, which is particularly the case along the two landfall option routes.

By contrast, the shallow geology of the north eastern section of the Offshore Export Cable Corridor is dominated by **Unit 2** (WBA) a basal till, which has been observed directly overlying the bedrock (shown with a single symbol on **Figure 17A.4**). This Unit is characterised by a chaotic internal structure, and is interpreted as a glacial till deposit of Devensian age. As such it is considered to be of low archaeological potential. **Unit 1** and **Unit 2** are very close to the surface throughout most of this section of the Offshore Export Cable Corridor, though they are overlain by a thin veneer of Holocene seabed sediment (**Unit 5**) and possibly thin, scattered pockets of **Unit 4**.

This geological sequence is observed along the four cable route approach options, though a possible channel feature has been identified at the northern end of option 1 (described below).

The Holocene seabed sediments (**Unit 5**) along the Offshore Export Cable Corridor consist of a thin veneer of sand and gravel generally less than 1m thick, though a sequence of silt

and fine sand up to 4m thick has been identified in the nearshore part of the Offshore Export Cable Corridor and interpreted as Holocene estuarine deposits. These sediments are not considered to be of intrinsic archaeological importance, though they can cover shipwreck sites in areas of sand waves. However, **Unit 5** is considered too thin for such seabed features to develop along the nearshore part of the Offshore Export Cable Corridor, and so this is deemed unlikely.

17A3.3 PREHISTORIC POTENTIAL

The discussion below outlines this potential for submerged prehistoric material with regard to two main phases:

- **Lower, Middle and Early Upper Palaeolithic:** (c. 970,000–13,000 BP) covering the period from the earliest evidence of hominin occupation of the UK to the onset of the last glaciation, and corresponding to the Cromerian and Anglian and the last glacial maximum of the Devensian;
- **Later Upper Palaeolithic:** (c. 13,000 BP- 10,000 BC) covering the period of re-inhabitation of the UK by modern humans following the last glacial maximum and the inundation of the ASA.

Lower, Middle and Early Upper Palaeolithic

During the Lower and Middle Palaeolithic Britain would have been occupied by a range of hominins, including *Homo heidelbergensis* and *Homo neanderthalensis*. During the Upper Palaeolithic, these populations would have been replaced by modern humans - *Homo sapiens*.

The dominant palaeogeographic setting of Britain for the majority of the late Pleistocene is that of a peninsula connected directly to mainland Europe across a broad front; from southern Scandinavia to north-west France. The flux of eustatic sea-level during interglacial periods has periodically flooded the English Channel and areas of the North Sea to create an island Britain. For the majority of the last one million years, especially during glacial periods, lower sea-level meant that Britain and Scotland were, to a greater or lesser extent directly connected to continental Europe.

No well-provenanced and reliable archaeological evidence of human occupation during the Lower, Middle and Early Upper Palaeolithic is known from Scotland (Wickham-Jones 1994). The cave site excavated in 1926 at Creag nan Uamh in Sutherland contained an accumulation of reindeer bones dating from between 44,000 and 22,000 BP. It has been interpreted as evidence of early hunting by humans but plausible alternative interpretations are possible (Lawson 1981). Nevertheless, whilst it may not prove the presence of humans, it does prove the presence of suitable prey species (Fleming 2004).

Although there are no reliable records for Scotland or Scottish waters from this period, more general records of Lower, Middle and Early Upper Palaeolithic human occupation of Britain, as well as local climatic and geological conditions can be used to assess potential.

Recent work at the terrestrial site of Happisburgh 3, Suffolk, (Parfitt *et al.* 2010) has produced lithic evidence of human activity in an interglacial environment that dates to between 780,000 to 1,000,000 BP (Oxygen Isotope Stage 17 or earlier). It is therefore theoretically possible for an intermittent human presence in eastern Scotland from at least this time onwards when climate conditions were cold but potentially tenable and the area was not submerged or covered by ice.

As noted above, the region has been subject to considerable glacial action, culminating in the Late Devensian glacial maximum, with a possible lodgement till associated with this period, the Wee Bankie Formation, widely distributed throughout the ASA. Although the survival of archaeological material in primary contexts under ice is possible (Cook and

Ashton 1991), it is unusual. Therefore any earlier archaeological deposits are likely to have been destroyed or buried under glacial deposits and any surviving artefacts may be some distance from their original site of deposition. The potential for the presence of Palaeolithic material within the region pre-dating the Devensian glaciation is therefore probably extremely low.

As a result of the Devensian ice sheet, the ASA is likely to have been too cold to be favourable for human exploitation for much of the part of the earlier Upper Palaeolithic period, in particular rendering the ASA region uninhabitable between c. 18,000-16,000 BP.

Due to the scarcity of previous finds from this period within the wider area, any finds that are recovered would be of significant regional and even national importance.

Later Upper Palaeolithic

The Devensian period coincides with the first appearance in Britain of anatomically modern humans (*Homo sapiens sapiens*) c. 40-30,000 BP (Stringer 2006). Their arrival is marked in the archaeological record by a new stone tool technology which includes finely-made leaf points, specialised tools like chisels and burins made on long thin stone blades and tools made from bone. This 'Upper Palaeolithic' culture also sees the first evidence for modern human behaviour with representational art (cave paintings), decorated burial of the dead, body adornment (beads, pendants, etc.) and new levels of social complexity (Stringer 2006).

Until recently there have been no later Upper Palaeolithic finds in Scotland from relatively secure contexts. However, a single site has now been discovered, Howburn Farm, South Lanarkshire, with the stone tools recovered dated to around 12,000 BP on typological grounds (Ballin *et al.* 2010).

As discussed above, sea-level models suggest that the ASA was inundated by 13,000 BP (Bradley 2011). As such, the potential for submerged prehistoric material of this date to be present in the ASA is low. However, it should be noted that well dated sea-level data for this period is still relatively scarce and the issue of rates of isostatic rebound is still controversial and relatively poorly understood. As such, the possibility for archaeological material dating to this period should not be discounted.

17A.4 CULTURAL HERITAGE BASELINE: MARITIME

17A4.1 BACKGROUND

As discussed in **Section 3** above, the ASA was probably inundated and became a fully marine environment at the beginning of the Mesolithic period onwards. As such, any subsequent activity within these areas can be considered to have been of a maritime nature, relating specifically to seafaring and the exploitation of the sea by human populations.

In contrast to the limited evidence of submerged prehistoric archaeology, shipwrecks are a common feature around the entirety of the UK coast. Large numbers of wreck sites are known and accurately charted in UK waters, while even greater numbers of shipping casualties are recorded in documentary sources, many of which have yet to be located.

The precise location of many of the wrecks in Scottish waters is not known, nor is the full extent of Scotland's shipwreck and maritime archaeological resource. The majority of located wreck sites lie relatively close to the coast (WA 2011b). This probably reflects in part the actual situation, as navigation in coastal waters is often relatively hazardous, but also a bias reflecting the processes of formation of the record, including greater hydrographic survey effort being concentrated in coastal waters, greater activity by recreational divers and the increased number of reports of losses resulting from shore-based observers. Despite this there may be many others distributed across Scotland's continental shelf. Hence, specific knowledge of the Scotland's maritime archaeology is minimal, particularly with regard to older wrecks (pre-1850).

Estimates for the density of shipping losses around the coast of the UK estimate eight to 40 wrecks for every mile of coastline. This does not include losses in open water, which are particularly difficult to quantify. Records such as Lloyd’s Lists contain many references to ships that are ‘overdue’ and for which no knowledge of their fate has ever been recovered. As a result, the currently known maritime casualties in UK waters may not represent the majority of actual losses. The positions of losses are often vague or inaccurate, and hence require interpretation.

17A4.2 SEABED FEATURES OF ARCHAEOLOGICAL INTEREST

The combined results of the geophysical assessment and seabed features/wrecks with known locations derived from SeaZone, UKHO and RCAHMS data searches produced a total of 513 features of confirmed/possible archaeological interest. Of these, 135 are located within the Development Area and 378 within the Offshore Export Cable Corridor (**Figure 17A.8-10** and **Annex III**). The main results of the geophysical assessment are given below.

A total of 253 sidescan sonar and 254 magnetic anomalies were identified within the ASA. These were grouped into 507 geophysical anomalies; comprising seven anomalies ascribed an A1 status and 500 anomalies given A2 status (**Table 17A.4**). A further six UKHO recorded wreck positions are also recorded within the ASA. These records have been given A3 status as they did not correlate with an associated geophysical anomaly.

Table 17A.4: Archaeological Discrimination of Anomalies

Archaeological Discrimination	Number of Anomalies: Development Area	Number of Anomalies: Offshore Export Cable Corridor	Interpretation
A1	5	2	Anthropogenic origin of archaeological interest
A2	126	374	Uncertain origin of possible archaeological interest
A3	4	2	Historic record of possible archaeological interest with no corresponding geophysical anomaly
Total	135	378	

These anomalies can also be classified by probable type, which can aid in interpreting archaeological potential and importance:

Table 17A.5: Types of Anomalies within the Entire ASA (Development Area and Offshore Export Cable Corridor)

Anomaly Classification	Number of Anomalies
Dark Reflector	156
Debris	85
Depression	1
Magnetic	254
Recorded Wreck / Obstruction	6
Seafloor Disturbance	5
Wreck	6
Total	513

The sites identified in the geophysical survey and assigned an archaeological discrimination of A1 or A2 are discussed below. The A3 classified historic records are also

described. Further details relating to all these sites can be found in the gazetteer in **Annex III**.

Development Area ASA

A total of 135 anomalies were identified within the Development Area. They are summarised in **Table 17A.6** and described in detail below, grouped by discrimination classification.

Table 17A.6: Types of Anomalies within Development Area

Anomaly Classification	Number of Anomalies
Recorded Wreck / Obstruction	4
Wreck	4
Debris	37
Seafloor Disturbance	2
Dark Reflector	78
Magnetic	10
Total	135

Anomalies of anthropogenic origin of archaeological interest (A1)

Anomaly **WA 7001 (Figure 17A.12)** is a distinct large wreck situated at the northeast edge of the Development Area ASA, beyond the boundary of the Development Area. A series of interconnecting linear and curvilinear dark reflectors show the structure of an upright wreck almost completely buried in sediment but with part of the stern still standing at 13m and the bow standing at almost 8m in height. The overall dimensions of the wreck are 150m x 32 x 8m and it is oriented southeast-northwest. The wreck is intact with elements of structure discernible in the interior. Two pieces of debris, one a linear dark reflector (13m x 1m) and the other a circular dark reflector (5m x 2m) lie just off the starboard side. It is possible that further debris could be lying on the port side but be obscured by shadow. The association of the observed debris with the main wreck is unclear. The debris is lying on top of the sediment partially burying the rest of the wreck so it could be inferred that these pieces of debris have broken off more recently.

There is no associated magnetic anomaly as the magnetometer survey does not extend over the location of the wreck. There is, however, a strong negative anomaly at the nearest end of the closest survey line which may be part of the signal of a large ferrous anomaly that might be expected over a modern wreck of this size. There are two SeaZone records associated with this wreck although the associated attributes provide no further detail on it.

Anomaly **WA 7041 (Figure 17A.13)** is a compact area of several linear and curvilinear dark reflectors showing the outline of a wreck. The anomaly is a diffuse oval shape with dimensions of 33m x 7m and with a height of 3m. The wreck appears to be quite fragmented as evidenced by the discontinuous curvilinear dark reflectors. The height of the shadow is greater at the northwest end. Although some structure is visible there is not enough detail to suggest how the wreck is lying. It is probably quite broken up and collapsed when comparing images from different survey lines. There are no obvious pieces of debris in the shadow area or the immediate vicinity of the wreck but the surrounding seabed sediment does contain numerous smaller circular dark reflectors some of which could be debris from this wreck.

A strong magnetic contact of 735nT indicates that the wreck is of metal construction. The associated SeaZone record does not provide further information on the type, construction or history of the ship.

Anomaly **WA 7044 (Figure 17A.14)** is a wreck with the main anomaly measuring approximately 55m x 35m and a clear rounded shadow at one end of the anomaly giving an object height of 3m. The wreck comprises two large diffuse curvilinears, approximately

parallel to each other and suggesting that the wreck is substantially buried in sediment. There is a scour mark at the shadow end of the wreck and some smaller circular and sub-circular dark reflectors are seen in the immediate vicinity of the wreck, which are probably associated debris.

The wreck appears to be lying on its base but heavily buried in sediment as no internal structure is visible. A magnetic contact of 180nT could indicate metal construction. The associated SeaZone record gives no details of this wreck other than its location.

Anomaly **WA 7132 (Figure 17A.15)** is an intact upright shipwreck. The bow of the ship is clearly visible, with less detail visible toward the stern as the distance from the sidescan towfish increases. A series of connecting curvilinear dark reflectors show the outline of a wreck approximately 79m x 14m and standing to a maximum height of 6m. Numerous parallel linear dark reflectors running the width of the feature reveal intact internal structure. In the immediate vicinity of the wreck at least one linear dark reflector, measuring 7m x 1m, is visible, which is interpreted as debris probably from the wreck. There are several smaller associated linear and circular dark reflectors which are also interpreted as wreck debris. A large scour mark is visible off the bow, starboard side.

A magnetic contact of 54nT is less than expected for a wreck of this size, especially as it appears to be of modern construction. It is therefore not considered as a reliable indication of the construction material of the ship. Two SeaZone records and one RCAHMS record describe the location of two wrecks in the immediate area. These records have been associated with anomaly **WA 7132** due to their proximity but no further information is provided in the records that allow this to be fully determined.

The UKHO records this as the location of a Live Wreck and suggest that it may be the wreck of the *Jonkoping II*. This was a two-boiler triple expansion steamship built in 1888. It was sunk in 1918 by *UC-49*. It was first surveyed in 1969. The most recent survey by Gardline in 2008 describes it as having a length of 81m and appearing to have been severed amidships. This identification is considered to be unconfirmed.

WA 7051 (Figure 17A.8) is interpreted as debris but has been given an archaeological discrimination of A1 as it could potentially be a wreck. It is a discrete area measuring 21 x 18m and containing several linear and circular shaped dark reflectors along its length, of which the largest circular dark reflector stands to a height of 0.5m. The dark reflectors are not readily discernible as structural in origin but their grouping and approximate regularity of spacing could suggest structure, albeit badly damaged and partially buried in seabed sediment. There is no associated magnetic anomaly to further characterise the sidescan anomaly and there are no recorded wrecks or obstructions at this location.

Anomalies of possible archaeological interest (A2) (Figure 17A.8)

The lower quality of geophysical data in the Development Area (see Section 2.5.16) means that a large number of anomalies remaining as dark reflectors as they are not able to be characterised further. A total of 126 anomalies have been interpreted as of uncertain origin of possible archaeological interest.

The following anomalies **WA 7098** and **WA 7120** are interpreted as seafloor disturbances. A seafloor disturbance is potentially an object where characteristics such as being of definite anthropogenic origin, presence of structural detail or type of material are difficult to discern, perhaps as a result of being buried in sediment.

Anomaly **WA 7098** is a discrete oval shaped area measuring 18m x 16m, containing numerous parallel linear dark reflectors. These dark reflectors could indicate structure but the anomaly appears to be partially buried by sediment, which makes interpretation difficult.

Anomaly **WA 7120** is an approximately crescent shaped area containing several circular dark reflectors and several short linear reflectors. The area measures 32m x 20m and there are slight scour marks visible.

There are 36 anomalies interpreted as debris and given an archaeological discrimination of A2. Anomaly **WA 7051** is also interpreted as a large piece of debris but it has been given an archaeological discrimination of A1 and therefore described in Para 0.

The following anomalies are all dark reflectors classified as debris on the basis that they are more complex with individual details being visible or even structure in some cases.

WA 7020 is a group of two dark reflectors, the larger is curvilinear in shape with slightly fatter ends and with a distinct oval shaped shadow and it measures approximately 5 x 5 x 2.5m. Approximately 20m away is a rectangular shaped dark reflector 4 x 1.5 x 1.5m with a strong scour surrounding it. The two dark reflectors in proximity to each other and the shape of the larger anomaly suggest debris.

WA 7021 is a bar shaped anomaly with a scour mark, the seabed appears built up around it with this at the peak suggesting that it is the top of a buried object. The anomaly measures 5 x 3m and the surrounding seabed is featureless with no further debris or dark reflectors associated.

WA 7060 is an approximately oval shaped dark reflector with a thin curvilinear dark reflector attached, it measures 7 x 1 x 1m, it lies within a scour and the attached thin curvilinear could indicate it is a piece of debris.

WA 7063 is a discrete area containing at least four dark reflectors, three are small and circular in shape but the fourth is a ring-shaped dark reflector in a scour. This is indicative of a piece of debris and the proximity of the three other dark reflectors suggests that they are associated.

WA 7064 is a small circular anomaly exhibiting a height of 1m and then a curvilinear dark reflector extending from it but not exhibiting any height, the whole anomaly measures 5 x 2m.

WA 7073 is an approximately ring shaped dark reflector measuring 5.5 x 2.5m, it is probably a piece of debris owing to its shape, there is potentially a second ring-shaped anomaly approximately 20m away but it appears a lot more diffuse and difficult to distinguish.

WA 7080, an amorphous shaped area containing a strong complex dark reflector of interconnecting curvilinears and an outer area of diffuse dark reflectors. No structure is visible but there is an associated scour mark. The overall dimensions of this anomaly are 7.5m x 2m x 0.5m.

WA 7111 is a discrete anomaly appearing more complex, measuring 7 x 1 x 1.5m and consisting of criss-crossing short linears and at least two circular dark reflectors grouped together.

The following anomalies are classified as debris on the basis of there being two or more dark reflectors grouped together either circular or oval in shape with no further detail or structure visible. They are **WA 7012, WA 7013, WA 7014, WA 7018, WA 7021, WA 7027, WA 7031, WA 7037, WA 7040, WA 7042, WA 7045, WA 7049, WA 7058, WA 7062, WA 7065, WA 7071, WA 7072, WA 7079, WA 7084, WA 7088, WA 7094, WA 7105, WA 7112, WA 7116, and WA 7125.**

A typical anomaly is **WA 7018**, a diffuse elongated dark reflector measuring 7 x 2 x 1m with an adjacent circular dark reflector 3 x 1 x 1.5m, their close proximity to each other could suggest that they were once the same object but have broken up into two.

Furthermore anomaly **WA 7061** comprises two dark reflectors approximately 75m apart, one is a linear anomaly measuring 8m x 1m x 1m, and the other is a circular dark reflector measuring 6m x 1.5m x 0.5m. **WA 7061** is the only one of these grouped anomalies to have an associated magnetic contact of 22nT and it could therefore indicate a piece of metal debris.

The remaining 78 anomalies are single dark reflectors linear, rectangular or approximately circular in shape and with no associated magnetic contact, each of which has been assigned an archaeological discrimination of A2. They range in size from 0.5 x 0.5m to 14 x 2 x 1m, as they are single anomalies without detail or structure and without further information to characterise them they are classified as dark reflectors and given an archaeological discrimination of A2 in that they are of possible archaeological interest but not enough is known to be certain of their origin.

This type of anomaly is typical of many anomalies seen in this survey. It is a smaller object, making it more challenging to identify and characterise at this data resolution. It is most likely to be anthropogenic in origin and may represent a small piece of debris, although the possibility that it is debris of geological origin cannot be discounted. A full description of each individual anomaly can be found in **Annex III**.

Ten anomalies **WA 7004, WA 7008, WA 7036, WA 7043, WA 7054, WA 7074, WA 7121, WA 7123, WA 7124, and WA 7127** are magnetic anomalies which do not have associated sidescan sonar anomalies visible in the data. They range in strength from 15nT (**WA 7008**) to 118nT (**WA 7123**). These magnetic anomalies could represent a feature of anthropogenic origin which is of metal construction. The absence of a sidescan sonar anomaly could be due to the object being buried in sediment and therefore not visible at the surface of the seabed.

Historic records (A3)

There are a number of A3 sites in the Development Area, that is, locations only known from records, with no corresponding anomaly noted in the assessment of the geophysical data. Only records with locations that are covered by geophysical survey have been included, records which lie within the ASA but are not covered by geophysical survey have not been included in the final gazetteer. Where historic records have been associated with an anomaly identified in the geophysical data gathered for the Development Area these are discussed under the entry for the associated A1 Anomaly.

WA 7003 is recorded in both the RCAHMS database and in the SeaZone data as the *Braconburn*, a war time loss that sank as a result of a collision with a Liberty ship (102790 NMRS, Larn & Larn 1998, 637000001074863 SeaZone). The *Braconburn* was evidently considered obsolete at the time of loss as the vessel was being taken to Scapa Flow, to be sunk to block up one of the channels that could be used to enter the anchorage there, as part of defensive measures taken against attacks by U-boats on the Royal Navy's capital ships based in Scapa Flow.

WA 7090 is the purported site of the *Grenmar*, a Norwegian registered steamship that was captured and scuttled by a U-boat in 1917. The UKHO notes that this record is classified as 'dead', that is, that no recent survey of the area has found the wreck. The wreck was entered here in the database in 1926 and has not been located by subsequent surveys in 1969 or 2008. Given the accuracy of positioning available in 1926 the anomaly could be hundreds or even thousands of metres away or may have been confused with another location.

WA 7091 is an unidentified wreck noted in the RCAHMS database (102785 NMRS). Not detecting such a site in the geophysical data may mean that the location in the record is incorrect, that a wreck or obstruction has been removed, or that has become buried sufficiently deeply that it does not generate a discernible geophysical response.

WA 7133 is a record of an obstruction. It is classified as a dead record in the SeaZone dataset. As noted above, the lack of geophysical response may be due to a number of reasons.

Offshore Export Cable Corridor ASA

A total of 378 anomalies were identified within the Offshore Export Cable Corridor and they have been further defined by type and listed below in **Table 17A.7**.

Table 17A.7: Types of Anomalies within the Cable Route Area

Anomaly Classification	Number of Anomalies
Recorded Wreck / Obstruction	2
Wreck	2
Debris	48
Seafloor Disturbance	3
Depression	1
Dark Reflector	78
Magnetic	244
Total	378

Anomalies of anthropogenic origin of archaeological interest (A1)

WA 7195 consists of two discrete areas, one to the north-west and a second to the south-east. These have been identified and interpreted as a single wreck with associated debris and given an archaeological discrimination of A1.

The area to the north-west is an anomaly of several interconnecting linears in a rectangular shape showing complex structure with considerable height; the anomaly measures approximately 13.5 x 9 x 6.5m (see **Figure 17A.16**). Due to the appearance of structure it is interpreted as the partial remains of a wreck, but badly collapsed. There are at least two further linear dark reflectors in the immediate vicinity which are possibly associated debris. A magnetic anomaly of approximately 325nT is associated with this area of wreck debris.

Approximately 130m to the south-east is the second area measuring 40 x 25m and containing small, diffuse circular and linear dark reflectors between 1 and 5m in length with a maximum height of 1m; some of the short curvilinear dark reflectors are parallel and could be interpreted as structural detail but there is also a lot of geological debris in the area obscuring this detail. This anomaly continues out of range and is not covered by geophysical survey therefore the full extent is not seen. However, due to its location and the small amount of structural detail seen it has been interpreted as wreck debris. There is no magnetic anomaly associated with this larger area of wreck debris as the magnetometer survey did not extend to this area.

A UKHO Live wreck is recorded at the latter location. It was first recorded based on a survey carried out by the HMS *Shipham* in 1976. A subsequent resurvey of the area as part of the Civil Hydrography Programme in 2006 amended the position as well as adding more details, including the upright position of the wreck, its degraded condition with a collapsed bow and stern, and the strong magnetic anomaly it presented. The wreck was noted to have a total length of 76m, a width of 17 and a height above the seabed of 7.5m. This wreck is identified in the UKHO records as the SS *Fylgia*, formerly known as the *Talavera*. It is not clear how the identification was made and it is presumed that it is only the similarity of position and dimensions (Baird 2009, 219). The SS *Fylgia* was a Swedish registered vessel built in 1889 by W. Dobson & Co. in Newcastle-Upon-Tyne. It was owned at the time of its loss by Angf Akt Kullen. It had two boilers, a triple expansion engine of 176 NHP and a single shaft. Its recorded dimensions were 81.1m long with a beam of 11.3m and a draught of 4.9m. It was sunk on passage from Gothenburg to Rouen after being torpedoed by UC-49. It was carrying a cargo of wood pulp and steel ingots at the time of its loss.

The discrepancy between the location of the north-west area of wreck debris and the recorded location of the wreck identified as recently as 2006 suggest that this is not the site of the wreck of the SS *Fylgia* but is probably associated debris still exhibiting considerable height. The area of wreck debris seen at the recorded location of the SS *Fylgia* is probably the remains of the wreck but we do not have full coverage of this area by geophysical survey therefore the partial anomaly seen in the sidescan sonar data is not enough to confirm the detailed description and dimensions recorded in the UKHO. The difficulty is that there is no mention in the description of any associated areas of debris, rather the wreck is described as degraded and collapsed 'in situ'. As the wreck location was resurveyed as recently as 2006 as part of the Civil Hydrography Programme it can be assumed that the positioning of the wreck is good.

WA 7376 is a large but discrete area approximately 1000m x 275m containing a spread of small pieces of debris, at least fourteen are identified from the sidescan sonar data but there could potentially be more buried and dispersed. The dispersed anomalies vary in length between 2 and 7m and in width between 0.5 and 2.6m with a maximum height of 0.5m. The dark reflectors vary in shape with some appearing more complex and potentially showing structure, albeit single pieces of structure and magnetic contacts from across this area have a strength of between 7 and 27nT (**Figure 17A.17**). Within the discrete area is located an NMRS record from an entry in Whitaker (1998) of a wreck, the *Malta*, a wooden steam trawler which sank in 1891 after a collision off Fidra. The record states that it was destroyed and broken up therefore a wide scattering of debris would be expected. The large area of dispersal of the identified anomalies measures over 1km in length and while not all of the dark reflectors are necessarily debris from this wreck they do lie in a discrete location on their own and have therefore been grouped together.

Anomalies of possible archaeological interest (A2)

There are 374 anomalies that have been given an archaeological discrimination of A2 (see **Figures 17A.9-11**). They have been classified further into types as follows: debris, dark reflectors, areas of seafloor disturbance and magnetic anomalies (see **Table 17A.7**).

Three anomalies are interpreted as seafloor disturbances and are described here in detail. **WA 7157** is a discrete area measuring approximately 120m x 55m containing at least nine pointed oval shaped dark reflectors all similar in appearance and shape but not size, and all appearing partially buried. The largest oval shaped feature measures 7 x 3 x 1m and the smallest is just 2.5 x 2 x 0.5m and none of them have an associated magnetic contact. They stand out from the surrounding featureless seabed and could potentially be items of debris but there is no obvious structure or detail to classify them as such. There is the possibility, due to the random dispersal and the number of them, that they are natural or geological in origin. **WA 7243** is a large seabed feature covering an area measuring approximately 620 x 375m, it has an associated magnetic anomaly with a strength of 21nT (**WA 7236**) within the area which has been kept as a separate anomaly due to its location within such a large feature. The anomaly appears as a large furrow extending in a curvilinear, random shape and is probably from an object, probably quite substantial in size, being dragged along the seabed leaving deep scars. There is no object visible there now. **WA 7414** is an area of disturbance approximately 47 x 30m in size and containing a number of irregular dark and bright reflectors. There are two more prominent anomalies within it, an irregular dark reflector 4 x 3.2 x 0.6m which could be a partially buried object and two linear dark reflectors, the larger measuring 5.7 x 0.3m which are possibly debris. There is no obvious structure or complex detail and there is no associated magnetic contact at this location or in the vicinity.

The following anomalies are interpreted as items or pieces of debris, this is on the basis of there being two or more anomalies grouped together or if the anomaly shows more complex characteristics such as having potentially structural detail. There are 48 anomalies interpreted as debris and given an archaeological discrimination of A2. Seven anomalies, interpreted as items of debris, have a magnetic contact associated with them, this increases the likelihood of their identification as they will potentially be of metal construction and therefore anthropogenic in origin. **WA 7363** is a large circular dark

reflector with an uneven diffuse outline measuring 7.5 x 4.5 x 0.5m with a magnetic strength of 225nT. The object has short narrow linear dark reflectors protruding from the surface potentially showing detail and it lies in an area with seabed scars visible, assumed to be from fishing activity. **WA 7144** is an example of a complex piece of debris showing several interconnecting linear dark reflectors in a discrete area measuring 6.5 x 2.5m, in particular is a narrow linear dark reflector extending from one side. They probably all show detail from the same object. **WA 7171** is an example of a small group of anomalies clustered together that is probably an area of debris; it consists of three dark reflectors all approximately circular with distinct shadows lie in an area measuring 5 x 4 x 1.5m. There is no detail visible from the dark reflectors and there is no associated magnetic contact.

There are 78 anomalies classified as single dark reflectors linear, rectangular or approximately circular in shape and with no associated magnetic contact, each of which has been assigned an archaeological discrimination of A2. They range in size from 0.5 x 0.5 x 0.5m to 10 x 3.5 x 1.5m, as they are single anomalies without detail or structure and without further information to characterise them they are classified as dark reflectors and given an archaeological discrimination of A2 in that they are of possible archaeological interest but not enough is known to be certain of their origin. A full description of each individual anomaly can be found in **Annex III**.

There is one anomaly classified as a depression, **WA 7493** consists of a thick curvilinear bright reflector encasing an oval shaped diffuse dark reflector, the anomaly measures 9.5 x 4.5m. It appears as a wide V-shaped dark reflector with a depression in front of it and could indicate the presence of an object.

The background geology of the survey area is predominantly igneous based causing a lot of high level background noise therefore making it difficult to identify small anomalies that could be caused by anthropogenic objects. In total there are 244 magnetic anomalies located across the Offshore Export Cable Corridor with no associated sidescan sonar anomaly or recorded wrecks and obstructions to further characterise them, they have been assigned an archaeological discrimination of A2 as their origin is uncertain. The magnetic anomalies vary hugely in range in strength from 10nT to 3059nT. Originally there were over 350 magnetic anomalies identified across the Offshore Export Cable Corridor, but due to such a large number being identified a threshold was set and therefore only magnetic anomalies greater than 20nT in strength have been included. The value of this threshold was established through the professional judgement of experienced geophysicists comparing geological mapping with distributions of apparent anomalies. The threshold has been lowered to 10nT, or occasionally less if the shape of the anomaly is a distinct dipole, for the nearshore part of the Offshore Export Cable Corridor as it is acknowledged that weaker anomalies will be difficult to pick out against the background noise. The magnetic anomalies are listed in **Annex III**.

As no sidescan sonar anomalies were visible at the location or in the vicinity of these magnetic anomalies there is very little that can be interpreted to characterise them further. One possible explanation is that the anomalies are in response to the geology of the area and the method of surveying. The water depth is fairly shallow in the survey area and the magnetometer would have been towed very close to the seabed therefore geological features, such as outcroppings of local bedrock igneous geology and buried erratics transported here by previous glacial activity, could be the cause of these anomalies. Another explanation is that the anomalies are anthropogenic in origin but are buried in sediment and therefore not visible at the surface of the seabed. It is probably a combination of both with some of the anomalies geological in origin and some of them anthropogenic in origin, at this stage there is not enough information to discriminate further.

Historic records (A3)

There are a number of A3 sites in the Offshore Export Cable Corridor, that is, locations only known from records, with no corresponding anomaly noted in the assessment of the geophysical data. Only records with locations that are covered by geophysical survey have been included, records which lie within the ASA but are not covered by geophysical survey

have not been included in the final gazetteer. Where historic records have been associated with an anomaly identified in the geophysical data gathered for the Offshore Export Cable Corridor these are discussed under the entry for the associated A1 Anomaly.

Two anomalies are UKHO recorded wrecks which have no geophysical anomaly identified at their location, the wreck might not be visible due to it being buried in sediment and not visible or detectable at the surface of the seabed, it does not confirm an absence.

WA 7141 is the location of a piece of wreckage, thought to represent either trawling gear or possibly an aircraft was noted at this location in 1995 during a survey by HMS *Berkeley* (200041 NMRS, 120972 NMRS; 637000001074967 Seazone, 2356300027688688 Seazone). The anomaly was recorded by underwater remote camera and noted to be approximately 4m long, 1 metre wide and 0.5m high. It is also described as 'broken in half' although no further clarification is given. A subsequent resurvey of the area as part of the Civil Hydrography Programme in 2008 failed to find any trace of wreckage at this point and the UKHO entry was amended to dead as it is no longer considered as a navigational hazard. This survey also did not find any trace of the wreckage at this location or in the vicinity, but as mentioned above this could be due to the wreckage being buried and therefore not visible at the surface of the seabed. However this location will still have a potential cultural heritage interest.

The RCAHMS database includes an entry at this location of a wreck **WA 7425**; this is based on an entry in Larn and Larn (1998) (200001 NMRS). It is unclear which record in Larn and Larn relates to this entry but the possible candidates there all seem to be derived from a superseded version of the UKHO database and therefore this is considered to be a located record. There was no geophysical anomaly visible at this location or in the immediate vicinity.

All magnetic anomalies associated with the route of known cables or pipelines as available from SeaZone Hydrosatial data have been identified but not included in the gazetteer as they are not of archaeological importance.

Similarly there were a number of sidescan sonar and magnetic anomalies identified in the nearshore part of the Offshore Export Cable Corridor and these corresponded to known modern shoreline and coastal structures, these were not included in the gazetteer as they are not considered of archaeological importance.

17A.5 MARITIME POTENTIAL

The above sections outline the known wrecks within the ASA. However, there is additional potential for as yet undiscovered wrecks within the ASA.

The Holocene deposits identified across the ASA, while forming only a thin veneer in places, reach up to a few metres in some areas. In these areas buried and previously unrecorded wrecks may survive.

Casualties

Major hazards in the vicinity of the ASA include the Bell Rock, lying around 3.5 nautical miles from the ASA. It is a reef visible only at low tide and was a notorious hazard to navigation until the construction of the Bell Rock lighthouse which was first lit in 1811. Other major hazards in the approaches of the Firth of Forth close to the ASA include the Isle of May and the Isle of Fidra, both of which have concentrations of known wrecks sites around them and are likely to be responsible for numerous further unknown wrecks.

In addition to information relating to known wrecks, the RCAHMS database includes records of documented maritime losses for which no exact grid reference can be confirmed and which have never been found through hydrographic or diver survey. In most cases these records have been assigned to approximate coordinates based on the descriptions of their loss. As a result the accuracy of these approximate positions varies enormously and in some cases losses are only known to have occurred 'off Scotland'. Where the

assigned coordinates place casualties anywhere within the ASA, these have been collated into a table (**Appendix III**) and used as an indicator of potential.

A distinction between known wrecks and casualties is made in the RCAHMS database. However this has been found to be somewhat out of date and has been ignored here. All historic losses mapped by RCAHMS within the ASA have been assessed against previously known sites and those discovered in the review of geophysical data undertaken for this project. In some cases RCAHMS casualties have been identified with wreckage on the seabed. Where this identification is considered to have a high degree of confidence the documented loss not listed separately in **Annex III** and is discussed as a known site under a **WA 7000** number.

In total there are 40 casualty records within the ASA, 39 of which map within the Offshore Export Cable Corridor ASA.

It is also important to note that a significant proportion of the maritime entries in the RCAHMS database (approximately 7%) have not been given any coordinates. Where maritime remains have been identified in the geophysical data they have been compared with unlocated wrecks from the wider area in the RCAHMS database.

The following section outlines the key periods of the UK's maritime history, with reference to the maritime archaeological potential for the ASA.

17A5.1 PREHISTORIC SEAFARING (PRE-AD 79)

Human settlement patterns in north-west Europe suggest that sea voyages were conducted as early as 7,000 BC, during the Mesolithic. No archaeological remains of vessels that pre – date the Mesolithic have been found in Western Europe. This may reflect the very low probability of organic remains of this type surviving. However, the simple technology required to construct a small boat will almost certainly have existed. The western European Mesolithic record currently consists exclusively of log boats.

Extensive coastal and continental trade and sea fishing increased during the Neolithic, Bronze Age and Iron Age. Small ports or anchorages developed in Britain as the scale of this activity grew. Indirect evidence for maritime activity during this period includes the many species of non-indigenous plants and animals introduced to Britain upon the adoption of agriculture. These foreign species would have been transported to Britain by boat, although little is known about the routes such journeys would have taken. Log boats, hide boats and plank boats were all used and there is evidence of significant advances in technology and vessel size from the Bronze Age onwards.

The earliest boat found in Scotland is the log boat found at Catherine Field in Dumfriesshire which dates to the early Bronze Age. A log boat with a separate transom, dating to about 1,500 BC, has also been found in Loch Tay. A further late Bronze Age log boat has been found in the Tay Estuary, dating between about 1130 – 970 BC (Mowat 1996). Other boat finds from Scotland are Iron Age or later. Of the approximately 150 log boats found in Scotland, most are medieval. No prehistoric boat finds of more complex construction or demonstrably capable of being used in open, maritime water have been found in Scotland.

Although no Bronze Age sewn-plank boats have been recovered in Scotland examples have been discovered in north-eastern England at Kilnsea (1750-1620 cal. BC) and Ferriby (2030-1780 cal. BC) and on the south coast at Dover (1757-1520 cal BC) (Van de Noort 2009). The discovery of sewn-plank boats near the coast and in estuaries suggests that they were primarily inshore vessels. While they would not have been able to conduct sea journeys in poor weather conditions, it is likely that they were capable of such crossings in more favourable weather (Van de Noort 2003). Being more robust than earlier vessels, sewn-plank boats would have extended the windows of opportunity available to seafarers to conduct the sea-based trade that became more common during the Bronze Age (Van de Noort 2003).

There is a considerable amount of evidence for maritime trade and exchange between Britain and the Continent in the Iron Age, beginning with the import of Early Iron Age Halstatt C type swords and later La Tène style metalwork in the Middle Iron Age (Cunliffe 2009: 84-86).

17A5.2 ROMAN SEAFARING (AD 43 – 410)

Scotland was only intermittently within the Roman Empire, and much of the land closest to the ASA was only part of the empire for very short periods. Roman influence in Scotland was still significant, with some tribes clients of the empire, and trade and diplomatic relations probably reaching further (Fraser 2009). Water transport is likely to have played a role in these activities. Evidence from England points to the emergence of new vessel types during the period, combining influences from the Roman Empire and indigenous traditions of shipbuilding (Marsden 1994).

Roman military forces are likely to have been supplied by ship or boat, whether by the Roman fleet in Britain (the *Classis Britannica*) or by merchant vessels (Martin 1992), for example the camp at Normandykes in Aberdeenshire may have been supplied by sea, with ships approaching through the Dee Estuary. There is therefore potential for the presence of archaeological evidence of Roman period seafaring within the ASA.

17A5.3 EARLY MEDIEVAL (AD 410 – 1100)

There is little direct evidence for maritime activity in this period from Scotland in terms of archaeological remains: the remains of a Viking boat burial have been excavated at Scar, Orkney. Aspects of shipbuilding technology of the era have been revealed by finds of ship remains elsewhere in Britain, principally the ship burials at Sutton Hoo and Snape in Suffolk, and also of finds in Scandinavia. There is a variety of other evidence for maritime activity in this period, such as the depiction of a vessel on St Orland's Stone, at Cossans in Angus (Graham-Campbell and Batey 1998).

The volume and nature of shipping activity during this period is poorly understood, but historical sources suggest that maritime activity within the area would have included both coastal shipping and movement across the North Sea. Eastern Scotland was largely occupied by Pictish tribes, with Anglian settlers in the south. The Picts were noted as mariners, and the Kingdom of Northumbria, is recorded as making use of naval vessels during the seventh century (Fraser 2009, Pullen-Appleby 2005). Raiding activity by the Vikings is historically attested, with records of raids around the British coast during the late eighth and ninth centuries. Frequent voyaging across the North Sea for raiding, colonisation and trading can be assumed: the potential for wrecks must therefore also be assumed.

17A5.4 MEDIEVAL (1100 – 1500)

There is no direct archaeological evidence for medieval maritime activity in the ASA in the form of shipwrecks or seabed debris. However, the historical and terrestrial archaeological evidence is relatively plentiful and documentary evidence becomes available for the first time.

During this period a number of ports were founded along the east coast of Scotland. The right to conduct foreign trade was limited to royal burghs, and a number of settlements near the ASA attained this status, and engaged in trade, for example Aberdeen, Arbroath, Dundee, Edinburgh, Perth and Montrose. David I strongly encouraged foreign trade, particularly with Flanders. Flemish, English and German traders were frequent visitors to the east coast royal burghs (Moore 2008). Over the course of the 13th century the eastern ports were also heavily engaged with trade with the Baltic, and by the 16th century, trade with western France was also becoming significant.

Small scale fishing is recorded on the east coast at this date. Fishing vessels of this period would mainly have worked the inshore waters, and are unlikely to have often worked within the ASA.

Less peaceful maritime activities are also recorded. Vessels are recorded as moving along the eastern coastal waters for the purpose of transporting troops and provisions and engaging in ship-to-ship combat during the Wars of Independence and subsequent Anglo-Scottish conflicts. Piracy, sometimes related to interstate conflict, also occurred, occasionally nearly closing ports (Ditchburn 1992).

Post-medieval (1500 -1800)

Trade to the Baltic and France continued to expand in the early part of this period. Religious and political conflict in the early part of the period also led to emigration from Scotland following these trade routes. There was some change in the precise pattern of trade which related to the effective end of the monopoly of royal burghs on foreign trade.

Despite Scotland, and subsequently the United Kingdom, being involved in a significant number of maritime conflicts during this period, no major naval actions occurred within or near to the ASA.

Naval activity in the ASA would have largely consisted of patrols to intercept the movement of money and agents for the Jacobite cause and patrols and vessels moving in convoy during the various conflicts of the period. Other military actions, however, including activity targeting merchant vessels, including privateering, may have lead to unrecorded losses within the ASA.

From the late 18th century the herring fishery was important to the east coast of Scotland, with many of the ports near the ASA being involved in it. Some of these ports were also engaged in the trade in cured herring overseas, particularly to Continental Europe. Another fishery that began in the region during this period was the northern whaling fishery. Aberdeen and a little later Dundee were the main ports on the east coast involved during this period (WA 2011b).

1800 – 1914

Of the 40 reported losses in the RCAHMS database, 28 date to this period and these are the earliest known losses thought to be within or close to the ASA. Most of these are described as fishing or cargo vessels, a significant proportion of which were built of wood.

The period following the end of the Napoleonic Wars saw dramatic revolutions in ship design as metal replaced wooden hulls and steam replaced sail as the principle means of propulsion. Tramp sail and then steamships dominated maritime trade in the 19th and early 20th centuries (Gould 2000). It also saw a considerable intensification of maritime activity in the region of the ASA.

Merchant shipping increased in the region for much of the period. In 1800 Aberdeen would have seen the landing of the second highest tonnage of cargo in Scotland as registered for customs (at 24, 081 tons). Other significant ports in the region listed for the purposes of customs include Alloa, Anstruther, Bo'ness, Dunbar, Dundee, Kirkcaldy, Leith, Montrose, Perth and Prestonpans. Ports in the East Scotland region would have accounted for approximately 55% of the registered tonnage landed that year (Moore 2008). Although the percentage of landed tonnage would have declined over the period, this is due to the much greater increase in trading activity in Scottish ports outside of this region: the absolute number of vessels and vessel size in fact increased.

A major component in the increase in numbers and sizes of vessels involved in trade in the region is due to the intensification in mining in the Fife coalfields. Initially much of the coal was traded down the east coast of Britain, but continental markets became increasingly important, and the ASA would have been a major transit zone for vessels involved in this trade.

During this period the herring fishery increased in importance within the region, although the rapidly growing fleets of drifters spend increasing amounts of time outside of the region, following the herring shoals in a seasonal round from the western fisheries round the north of Scotland and then either to herring grounds off Shetland, or down the east coast of Britain, particularly off East Anglia (Coull 2008). During this period the Scottish whaling industry reached its peak activity, and white fish trawling was introduced to Scotland, all increasing the numbers of vessels moving through the ASA during this period.

The changes in the different fisheries were reflected in shipbuilding on the east coast of Scotland. Although Dundee became less important as a whaling centre, it continued to specialise in the building of whalers. The small shipyards of Fife created the Fifie and Zulu types of drifter for the herring fishery and Aberdeen began to become the main centre in Scotland for the building of trawlers.

1914-1945

Many of the activities noted above went into a degree of decline during this period, particularly after World War I. The progressive closure of markets in central Europe as a result of war and revolution caused a steep decline in the herring industry. Over-exploitation had caused the northern whale fishery to largely collapse early in the period. The demersal fisheries continued to use ports on the east coast, but trawling in the area of the ASA probably diminished somewhat as over-exploitation started to reduce yields (Robinson 1996).

Demand for coal and the ability of the Fife coalfields to supply fluctuated over the period, but the coal trade formed a major element in merchant shipping throughout the period. Trade continued to be along the east coast and to the ports across the North Sea and Baltic (WA 2011b). The coal trade was sufficiently important that the east coast routes were among the first to receive convoy protection against enemy attack in World War I.

During the latter part of World War I and all through World War II coastal convoys were instituted by the government. These moved north and south along the east coast, and coal was a major component of the cargoes carried, essential to keep industries in southern Britain, including war industries, in action.

The types of losses associated with the world wars include merchant vessels that might have sailed in the escorted convoys or sailed independently, lost to a variety of enemy threats including surface vessels, submarines, mines and, in World War II, aircraft, the latter particularly significant along the east coast because of the relative proximity of German-held airfields to the North Sea.

During WWI and WWII, large numbers of steam trawlers and drifters were bought or hired by the Admiralty to supplement the Royal Navy. They particularly served in coastal convoy duties, including minesweeping and acting as armed escorts. Dozens of these small vessels were lost because of enemy action (WA 2011b).

There is a single reported casualty recorded in the RCAHMS database which falls within the ASA. This is an incomplete record relating to a vessel en route from Aberdeen to Sunderland which was torpedoed by a submarine. According to the entry three lives were lost. No further information is given although the entry is apparently derived from a list of World War I Shipping Losses. It is likely that this partial record relates to another complete entry elsewhere in the database. There are no reported losses of WWII date in the RCAHMS database which can be tied to the ASA at present.

Summary of maritime potential

Maritime archaeological finds from the medieval period and earlier will be of national interest and will hold special significance, as so little survives in the current record. Any post medieval finds would also be of special interest but such finds are more common than those of earlier dates. More examples of boats and ships exist from the modern period; therefore more discrimination would be required to determine the importance of any

remains discovered. Due to the considerable changes in ship/boat building during this period, any remains discovered showing evidence of this could be considered as being of particular interest. The losses attributed to the two World Wars should be considered as significant due to the magnitude of the loss endured by all countries involved and for their potential to be categorised as war graves under the PMRA 1986.

17A.6 CULTURAL HERITAGE BASELINE: AVIATION

17A6.1 KNOWN AVIATION SITES

There are no known aircraft wrecks within the ASA. However the anomalies identified during the review of geophysical data may

17A6.2 AVIATION POTENTIAL

The above section describes the known aviation wrecks within the ASA. However, there is also a potential for as yet undiscovered aviation wrecks within the ASA.

The Holocene deposits identified across the ASA, while forming only a thin veneer in places, reach up to a few metres in some areas. In these areas buried and previously unrecorded aviation wrecks may survive. Compared to maritime remains aviation wrecks are often difficult to find using geophysical survey due to their more ephemeral nature.

In addition to incidents involving boats and ships there have been many military and civilian aircraft losses in UK waters since the introduction of powered flight in the early 20th century. The location of many aircraft lost at sea is currently unknown. Therefore, there is potential for wrecked aircraft to be affected during the construction of the offshore wind farm.

There is one reported loss which is listed in the RCAHMS database and falls within the ASA. This record is derived from Whitaker (1998) who records that a Bristol Beaufighter VI crashed into the sea 1.5 miles north-east of North Berwick on the 15th June 1944. This would place it somewhere near the southern limit of the cable route ASA.

The aviation resource may be categorised into three broad chronological divisions as follows:

- Pre-1939: A period of intense and rapid development of a new technology. While at least 119 different aircraft models were used by the military in the UK during this period, examples of only 24 survive today anywhere in the world. This, alongside the fragility of the airframes and the relative scarcity of flights over water, deem any aircraft remains dating to this period of special interest. From the 1920s and 30s there was also a significant increase in commercial civil aviation with the establishment of services to a number of European and worldwide destinations (WA 2008:16);
- 1939-1945: Advances in technology in this period greatly extended the reliability and range of aircraft and enabled aircraft to increasingly undertake long-range flights, some of which may have taken place across the ASA. This period is marked by the greatest number of losses in the history of aviation and as such has special significance. Analysis of figures showing WWII British Air/Sea Rescue operations demonstrate that the Firth of Forth saw a high concentration of aircraft losses in WWII. The operation of a military airfield at East Fortune in East Lothian during WWI and WWII undoubtedly contributed to these figures.
- Post-1945: This period is characterised by the rapid development of jet propulsion technology and its use in both military and civilian aviation applications.

Although the ASA lies outside of the areas of highest aircraft activity during WWII, the area would still have seen significant activity: coastal convoys in the North Sea would have been a target, as would some settlements on the east coast, and in addition to aircraft defending

against this, there would also have been patrol activity, both by Fighter Command and Coastal Command aircraft. As such there is considerable potential for undiscovered aircraft remains to be impacted by the proposed development.

17A.7 CULTURAL HERITAGE BASELINE: INTERTIDAL

This baseline includes details of the known and potential cultural heritage in the intertidal zone. The results of the review of baseline data produced a total of ten sites of possible archaeological interest located within the ASA (**Figure 17A.2** and **Annex IV**). Data for these sites has been derived from the Monuments of East Lothian database and the database of terrestrial features of archaeological interest maintained by RCAHMS.

17A7.1 KNOWN FEATURES OF CULTURAL HERITAGE INTEREST IN THE INTERTIDAL ZONE

There are a total of ten known cultural heritage assets within the intertidal part of the Offshore Export Cable ASA. These are discussed below by period.

Prehistoric

A stray find of an apparently worked flint (**WA 1003**) was recovered from the beach at Prestonpans. It is described as 'a blade which had been reworked into a scraper'. It is suggested in the MEL database that it might be Palaeolithic in date although there does not appear to have been any specialist analysis to confirm this. The position given places it in the centre of the intertidal area.

There have been at least four discoveries of buried metalwork of Iron Age date at Seton Sands. An Iron Age hoard (**WA 1010**) was found on the beach at Seton Sands. The hoard included two terrets (a terret was a rein guide from a yoke) a spiral finger ring and a plain finger ring. The hoard was found about one foot below the surface of the black sand, over an area of roughly 50m in diameter. The hoard was recorded by the Coastal Assessment Survey in 1996 but the find date is not included in the database. An Iron Age copper alloy spiral finger ring was found in the same general area in 2006 (Hunter 2006) and the RCAHMS database also records the discovery of a Medieval lead-alloy annular brooch in the same general area. The exact findspots are uncertain and the coordinates given in the RCAHMS database are rounded to the nearest hundred metres. An Iron Age knobbed terret (**WA 1008**) was also found at this approximate location by metal detectorists in 2001 (Hunter 2001). It is unknown whether all of this material was buried as votive deposits (ritual offerings) or whether it is part of a hoard, buried with the intention of later recovery. It is also unclear whether all of the material has been recovered although it is likely the area has been extensively picked over by metal detectorists since the material was reported.

Harbours

There are three harbours within the ASA, two of which are still in use.. Although most of the physical remains of these harbours lies above the MHWS mark they are included here as they extend into the intertidal zone. All three were first constructed in the 16th/17th centuries. The two harbours still in use are the focus of the Cockenzie and Port Seton Conservation Area.

Morrison's Haven (**WA 1002**) is the site of a medieval harbour, built in the 16th century by the monks of Newbattle. It fell out of use during WWII and has since been largely covered by an area of mining spoil known locally as 'the cast' although a significant part of the structure appears to be intact within the spoil heap. Geotechnical coring showed up to 4m of waterlogged spoil overlying the structure (Cressey 2005). A topographic survey was undertaken at Morrison's Haven as part of the Prestongrange Community Archaeology Project. This showed that 60-70% of the shoreward side of Morrison's Haven is now below several metres of colliery waste. The dense vegetation was cleared and the tops of walls exposed to enhance the structure. An aerial photographic survey and a geophysical survey were also undertaken (Cressey 2006). The geophysical survey suggested that further archaeological potential remained to the immediate east of the harbour which may relate to a kiln. The extent of the site shown on the figures in this report is derived from the 1st edition Ordnance Survey.

The Category B-listed Cockenzie Harbour (**WA 1004**) was first built in the early 17th century to service the saltpan industry. The harbour was destroyed in the mid-17th century by a storm and rebuilt in the 1830s. Some structures around Cockenzie Harbour still include vestiges of ancient walls, some probably connected with the old salt industry. Graham (1971) states that Cockenzie is on record in 1565 and in 1592, at the latter date as a free haven. Blaeu's map marks 'Cockeny hauen' and shows two projections, presumably representing piers, and these may be correlated with the harbour begun by the 3rd Earl of Winton, about 1630, in connection with his salt-pans of which there were ten in 1790, six in 1840 and two in 1883. The Cockenzie Waggon-way, a wooden tramway built in 1722 terminated here. It was replaced by an iron railway in 1815. The RCAHMS database records that it no longer survives in the area of the harbour although there are a number of upstanding undesignated buildings associated with the harbour recorded in the RCAHMS database. The extent of the harbour shown on **Figure 17A.2** is based upon the approximate extent of entries in Historic Environment Records relating to the harbour. Further details for each separate entry can be found in the RCAHMS database.

The Category B-listed Port Seton Harbour (**WA 1007**) is tidal and built of concrete, covering approximately 8 acres. It was built in 1880 on the site of an earlier harbour on this site dating from 1679, which once functioned as the port for Prestonpans. This was totally destroyed by storm in 1810. The extent of the harbour on **Figure 17A.2** is calculated from several separate and related entries in the RCAHMS and MEL database including both breakwaters, a leading light, a pier and a slipway.

Industrial sites: Salt-panning, Fishing and Mining

There is a long history of salt panning in this area, as witnessed by the many names containing the element 'pans'. Two adjacent rock-cut salt pans (**WA 1005**) have been recorded to the immediate east of Cockenzie Harbour in the MEL database. They are carved into intertidal bedrock and the following description was made during the coastal assessment (James 1996) 'Salt Pan 1- an oval rock cut hollow sloping slightly from the west to the east and now filled with sand and rocks. Two channels lead from the hollow to the sea. One runs north for approximately 20m, the other runs NE - SW for 40m, half way along the channel is a carved stone forming a cap over the channel. Salt Pan 2- lying 20m west of Salt Pan 1, a rock cut channel filled with angular rubble and used for a sewage outflow pipe, this may be an earlier channel re-used. The settling pool may lie to the south under a soil dump where land has been built up.' A third salt pan (**WA 1006**) has been recorded 170 m to the east. The following description was made during the coastal assessment (Guard 1996) 'Salt Pan 3- a sub-circular rock cut hollow approximately 8m in diameter with a channel (3m long x 1.4m wide) leading from the north side to the sea, a fragment of iron pipe lay in the channel'. A number of concrete and sandstone walls have also been recorded in the immediate vicinity of this salt pan. Some of these are thought to represent medieval plot boundaries or to be associated with the salt pan industry.

Two lines of posts (**WA 1009**) are recorded in the MEL database at this location, protruding from the sand and visible only at low tide. It is suggested in the entry for the site that they may have been used for fishing nets, presumably for drying. No date is suggested. Another possible interpretation is that they are WWII anti-glider posts which are often found on large open sandy beaches in Scotland. The full extent of this feature is unknown at present.

A circular domed cement structure (**WA 1001**) lies at the upper edge of the intertidal zone to the east of Levenhall Links Leisure Park. It is 5 m in diameter and 3 m in height. It functioned as a cap for an air shaft from Prestongrange Colliery, now disused. The doorway is to the south west and is fitted with an iron gate; internal fittings include an iron pulley system hanging from the roof and a metal floor. There are external iron fittings on the roof. The sea is eroding the bottom third of this feature. There appear to be two slightly different locations given for this site in the East Lothian HER database. The location used is the from the RCAHMS database.

17A7.2 CULTURAL HERITAGE POTENTIAL IN THE INTERTIDAL ZONE

This stretch of East Lothian coastline has been extensively settled throughout human history for a wide variety of activities, including salt panning, pottery manufacture, coal mining and related maritime activities such as fishing. Further unknown cultural heritage remains from the Mesolithic to modern times may be present.

The intertidal part of the ASA is largely made up of sandy beaches and exposed bedrock, with a few areas of modern development and made ground. Potential within areas of bedrock and modern development is very low or non-existent. Although some salt pans have been noted carved into the bedrock, the extensive surveys carried out across the rest of the area have not found any similar sites. Modern developments and made ground have removed intertidal potential in some areas, most notably at Cockenzie Power Station (which is itself largely built on reclaimed land formed at least partly from colliery spoil heaps. However not all made ground within the intertidal part of the Offshore Export Cable Corridor ASA is archaeologically sterile. As noted above, geotechnical coring of a mound known as 'the Cast' to the west of Prestonpans has shown that structures of archaeological interest are preserved within it, albeit under several metres of spoil.

Although some of the sand deposits overlying the bedrock along the coast may be mobile, being periodically reduced and replaced by storm events and the action of the sea. The discovery of well-preserved archaeological material from sandy deposits within the beach at Seton Sands clearly demonstrates that this area has an archaeological potential. Within Seton Sands, archaeological deposits may have been shielded from erosion by the large dolerite dyke running along much of the MLWS mark. The western part of this feature is marked on the 1st edition Ordnance Survey maps as 'Long Craigs' and the eastern part is marked as 'Dalskelly Craigs'. In addition there is known to be a significant potential for cultural heritage remains relating to World War II as there are remains of coastal defences in the intertidal zone of the wider area, including anti-tank defences and pillboxes.

A more detailed discussion of the potential for currently unknown cultural heritage features to be present in the intertidal zone, will be presented in a separate cultural heritage baseline study (WA ref:85340.03) in preparation for a separate planning application of the onshore transmission works. This will be informed by analysis and discussion of known features in the wider area and the results of a walkover survey.

17A.8 SUMMARY

A comprehensive baseline study of cultural heritage data within the Wind Farm Development Area and Offshore Export Cable Corridor has been undertaken including a review of marine geophysical data across the extent of the offshore proposed development and a review of data for the intertidal zone.

Known archaeological receptors within the Development Area comprise four recorded wrecks for which no corresponding geophysical anomalies were identified and four further wrecks, not charted by the UKHO (**Figure 17A.8**).

Known archaeological receptors within the Offshore Export Cable Corridor comprise two recorded wrecks for which no corresponding geophysical anomalies were identified and two further wrecks, not charted by the UKHO (**Figures 17A.9-11**).

A number of 500 other anomalies of possible archaeological interest have also been identified in the geophysical data assessed for the Project (**Figures 17A.9-11**).

A review of the evidence for heritage assets associated with submerged palaeolandscapes has been undertaken. A very low potential for reworked sediments containing finds of prehistoric date has been identified (**Figure 17A.4**).

Known archaeological receptors within the intertidal area comprise 10 records of sites and findspots. These can be classified as historic harbours, various prehistoric finds (including

remains of an Iron Age hoard) and industrial features relating to the exploitation of the intertidal zone in the historic period (**Figure 17A.2**).

In addition to prehistoric, maritime and aviation cultural heritage features with known locations an assessment of archaeological potential has been undertaken.

The sensitivity of the cultural heritage receptors identified in this baseline study and the potential significance of impacts upon them arising from the proposed development is discussed in full in ES Chapter 17A: Cultural Heritage.

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ANNEX 17A.1: LEGISLATION AND GUIDANCE

SUMMARY

Description of the domestic, European and international legal framework, including:

- Existing statutory mechanisms relevant to the archaeological heritage;
- The application of marine consent and licensing procedures;
- The implications of changes associated with the Historic Environment (Amendment) (Scotland) Act 2011, Marine (Scotland) Act 2010 and Marine and Coastal Access Act 2009;
- National plans, policies and guidance relating to marine archaeology.

This section presents the legal and policy framework applicable to marine archaeology within the UK Continental Shelf (UKCS), encompassing UK territorial waters and the UKCS itself.

The legal framework applicable to marine archaeology is subject to a variety of jurisdictional divisions. It is generally accepted in international law that states have jurisdiction in respect of heritage within their territorial waters (to 12 nautical miles (nm)). Accordingly, the UK exercises authority in respect of marine archaeology to 12nm on the basis of UK-wide legislation. However, as cultural issues are generally devolved, marine archaeology is administered separately by different authorities in each of the home countries, in the case of Scotland, Historic Scotland are the relevant authority.

Some aspects of the law relating to marine archaeology, such as the Marine and Coastal Access Act 2009, Protection of Military Remains Act 1986 and the Merchant Shipping Act 1995, are administered by authorities with UK-wide powers.

Administration beyond 12nm is not devolved, so that – in principal – marine archaeology on the UKCS is addressed UK-wide. However, in practice the UK-wide authorities with powers relating to archaeology beyond 12nm generally call upon the expertise of the heritage agency responsible for the adjacent territorial waters.

UNITED KINGDOM

Introduction

There are two different pieces of legislation under which wrecks of archaeological interest may be designated for protection, namely the Protection of Wrecks Act 1973 (PWA 1973, which has two relevant sections) and the Protection of Military Remains Act 1986 (PMRA 1986). Designation of wrecks is also possible under a third act, the Ancient Monuments and Archaeological Areas Act 1979 (AMAA 1979), which applies to England, Scotland and Wales, but not Northern Ireland which has its own equivalent legislation.

Scotland's Marine Act (2010; see below), allows for new Scottish- protection to be implemented, with historic assets in the marine environment potentially eligible for designation as Historic Marine Protected Areas.

In addition, there are UK-wide provisions applying generally to people who find or take possession of wreck – including wreck of archaeological interest – under the Merchant Shipping Act 1995 (MSA 1995).

The Protection of Military Remains Act 1986 and the Merchant Shipping Act 1995 are administered UK-wide by the Ministry of Defence (MOD) and the Maritime and Coastguard Agency (MCA) respectively. Section Two of the Protection of Wrecks Act 1973, which deals with dangerous wrecks, is also administered UK-wide by the MCA. However, Section One of the Protection of Wrecks Act 1973, which deals with wrecks of historic or archaeological importance, is administered by the heritage agencies of each of the home countries. The Ancient Monuments and Archaeological Areas Act 1979 is also administered by the heritage agencies of England, Scotland and Wales.

Protection of Wrecks Act 1973: Section One

The following paragraphs set out the general provisions and background of Section One of the PWA 1973. Further details relating to its administration in each home country are dealt with subsequently, under the heading for each country.

Section One of the Protection of Wrecks Act 1973 enables the Secretary of State (now the devolved Scottish Government) to protect wreck sites from unauthorised interference if they are of historic, archaeological or artistic importance.

The workings of Section One of the Protection of Wrecks Act 1973 in Scottish Waters are in the process of being replaced by the provisions of the Marine (Scotland) Act 2010 concerning the designation of Historic Marine Protected Areas.

Under the PWA 1973 it is an offence to carry out certain activities in a defined area surrounding the site, unless a licence for those activities has been obtained from the Government.

Section One of the PWA 1973 is administered by each of the home country heritage agencies, largely independently.

The relevant Secretary of State (or Scottish Government) must consult appropriate advisors prior to designation, though it is possible to designate a wreck in an emergency without first seeking advice. Advice on designations is provided by the heritage agencies.

There are currently a total of 61 sites across the UK protected under Section One of the Act <http://www.english-heritage.org.uk/daysout/maritime-heritage/map/>. The sites range in date and character from dispersed cargoes of Bronze Age metalwork to the largely intact remains of the submarine A1, lost in 1911.

Generally, sites are designated following an extended consultation process. However, there have been instances (such as the Swash Channel wreck) where an emergency designation order has been obtained after detection by geophysical investigations in the course of Environmental Impact Assessment (EIA). The Act does provide for the rapid protection of wrecks at risk, if necessary.

The Protection of Military Remains Act 1986

Under the Protection of Military Remains Act 1986 the Ministry of Defence has powers to protect vessels that were in military service when they were wrecked. The definition of 'military service' has been examined in detail in the course of judicial review and subsequent appeal, such that in some circumstances merchant vessels are eligible for protection, for example the SS *Stora*.

The MOD can designate named vessels as Protected Places even if the position of the wreck is not known. In addition, the MOD can designate Controlled Sites around wrecks whose position is known. In the case of Protected Places, the vessel must have been lost after the 4th August 1914, whereas in the case of a wreck protected as Controlled Sites, no more than 200 years must have elapsed since loss (MOD 2001). In neither case is it necessary to demonstrate the presence of human remains.

Diving is not prohibited at a Protected Place but it is an offence to tamper with, damage, move or remove sensitive remains. Diving, salvage and excavation are all prohibited on Controlled Sites. Licences to undertake otherwise restricted activities can be sought from the MOD.

The provisions of the PMRA 1986 in respect of Protected Places and Controlled Sites are applicable in international waters, which would include the UK Continental Shelf, although they are only enforceable in respect of British-controlled ships, British citizens, and British companies.

The MOD is undergoing a rolling programme of identification and assessment that has resulted in several groups of wrecks being designated under the PMRA 1986. The most recent tranche came into effect on 1st May 2008. There are now a total of 12 controlled sites and 55 protected places around the world.

Records of vessels lost while in military service do not always give an exact location for the loss. Given the extent of military activity on the UKCS, the potential for wrecks eligible for further designation under the PMRA 1986 is high.

Under the Protection of Military Remains Act 1986, all aircraft that have crashed in military service automatically constitute a Protected Place. As such, it is an offence to tamper with, damage, move or remove any remains of military aircraft unless authorised by a licence. The provisions of the PMRA 1986 relating to aircraft are administered by the MOD Joint Casualty and Compassionate Centre.

It should also be noted that it is an offence under the PMRA 1986 to carry out unauthorised excavations for the purpose of discovering whether any place in UK waters contains remains of a vessel which has crashed, sunk or been stranded while in military service.

Ancient Monuments and Archaeological Areas Act 1979

The main legislation used to protect archaeological remains in the UK is the Ancient Monuments and Archaeological Areas Act 1979. This Act primarily deals with terrestrial sites but there is provision to designate sites in territorial waters as Scheduled Monuments.

Monuments are defined by the AMAA 1979 as including buildings, structures, works, caves, excavations, vehicles, vessels, aircraft or other movable structures. Monuments can only be scheduled if they are of national importance. Section 53 extends the AMAA 1979 to monuments situated in, on or under the seabed within UK territorial waters.

The act has recently been amended in Scotland (see section on Scotland below).

Once a monument has been Scheduled, visiting or diving on the site is not necessarily restricted. It is, however, an offence to demolish, destroy, alter or repair the monument without prior authorisation, in the form of Scheduled Monument Consent.

Examples of wreck sites that have been designated as Scheduled Monuments in Scottish waters include the following:

- The Light Cruisers *Brummer*, *Dresden*, *Karlsruhe* and *Koln*, along with the Battleships *Konig*, *Kronprinz Wilhelm* and *Markgraf* of the German High Seas Fleet. All scuttled at Scapa Flow, Orkney, on 21st June, 1919
- The Kilspindie Hulks Nos.1-8. Examples of 19th to 20th century 'Fifie' sailing fishing vessels, Kilspindie, Aberlady Bay, Lothian

The Ancient Monuments and Listed Buildings (Amendment) Scotland) Bill is currently in consultation and would replace the AMAA 1979 within Scotland if enacted.

Merchant Shipping Act 1995

The Merchant Shipping Act 1995 (ASA 1995) is used to regulate the reporting and disposal of wreck – including wreck of archaeological interest – found or recovered from UK waters, or found or recovered outside UK waters but brought within those waters. Within the context of the ASA 1995, wreck refers to flotsam, jetsam, derelict and lagan found in or on the shores of the sea or any tidal water. It includes ships, aircraft and hovercraft, parts of these, their cargo and equipment. <http://www.legislation.gov.uk/ukpga/1995/21/contents?view=plain>

All wreck that is found or taken into possession must be notified to the Receiver of Wreck by the finder. The wreck is then delivered to the Receiver, or, more commonly, held by the finder to the order of the Receiver.

The ownership and disposal of wreck is decided according to procedures contained within the ASA 1995. Provision is made for original owners to come forward to claim their property. Ownership of unclaimed wreck from within territorial waters lies with the Crown Estate or in a person to whom rights of wreck have previously been granted by the Crown.

The Receiver has a duty to ensure that finders who report their finds according to the legislation, receive an appropriate salvage payment. In the case of material considered to be of historic or archaeological importance, a suitable museum is asked to buy the material at the current valuation and the finder receives the net proceeds of the sale as a salvage payment. If the right to, or the amount of salvage cannot be agreed, either between owner and finder or between competing salvors, the Receiver will hold the wreck until the matter is settled, either through amicable agreement or by court judgement.

The Merchant Shipping Act 1995 applies only to archaeological material that is 'wreck', i.e. material that is derived in some way from a ship or aircraft.

Marine Policy Statement (MPS)

The MPS <http://archive.defra.gov.uk/environment/marine/documents/interim2/marine-policy-statement.pdf>, issued in March 2011, gives the framework for marine planning and decisions affecting the marine area. Marine Plans will set out how the MPS will be implemented in specific areas, extending to mean high water and overlapping with terrestrial planning schemes. Marine policy guidance and Marine Plans will seek to complement rather than replace terrestrial schemes, recognising that both systems may adapt and evolve over time.

The MPS provides the policy context and framework within which all aspects of the historic environment should be managed. The MPS defines the historic environment as including 'all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged. Those elements of the historic environment – buildings, monuments, sites or landscapes – that have been positively identified as holding a degree of significance meriting consideration are called heritage assets'. The MPS uses the term historic environment to include all heritage assets of whether they are afforded statutory protection or not.

In relation to the requirements for EIA's under Environmental Impact Assessment (EIA) Directive (Directive 85/337/EEC), the MPS outlines a number of principles to be used, specifically that decisions should:

- Be taken using a risk-based approach that allows for uncertainty, recognising the need to use sound science responsibly
- Be sensitive to potential impacts on sites of particular significance – including designated marine heritage assets
- Look to mitigate negative impacts where possible at various stages of development (in line with legal obligations) in a manner that is proportionate to the potential impacts of the proposal under consideration. Where alternative site selection or design could mitigate effects this should be considered, where appropriate

The MPS states that the protection and management of marine cultural heritage should be in a manner appropriate and proportionate to their significance. Significance is defined as 'the value of a heritage asset to this and future generations because of its heritage interests'. It is also highlighted within the MPS that many heritage assets with archaeological interest in coastal and offshore areas are not designated but are of equivalent significance. The MPS states that the 'absence of designation for such assets does not necessarily indicate lower significance' and that the same policy principles should be applied to them as to designated heritage assets.

In relation to the management of heritage assets, the MPS identifies the desirability of 'sustaining and enhancing the significance of heritage assets' and a general presumption in favour of the conservation of designated heritage assets should be adopted. The more significant the asset, the greater the presumption in favour of its conservation. Where substantial loss or damage to heritage assets through development activities is considered justified the marine plan authority should identify and require suitable mitigating actions to record and advance understanding of the significance of the heritage asset before it is lost.

Also of relevance to the historic environment, are the MPS's statements in relation to seascapes, which it defines as 'landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other'. The MPS states that the visual, cultural, historical and archaeological impacts on seascapes should be considered for all coastal areas.

Other UK Plans, Policies and Guidance

Of direct relevance to offshore renewables development is COWRIE's Historic Environment Guidance for the Offshore Renewables Sector (2007) (http://www.offshorewindfarms.co.uk/Assets/archaeo_guidance.pdf). This guidance is UK-wide and provides information on all aspects of dealing with the historic environment in planning and implementing offshore renewable schemes. The guidance is also generally relevant to other forms of marine development, including oil and gas. COWRIE has also published Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (http://www.offshorewindfarms.co.uk/Assets/cowrie_ciarch%20web.pdf%20) (2008) and on offshore geotechnical investigation and historic environment analysis (<http://www.offshorewind.co.uk/Assets/final%20GEORARCH-09%20Offshore%20Geotech%20Guidance%20web.pdf>).

The Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Development is a UK-wide code developed in conjunction with key industries. The JNAPC Code is voluntary but provides a framework that can be used in the course of development to ensure that activities are conducted in an archaeologically sensitive manner (http://www.thecrownestate.co.uk/jnarc_code_of_practice.pdf).

The Crown Estate commissioned WA Coastal & Marine to prepare a guidance note on assessing, evaluating, mitigating and monitoring the archaeological effects of offshore renewables projects, Protocol for Archaeological Discoveries: Offshore Renewables Projects, (<http://www.scribd.com/doc/45787868/The-Crown-Estate-Protocol-for-Archaeological-Discoveries>) (The Crown Estate, 2010).

As general context for best-practice, English Heritage's general guidance with respect to wind energy is set out in 'Wind Energy and the Historic Environment' (October 2005), which includes a short section on offshore renewables (<http://www.english-heritage.org.uk/publications/wind-energy-and-the-historic-environment/>).

English Heritage has also developed a methodology for Historic Seascape Characterisation, which 'maps a cultural understanding of coastal and marine landscapes' to 'provide area based cultural context our marine management decision-making'. The character areas have no formal legal or planning status, but provide a framework within which seascapes can be understood and managed (<http://www.english-heritage.org.uk/professional/advice/advice-by-topic/landscape-and-areas/characterisation/seascape-character/>).

In effect, these principles mean that the historic environment must be a material consideration in development control, that preservation in situ is the preferred approach for heritage assets, that developers are responsible for the recording, publication and dissemination of investigations of heritage assets that cannot be preserved in situ, and that consents are issued subject to sufficient information on archaeological impacts and mitigation.

The effects of wind energy programmes and projects on the historic environment should be evaluated in all levels of environmental impact assessment.

- Consideration of the historic environment should include World Heritage Sites; marine, coastal and terrestrial archaeology; historic buildings and areas; designed landscapes; and the historic character of the wider landscape
- The significance of internationally and nationally designated sites should be safeguarded, and physical damage to historic sites should be avoided

- The impact of wind energy developments on the setting and visual amenity of historic places should also be considered
- Where wind energy developments affect historic sites, national planning policies on the historic environment should be taken into account
- Consideration should always be given to the reversibility of wind energy projects

SCOTLAND

Historic Scotland (HS) carries the responsibilities of Scottish Ministers with regard to nationally important archaeological and built heritage matters, which extend offshore to the 12 nautical mile (nm) territorial limit under the Marine (Scotland) Act 2010. These responsibilities are carried out in collaboration with other bodies such as Marine Scotland, public authorities and marine planning authorities where appropriate on matters of marine planning or licensing (<http://www.scotland.gov.uk/Topics/marine/seamanagement/marineact>).

There are three relevant pieces of legislation from which direct responsibilities arise: the Marine (Scotland) Act 2010, the Ancient Monuments and Archaeological Areas Act 1979 (<http://www.legislation.gov.uk/ukpga/1979/46/contents>) and the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, the last two acts as amended by the Historic Environment (Amendments) (Scotland) Act 2011 (see below).

Under the Marine & Coastal Access Act 2009, Scottish Ministers now have powers over marine planning, licensing and conservation over the Scottish Marine Area from 12 - 200 nm offshore. UK Marine Policy Statement and resultant regional marine plans (due by spring 2012) will outline specific priorities and policy within 12 – 200 nm offshore.

Historic Scotland has used the definitions in AMAA 1979 as a basis for designating sites of archaeological interest. The definition of a monument has been amended under the Historic Environment (Amendment) (Scotland) Act 2011 to define monuments as including “any site ...comprising any thing, or group of things, that evidences previous human activity” (part 2, clause 14). This would therefore include artefact scatters, palaeoenvironmentally important sediments containing artefacts, i.e. archaeological material that does not fit under the previous definition that focused upon ‘structure’ or ‘work’. These kinds of archaeological remains are principal components in the archaeological record of submerged prehistoric sites and landscapes and wrecks sites where no vessel has been located. Therefore these proposed amendments are important considerations for the protection of marine archaeology and future guidance.

Marine (Scotland) Act 2010

The definitions of significance and importance set out in AMAA 1979 have been incorporated into the newly assented Marine (Scotland) Act 2010 and underpin the provisional policies (http://www.scottish.parliament.uk/s3/committees/rae/bills/Marine%20bill/documents/20100110CabSe_cSGS2Committments-ProvisionalpoliciesforHistoricMPAs-circulationtoparliament.pdf) based upon the Act which replaces the PWA 1973 in Scotland. Under section 4 of the Act, Scottish Ministers have the power to designate an area as a Historic Marine Protected Area (HMPA) in order to preserve “a marine historic asset of national importance located, or believed to be located, in the area”.

A marine historic asset is defined as:

- a vessel, vehicle or aircraft (or a part of a vessel, vehicle or aircraft);
- the remains of a vessel, vehicle or aircraft (or a part of such remains);
- an object contained in, or formerly contained in, a vessel, vehicle or aircraft;
- a building or other structure (or a part of a building or structure);
- a cave or excavation;
- a deposit or artefact (whether or not formerly part of a cargo of a ship) or any other thing which evidences, or groups of things which evidence, previous human activity.

Ministers would also be obliged to consider other environmental characteristics of the marine area with respect to biodiversity and geodiversity policy aims and planning and licensing proposals.

Scottish Ministers are required to publish notice and hold a consultation for a proposed Historic MPA designation, however if there is a perceived need to rapidly protect a marine historic asset a designation may be enforced without this process enabling protection for up to 2 years. Specific preservation objectives pertaining to an individual Historic MPA would be defined by Scottish Ministers through Marine Conservation Orders (MCOs) which could prohibit, restrict or regulate a wide range of activities not controlled by other means. The status of designations would be assessed in an ongoing process in relation to the changing state of knowledge and future requirements.

Within an MPA it would be an offence to “intentionally or recklessly carry out a prohibited act that significantly hinders or may significantly hinder the achievement of the state preservation objectives for the protected area”. Prohibited acts would be to:

- carry out works or activities (or which are likely to) damage or interfere with a marine historic asset or have a significant impact on the protected area;
- remove, alter or disturb a marine historic asset;
- to contravene an MCO.

Exceptions may apply when in accordance with a permit or authorisation issued by the Scottish Ministers.

Further to powers of protection, marine planning and some licensing powers (under the Marine and Coastal Access Act 2009) would be devolved to Scottish Ministers through the Marine (Scotland) Act 2010 covering the Scottish Marine Area.

Planning and the Historic Environment (Scotland)

The operation of a number of laws concerning the protection of the historic environment in Scotland have been amended by the Historic Environment (Amendment) (Scotland) Act 2011 with the aim of harmonising existing legislation for the management of the historic environment. These include: The Historic Buildings and Ancient Monuments Act 1953, The Ancient Monuments and Archaeological Areas Act 1979 and Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. The most significant change with respect to the current EIA is the widening of the definition of the historic environment.

The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 contains the bulk of built heritage conservation planning law for Scotland. It requires Scottish Ministers to compile lists of buildings of archaeological or historic importance and provides for the designation of conservation areas. This Act has also been amended by the Historic Environment (Amendment) (Scotland) Act 2011 (HE(A)(S)A 2011).

Under the broader definition of the archaeological record (as per HE(A)(S)A 2011) artefact scatters and archaeological important sediments containing evidence of past human activity could be protected once ‘cultural significance’ and ‘national importance’ have been discerned under the defined criteria. For example, this type of situation would be well-described by the known submerged prehistoric landscapes and stone tool scatters that define the Mesolithic and Palaeolithic archaeological record in the North Sea.

The scope of statutory planning control associated with legislation such as the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 and Town & Country Planning (Scotland) Act 1997 ends at the mean low water mark and it is therefore not possible for buildings or sites that are permanently submerged to be listed. However, it is possible for structures which are sometimes or partly below the sea to be listed, such as ports and harbours. Under the M(S)A 2010 the scope of The Act defines the “Sea” as including the mean high water spring tide, therefore in the case of the intertidal zone, there are overlapping jurisdictions between marine and terrestrial planning legislation and various public bodies including Local Planning authorities and Historic Scotland for example. The resolution of planning decisions in the intertidal zone will be achieved through the national marine plan, and regional marine plans as prepared by Government and regional Marine Planning

Partnerships, respectively. The process of producing marine plans (national and regional) is set to take 2 years from the Royal Assent of the M(S)A (10th March 2010).

The strategic policies of Scottish Ministers with regard to the historic environment are being set out in a set of documents: the [Scottish Planning Policy \(SPP\)](#), which lays out the high-level planning policy of the Scottish Government over a wide range of issues, including the historic environment, Planning Advisory Note 2/2011, which lays out key technical policies and procedures, the [Scottish Historic Environment Policy \(SHEP\)](#), and [Managing Change in the Historic Environment Guidance Notes](#), the last two of which set out more technical aspects of planning policy and provide context for advice arising from Historic Scotland. SHEP was re-issued in December 2011. This document takes account of the changes in consequent upon the M(S)A 2010 and HE(A)(S)A 2011. These documents supersede previous statements including *SPP 23: Planning and the Historic Environment*, Planning Advice Notes (PANs), and National Planning Policy Guidelines (NPPGs) including *NPPG 18: Planning and the Historic Environment* and *NPPG 5: Archaeology and Planning*.

Although it is primarily concerned with development on land, a recent document on scoping wind farm proposals in Scotland from Historic Scotland (http://www.historic-scotland.gov.uk/eia_and_gdpo_scoping_setting.pdf) may also be relevant to offshore wind farms.

RELEVANT INTERNATIONAL INSTRUMENTS

A broader context is provided by international law, represented by customary law and the conventions to which the UK is party. The United Nations Convention on the Law of the Sea 1982 (UNCLOS 1982 - http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm), the European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (the Valletta Convention), the UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001 (UNESCO 2001 - <http://unesdoc.unesco.org/images/0012/001260/12065e.pdf>) and the European Landscape Convention 2000 (ELC 2000 - <http://conventions.coe.int/Treaty/Commun/QueVoulezVous.asp?NT=176&CM=8&DF=5/19/2009&CL=ENG>) are all relevant in this regard, as is the (ICOMOS) Charter on the Protection and Management of Underwater Cultural Heritage 1996.

UNCLOS 1982 was ratified by the UK in 1997. Article 303 stipulates that 'states have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose'. Article 303 also provides for coastal states to exert a degree of control over the archaeological heritage to 24 nautical miles, though the UK has not introduced any measures to implement this right.

The Valletta Convention was ratified by the UK Government in 2000 and came into force in 2001. The convention binds the UK to implement protective measures for the archaeological heritage within the jurisdiction of each party, including sea areas. Insofar as the UK exerts jurisdiction over the Continental Shelf, then it would appear that the provisions of the Valletta Convention apply to that jurisdiction.

The UNESCO Convention 2001 is a comprehensive attempt to codify the law internationally in respect of the underwater archaeological heritage. Although the UK abstained in the vote on the final draft of the Convention, it has stated that it has adopted the Annex of the Convention – which governs the conduct of archaeological investigations – as best practice for archaeology (<http://www.unesco.org/new/en/unesco/themes/underwater-cultural-heritage/>).

The ELC 2000 became binding on the UK from 1 March 2007. Its principal clauses require the Government:

- to recognise landscapes in law as an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity
- to establish and implement landscape policies aimed at landscape protection, management and planning through the adoption of ... specific measures

- to establish procedures for the participation of the general public, local and regional authorities, and other parties with an interest in the definition and implementation of the landscape policies mentioned in paragraph b above
- to integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape

The Convention applies to the entire territory of the UK and includes land, inland water and marine areas.

One further international measure is worth noting, namely the International Council on Monuments and Sites (ICOMOS) Charter on the Protection and Management of Underwater Cultural Heritage 1996 (the Sofia Charter). The Charter includes a series of statements regarding best practice, intending 'to ensure that all investigations are explicit in their aims, methodology and anticipated results so that the intention of each project is transparent to all'. The UK is a member of ICOMOS.

ANNEX 17A.2: INTERTIDAL FEATURES OF CULTURAL HERITAGE INTEREST

WA ID	Name	Description	HER IDS	Easting (OSGB)	Northing (OSGB)
1001	Prestongrange	A circular domed cement structure 5m in diameter and 3m in height. It functioned as a cap for an air shaft from the coal mine, now disused. The doorway is to the south west and is fitted with an iron gate; internal fittings include an iron pulley system hanging from the roof and a metal floor. There are external iron fittings on the roof. The sea is eroding the bottom third of this feature. There appear to be two entries for this site in the East Lothian HER database. The location used is the from the RCAHMS database.	RCAHMS 113114, MEL2295, MEL9344	337098	673824
1002	Morrison's Haven	This is the site of a medieval harbour, built in the 16 th century by the monks of Newbattle. It fell out of use during WWII and has since been largely covered by mining spoil although the structure appears to be largely intact. Geotechnical coring showed up to 4m of waterlogged spoil overlying the structure (Cressey 2005). A topographic survey was undertaken at Morrison's Haven as part of the Prestongrange Community Archaeology Project. This showed that 60-70% of the shoreward side of Morrison's Haven is now below severalm of colliery waste. The dense vegetation was cleared and the tops of walls exposed to enhance the structure. An aerial photographic survey and a geophysical survey were also undertaken (Cressey 2006). The geophysical survey suggested that further archaeological potential remained to the immediate east of the harbour which may relate to a kiln. The extent of the site shown on the figures in this report is derived from the 1 st edition Ordnance Survey.	RCAHMS 53652, EEL, 242, EEL243, EEL277, EEL278, MEL41	337158	673817
1003	Prestonpans	A worked flint was found in Prestonpans. It was a blade which had been reworked into a scraper. It is suggested in the MEL database that it might be Palaeolithic in date although there does not appear to have been any specialist analysis to confirm this.	RCAHMS , MEL9265	338800	674720

WA ID	Name	Description	HER IDS	Easting (OSGB)	Northing (OSGB)
1004	Cockenzie Harbour	A number of undesignated entries in the RCAHMS and MEL database have been assimilated into this entry, all of which relate to the B-listed Cockenzie Harbour and associated features. A harbour was first built here in the early 17 th century to service the saltpan industry. The harbour was destroyed in the mid-17 th century by a storm and rebuilt in the 1830s. Some structures around Cockenzie Harbour still include vestiges of ancient walls, some probably connected with the old salt industry. Graham (1971) states that Cockenzie is on record in 1565 and in 1592, at the latter date as a free haven. Blaeu's map marks 'Cockeny hauen' and shows two projections, presumably representing piers, and these may be correlated with the harbour begun by the 3rd Earl of Win ton, about 1630, in connection with his salt-pans of which there were ten in 1790, six in 1840 and two in 1883. The Cockenzie Waggon-way formerly terminated at Cockenzie Harbour. The RCAHMS database records that it no longer survives in the area of the harbour although there are a number of upstanding undesignated buildings associated with the harbour recorded in the RCAHMS database .The extent of the harbour shown here is based upon the approximate extent of heritage records relating to the harbour. Further details for each site can be found in the RCAHMS database.	RCAHMS 53643, 53645, 53646, 53648, 113117, 290007, MEL34, MEL35, MEL2298, MEL9662, Listed Building 23025	339770	675694
1005	Cockenzie (salt pans)	Two salt pans have been recorded at this location in the MEL database. Their position is calculated from their depiction on the 1 st edition of the OS 6" map. The following descriptions were made during the coastal assessment (James 1996) 'Salt Pan 1- an oval rock cut hollow sloping slightly from the west to the east and now filled with sand and rocks. Two channels lead from the hollow to the sea. One runs north for approximately 20m, the other runs NE - SW for 40m, half way along the channel is a carved stone forming a cap over the channel. Salt Pan 2- lying 20m west of Salt Pan 1, a rock cut channel filled with angular rubble and used for a sewage outflow pipe, this may be an earlier channel re-used. The settling pool may lie to the south under a soil dump where land has been built up.' A third salt pan lying to the east is recorded under a separate entry in this annex.	RCAHMS , MEL32	339914	675754

WA ID	Name	Description	HER IDS	Easting (OSGB)	Northing (OSGB)
1006	Cockenzie (salt pans)	A salt pan has been recorded at this location in the MEL database. Its position is calculated from its depiction on the 1 st edition of the OS 6" map. The following description was made during the coastal assessment (James 1996) 'Salt Pan 3- a sub-circular rock cut hollow approximately 8 m in diameter with a channel (3 m long x 1.4 m wide) leading from the north side to the sea, a fragment of iron pipe lay in the channel' Two other salt pans lying to the west are recorded under a separate entry in this annex. A number of concrete and sandstone walls (not shown) have been recorded in the immediate vicinity of the salt pan. Some of these are thought to represent medieval plot boundaries or to be associated with the salt pan industry. Further details and exact locations are available in the RCAHMS and MEL entries.	RCAHMS 113136, 113138, MEL32, MEL2299	340056	675790
1007	Port Seton Harbour	A number of entries in the RCAHMS and MEL database have been assimilated into this entry, all of which relate to the B-listed Port Seton Harbour and associated features. The harbour is tidal and built of concrete, covering approximately 8 acres. It was built in 1880 on the site of an earlier harbour on this site dating from 1679, which once functioned as the port for Prestonpans. This was totally destroyed by storm in 1810.	RCAHMS 54927, 282064, 282071-5, MEL504, MEL9441-6, , Listed Building 23025	340487	675947
1008	Seton Sands (terret)	An Iron Age knobbed terret was found at this approximate location while metal detecting on Seton Sands (Hunter 2001). The findspot suggests it was a votive deposit. The exact findspot is uncertain and the coordinates given in the RCAHMS database are rounded to the nearest hundredm.	RCAHMS 213388, MEL4605	341900	676200
1009	Seton Sands (post alignment)	Two lines of posts are recorded in the MEL database at this location, sticking up out of the sand and visible at low tide. It is suggested in the entry for the site that they may have been used for fishing nets, presumably for drying. No date is suggested.	RCAHMS , MEL9220	342460	676079
1010	Seton Sands (hoard and find spots)	An Iron Age hoard was found on the beach at this approximate location. The hoard included two terrets, a spiral finger ring and a plain finger ring. The hoard was found about one foot below the surface of the black sand, over an area of roughly 50m.	RCAHMS 54947, 277485, 281669, MEL524, MEL8932, MEL9466	342800	676300

ANNEX 17A.3: KNOWN WRECKS AND GEOPHYSICAL ANOMALIES

DEVELOPMENT AREA ANOMALIES

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7000	Dark reflector	549962	6273190	A2	1.3	1.2	0.7		A strong and approximately circular anomaly in a strong scour mark and lying in area of sand ripples.	
7001	Wreck	551803	6273064	A1	149.4	32	8.2		Large and discrete area of numerous linear and curvilinear dark reflectors showing the structure of large, mostly intact, upright wreck and partially buried in sediment. Internal structure visible of possibly the deck area with two larger pieces of debris close to portside. The surrounding seabed is featureless and no scour is visible. Further details are given on the wreck sheet (Figure 17A.12).	63700000 1074867 Seazone, 23563000 27688762 Seazone
7002	Dark reflector	548988	6272092	A2	3	0.5	1.5		Very small circular anomaly with distinct elongated shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7003	Recorded wreck	551086	6271292	A3	35	7	4		Dead record of the location of the Trawler Braconburn sunk in collision with Liberty ship SS Le Barron Russell Briggs, en route to being sunk at Scapa Flow as a block ship in 1944. Recorded dimensions of 35mx7mx4m, registered in UK, 203 GT, built in 1918, Hall & Russell, Aberdeen.	102790 NMRS, Larn & Larn 1998, 63700000 1074863 SeaZone, UKHO 3037
7004	Magnetic	546012	6271165	A2	-	-	-	18.77	Medium sized anomaly at the start of a survey line.	
7005	Dark reflector	545992	6270870	A2	35	2	1.6		Two anomalies, firstly a small circular anomaly with long pointed shadow 1.1 x 1.7 x 0.9m and secondly a thick, linear anomaly 3.2 x 0.4 x 1.6m with a possible scour mark off one side.	
7006	Dark reflector	545454	6270792	A2	1.1	1.1	1.3		Straight edged anomaly with triangular shaped shadow.	
7007	Dark reflector	549260	6270778	A2	6.6	0.4	0.9		Small approx circular anomaly with elongated shadow and slight scour mark.	
7008	Magnetic	550664	6270633	A2	-	-	-	14.58	Medium sized anomaly, isolated.	
7009	Dark reflector	550950	6270521	A2	7.1	1.4	0.9		Isolated and approximately oval shaped anomaly with diffuse weak shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7010	Dark reflector	549805	6270373	A2	4.3	0.5	1.2		Strong oblong shaped anomaly with thin linear shadow. Near an area with trawling/fishing scars visible.	
7011	Dark reflector	545671	6270333	A2	0.7	0.4	1		Small circular anomaly with linear narrow shadow.	
7012	Debris	545823	6270310	A2	7.6	1.7	0		Approximately circular anomaly with strong scour mark off one side.	
7013	Debris	547299	6269901	A2	1.7	0.7	0.7		Short, thick, linear anomaly with straight edged shadow.	
7014	Debris	546936	6269792	A2	2	1.1	1.4		Thick linear anomaly with straight edged shadow.	
7015	Dark reflector	547843	6269605	A2	3.4	0.6	1.6		Two small circular anomalies side by side.	
7016	Dark reflector	545145	6269544	A2	6.8	0.5	1.1		Linear anomaly with shadow.	
7017	Dark reflector	545890	6268995	A2	1.3	0.6	1		Small circular anomaly with shadow.	
7018	Debris	549229	6268870	A2	40	1.6	1.3		Two adjacent anomalies, a diffuse edged elongated anomaly 7 x 2 x 1m with weak shadow and scour mark and a circular anomaly 3 x 1 x 1.3m with diffuse edges and a surrounding scour.	
7019	Dark reflector	548821	6268721	A2	1.5	0.5	1.1		Small point size reflector with shadow and slight scour.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7020	Debris	546042	6268677	A2	4.7	5.1	2.3		Curvilinear dark reflector measuring 4.7 x 5.1 x 2.3m with a rounded oval shaped shadow and a dark reflector 6.2 x 1.3 x 1.3m difficult to distinguish due to strong scour mark around it but thin linear distinct shadow visible. The two anomalies are approximately 20m apart.	
7021	Debris	544790	6268305	A2	4.7	2.7	0		Bar shaped anomaly with scour mark behind it, possibly debris, isolated.	
7022	Dark reflector	550749	6268154	A2	5.1	1.1	1.2		Diffuse linear anomaly with elongated shadow, in area of heavy seabed scars probably from fishing.	
7023	Dark reflector	551658	6268069	A2	7.1	0.7	0.8		Short linear anomaly.	
7024	Dark reflector	552014	6268009	A2	6.5	0.8	1.1		Strong elongated anomaly 6.5 x 0.8 x 1.1m with weak shadow, near trawl scars and diffuse linear anomaly 2 x 1.8 x 1.5m.	
7025	Dark reflector	544364	6267793	A2	10.8	2.8	0		Diffuse strong anomaly with scour mark and bright reflector/shadow in front of it.	
7026	Dark reflector	544629	6267789	A2	3.9	3.7	0		Possibly circular anomaly, could be modern debris.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7027	Debris	551067	6267428	A2	130	1.2	0.8		Two small dark reflectors approximately 130m apart in a north-south orientation. Thick linear anomaly 4.2 x 1.2 x 0.8m with straight edged shadow along its length and a second narrow linear anomaly 3.8 x 0.3 x 0.4m.	
7028	Dark reflector	547839	6267270	A2	3.1	1.6	1.1		Approximately square anomaly with bright shadow and surrounding scour mark.	
7029	Dark reflector	547319	6267213	A2	1.1	0.5	1.2		Small approximately circular anomaly with fan shaped shadow.	
7030	Dark reflector	550166	6267086	A2	1.9	0.3	1.8		Narrow linear anomaly with long thin shadow.	
7031	Debris	544708	6266861	A2	5.7	2.9	0		Oval shaped dark reflector with thin short linear dark reflector at one end, possibly further dark reflectors in the vicinity associated but they cannot be confidently interpreted as anthropogenic.	
7032	Dark reflector	546093	6266826	A2	4.1	1.1	1.2		Approximately oblong anomaly with clear shadow and possible faint scour mark.	
7033	Dark reflector	548653	6266121	A2	1.1	1.5	1.4		Linear, narrow, faint anomaly with elongated shadow.	
7034	Dark reflector	545051	6265669	A2	7.1	0.7	0.6		Oval shaped anomaly with shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7035	Dark reflector	546569	6265655	A2	4.6	1.1	0.7		Strong square anomaly with rounded shadow and scour mark off one side.	
7036	Magnetic	550664	6265650	A2	-	-	-	15.27	Isolated medium sized anomaly,	
7037	Debris	545863	6265481	A2	13	4.8	0.6		Large hemispherical anomaly with anorphous shaped shadow, in area of coarser sediment as area is of darker reflectors. Scars from scallop fishing.	
7038	Dark reflector	544617	6265412	A2	4.7	1.2	1		Short thick linear with clearly defined shadow.	
7039	Dark reflector	544558	6265246	A2	3.4	0.7	0.6		Short dark reflector with shadow.	
7040	Debris	545041	6265131	A2	6.8	4.2	1.5		Two strong circular dark reflectors, the larger with a well-defined shadow, in an area of scour. The smaller curvilinear shaped dark reflector curves around the larger anomaly and were probably originally part of the same object.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7041	Wreck	548805	6264753	A1	33.1	6.9	3	735	Several large curvilinear dark reflectors in a discrete area with an irregular shaped shadow. Probably a wreck, can see some structure but appears badly damaged and very buried, possibly on its side. Area of connecting curvilinear dark reflectors showing structure of a wreck lying upright on the seabed with the stern end still displaying considerable height. Bow end not visible, assumed partially/wholly buried in sediment. Large scour. Scour mark. Surrounding seabed featureless. Further details are given on the wreck sheet (Figure 17A.13).	63700000 4745686 Seazone
7042	Debris	544620	6264526	A2	9.3	1.1	1.4		Weak linear anomaly with stronger shadow.	
7043	Magnetic	550937	6264330	A2	-	-	-	22.12	Isolated medium strength anomaly	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7044	Wreck	546162	6264260	A1	55.1	34.5	2.8	180	Two large curvilinear dark reflectors, appear to be lying on their side, partially buried. Several smaller approx circular dark reflectors lying nearby. Large scour mark extending from the wreck. Hemispherical-shaped anomaly with two curvilinear attached anomalies coming off either end. Several smaller approximately circular diffuse dark reflectors lying nearby. Could be partially buried wreck/debris, large scour mark which disappears off range so full size of scour unknown. Further details are given on the wreck sheet (Figure 17A.14).	63700000 1074859 Seazone, UKHO 3033
7045	Debris	543773	6264171	A2	105	2	1		Two dark reflectors, a triangular shaped anomaly 5 x 1.5 x 0.5m with short narrow shadow and strong dark reflector with shadow 4 x 2 x 1.	
7046	Dark reflector	551069	6264031	A2	13.7	2	0.7		Rectangular shaped anomaly with diffuse shadow.	
7047	Dark reflector	548905	6263970	A2	2.6	1.1	1.3		Strong oval shaped anomaly with narrow elongated shadow.	
7048	Dark reflector	544843	6263952	A2	3.8	0.8	0.7		Very small circular anomaly with short, narrow shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7049	Debris	548600	6263933	A2	10	0.8	1.8		Amorphous shaped anomaly 3 x 1 x 2m with large rounded shadow, possibly further tiny dark reflectors in front but these haven't been tagged as probably rock debris. Associated is a curvilinear diffuse anomaly 5 x 1.05 x 1 with clearly defined shadow and surrounding scour.	
7050	Dark reflector	550869	6263895	A2	0.7	0.8	1		Approximately circular anomaly with elongated shadow and surrounding scour.	
7051	Debris	549321	6263864	A1	21	17.7	0.5		Discrete area containing several diffuse amorphous shaped dark reflectors, one in particular is circular and has some height. Not really any structure discernible and surrounding seabed is featureless. Could indicate a partially buried wreck.	
7052	Dark reflector	551969	6263838	A2	8.7	0.4	0.6		Narrow strong linear with shadow.	
7053	Dark reflector	547627	6263626	A2	1.4	0.5	0.9		Linear, fat anomaly with straight edged shadow. Other similar anomalies but less distinct so could be geological debris.	
7054	Magnetic	544224	6263593	A2	-	-	-	27.2	Medium sized anomaly in an area of enhanced magnetic response	
7055	Dark reflector	550905	6263581	A2	2	1.1	0.9		Oval shaped anomaly with straight edged shadow.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7056	Dark reflector	549387	6263535	A2	2.7	1.6	0.5		Strong approx circular anomaly with strong shadow and scour mark surrounding it.	
7057	Dark reflector	545890	6263509	A2	1.3	0.4	1.8		Small circular anomaly with long straight edged shadow.	
7058	Debris	547720	6263415	A2	7.1	1.9	0.5		Amorphous shaped anomaly with thin linear shadow at one end only, in an area of seabed scars probably from fishing.	
7059	Dark reflector	545344	6263265	A2	7.2	1.8	1		Approximately circular anomaly with shadow and possible scour mark or further dark reflector next to it.	
7060	Debris	550711	6263163	A2	6.9	0.9	1		Approximately circular shaped anomaly but a narrow curvilinear protruding from it, slight seabed scour.	
7061	Debris	544630	6263118	A2	7.8	0.7	1.2	22	Two anomalies 75m apart, linear anomaly with shadow 8 x 1 x 1m and small circular dark reflector 6 x 1.5 x 0.5m, with scour mark. Medium strength magnetic anomaly with the vicinity, possibly associated.	
7062	Debris	544376	6263068	A2	0.7	0.4	1.1		Two anomalies approximately 60m apart, a small circular anomaly 1 x 0.5 x 1m with slight scour mark and a second small circular anomaly also approximately 1 x 0.5 x 1m .	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7063	Debris	544694	6262964	A2	2.7	1.2	0		Short linear anomaly 3 x 1m with a ring-like structure 2 x 1 x 1m approximately 15m away to the northeast.	
7064	Debris	551074	6262893	A2	5.1	2.2	1.1		Amorphous shaped strong reflector with surrounding scour mark.	
7065	Debris	544012	6262840	A2	19.7	4.5	0		Large amorphous shaped anomaly possibly with a scour mark in front of it or some depth. Small oblong anomaly 4 x 1.5 x 1m with shadow and possibly in a scour mark. Small anomaly with shadow 2 x 1 x 0.5m. Amorphous shaped anomaly possibly with a slight scour. Set of three small anomalies grouped together with short shadow.	
7066	Dark reflector	548923	6262667	A2	3.2	1.2	0.6		Oval shaped anomaly with shadow and scour mark off one side.	
7067	Dark reflector	544895	6262407	A2	8	1.1	0		Strong amorphous shaped anomaly.	
7068	Dark reflector	544442	6262404	A2	7.6	0.8	0.7		Curvilinear anomaly with shadow.	
7069	Dark reflector	550593	6262317	A2	20	1.1	1.5		Diffuse oval shaped anomaly 4 x 1 x 1.5m with straight edges with weak shadow and a small approx circular anomaly 3.6 x 0.5 x 2m with linear narrow shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7070	Dark reflector	545667	6262268	A2	3.1	1.1	0.5		Small circular anomaly with straight linear shadow.	
7071	Debris	551129	6262081	A2	5.5	7	0.7		Three identical anomalies grouped together in a linear orientation, oval shaped with weak shadows.	
7072	Debris	543948	6261907	A2	125	0.8	1.2		Three small circular anomalies with clearly defined shadows measuring between 1 and 2m in length and all approximately 0.75m in width. Average height of 1m.	
7073	Debris	543606	6261842	A2	5.5	2.4	0		Circular dark reflector with circular bright reflector around it, possibly modern debris.	
7074	Magnetic	545114	6261828	A2	-	-	-	17.49	Medium sized anomaly in an area of enhanced mag response, no SSS anomalies in the vicinity.	
7075	Dark reflector	546278	6261779	A2	3	1.2	1.2		Short linear anomaly with clear shadow.	
7076	Dark reflector	547312	6261698	A2	0.9	0.6	1		Small approx circular anomaly with fan shaped shadow, near area of scallop dredging scars.	
7077	Debris	543829	6261305	A2	8.9	2.7	1.4		Approx sub-circular anomaly 9 x 3 x 1.5m with large diffuse shadow and an amorphous shaped anomaly 2.5 x 1.5 x 1m with large diffuse shadow 165m away. Could be debris as in area of trawl scarring.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7078	Dark reflector	545203	6261266	A2	6.6	2.1	1		Strong approx circular anomaly with clear shadow and scour mark off either end of object.	
7079	Debris	551368	6261221	A2	25	8	0.4		Narrow linear anomaly with weak shadow 7.5 x 0.5 x 0.4m and larger oval shaped anomaly with elongated shadow 3.2 x 1 x 0.7m and a thick curvilinear anomaly 3.6 x 1.1 x 1m with straight edged shadow.	
7080	Debris	544460	6261192	A2	7.5	2.2	0.3		Sub-circular anomaly with shadow and scour marks, possibly a partially buried object.	
7081	Dark reflector	545144	6261029	A2	7.7	2.7	1.6		Two small approx oval shaped anomalies next to each other with extended shadow, at the end of the shadow is a further discrete area of dark reflector.	
7082	Dark reflector	550692	6260829	A2	10.3	3.1	0		Thin linear anomaly with second much smaller weaker anomaly next to it in area of sand ripples.	
7083	Debris	543477	6260822	A2	190	65	1		Narrow linear anomaly. Three anomalies grouped together over an area of approx 190m x 65m with the largest measuring 8m x 1m.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7084	Debris	547551	6260820	A2	150	1	0.8		Two anomalies approximately 150m apart. Linear anomaly 3.8 x 0.5 x 0.8m with scour mark extending off one end and a small approx circular anomaly 1 x 0.7 x 0.5m with pronounced scour mark off one end.	
7085	Dark reflector	548905	6260769	A2	1.9	1	0.6		Small square strong anomaly with shadow.	
7086	Dark reflector	543504	6260485	A2	7.7	1.7	0		Weak, diffuse dark reflector with surrounding patch of very weak dark reflector, possibly a scour mark. Area of bright reflection in front of the anomaly too, possibly indicating a depression.	
7087	Dark reflector	550297	6260432	A2	1.9	0.8	1.2		Oval shaped anomaly with narrow linear shadow, near beam trawl scars.	
7088	Debris	546038	6260287	A2	1.8	0.3	1.2		Two small pointed anomalies with thin linear shadows and scour marks around them. They are approximately similar in size 1.5 x 0.2 x 1m.	
7089	Dark reflector	545518	6260215	A2	2.4	1	1.1		Small curvilinear anomaly with clear shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7090	Named loss	552251	6260185	A3	-	-	-		Steamship Grenmar. Norwegian registered. 463 GRT. Captured and sunk by German submarine in 1917. The wreck was entered in the UKHO database in 1926 and has not been located by subsequent surveys in 1969 or 2008. Given the accuracy of positioning available in 1926 the anomaly could be hundreds or even thousands of metres away or may have been confused with another location.	63700000 1074854 SeaZone, 102784, 31461+M 40 NMRS
7091	Unknown obstruction	552038	6260175	A3	-	-	-		It is likely that this A3 anomaly derived from the RCAHMS database represents an inaccurate copy of the UKHO anomaly 3028 (see WA 7091). Incomplete details are given in the RCAHMS database and do not allow for a clear concordance with the UKHO database to be established.	102785 NMRS
7092	Dark reflector	548504	6260031	A2	5	1.8	0.8		Strong circular anomaly with shadow and scour mark.	
7093	Dark reflector	546847	6259880	A2	28	1.5	1		Weak oval shaped anomaly with long straight edged shadow, isolated with linear anomaly adjacent measuring 4.5 x 1 x 1m with straight edged shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7094	Debris	549289	6259671	A2	1.7	0.8	0.8		Two small circular anomalies side by side, only larger one has been measured s the other is too small.	
7095	Dark reflector	550757	6259479	A2	6.4	1.3	1.1		Thick, curvilinear anomaly with clear shadow.	
7096	Dark reflector	543944	6259414	A2	7	1.4	1		Linear fatter anomaly with narrow shadow.	
7097	Dark reflector	545659	6259092	A2	4.1	1.1	1		Approx circular anomaly, other dark reflectors in the surrounding area but this is the only one with a shadow.	
7098	Seafloor disturbance	544031	6259006	A2	18.1	16	0		Oval shaped area containing alternating dark reflectors with areas of sediment, ribbed effect. No obvious features surrounding the anomaly.	
7099	Dark reflector	543655	6258941	A2	2	1.5	1.1		Small approx circular anomaly with narrow long shadow.	
7100	Dark reflector	546647	6258732	A2	3.5	0.8	0.9		Square anomaly with rounded shadow, isolated with geological rock debris/features in the area.	
7101	Dark reflector	549859	6258699	A2	1.4	1.3	1		Small circular anomaly with clearly seen elongated shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7102	Dark reflector	546341	6258635	A2	12.8	3.7	1		Short linear anomaly 3.5 x 1 x 1m with straight edged shadow and amorphous shaped anomaly 9 x 3 x 0.5m with small shadow only on one half not across full length of anomaly.	
7103	Debris	548887	6258398	A2	100	1.5	0.8		Two anomalies 100m apart a strong oval shaped anomaly 3.2 x 0.6 x 0.8m with straight edged shadow and a narrow V-shaped anomaly 4.5 x 1.6 x 0.5m with short linear shadow.	
7104	Dark reflector	546835	6258390	A2	5.4	0.8	0.6		Thick linear with shadow and surrounding scour mark.	
7105	Debris	544847	6258377	A2	6	2.5	1		Two circular anomalies with shadow and a larger diffuse dark reflector area around it.	
7106	Dark reflector	544575	6258349	A2	6.9	3.3	0		Sub-oval shaped strong anomaly, isolated.	
7107	Dark reflector	549555	6258002	A2	2	1	1		Amorphous shaped anomaly with strong shadow and scour.	
7108	Dark reflector	544935	6257901	A2	2.8	1.1	0.7		Curvilinear anomaly with shadow.	
7109	Dark reflector	544865	6257717	A2	4.4	1.3	0		Diffuse edged anomaly with scour mark off one end.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7110	Dark reflector	548278	6257698	A2	7	1.1	1.3		Curvilinear narrow reflector 7 x 1 x 1.5m with shadow associated with an oval shaped strong anomaly with 4 x 1 x 5m and strong scour mark around it.	
7111	Debris	548277	6257695	A2	7	1.1	1.3		Curvilinear narrow reflector with shadow.	
7112	Debris	557659	6257687	A2	25	1.6	1		Strong oval shaped anomaly 4 x 1.6 x 1 and elongated linear anomaly 16.2 x 1.4m with scour mark surrounding it.	
7113	Dark reflector	547903	6257586	A2	4	1	0.8		Approximately circular anomaly with shadow and scour mark off one side and second much smaller circular anomaly adjacent.	
7114	Dark reflector	548889	6257066	A2	4.6	0.3	0.5		Square anomaly with shadow.	
7115	Dark reflector	545009	6257055	A2	6.7	0.8	0.7		Curvilinear anomaly with shadow, possibly in an old trawl scar.	
7116	Debris	550298	6256813	A2	5.9	0.8	0.8		Two short linears with shadow, lots of anomalies in the area, probably geological but these displays height.	
7117	Dark reflector	545896	6256774	A2	1.9	0.8	0.8		Approx circular anomaly with straight linear shadow.	
7118	Dark reflector	545294	6256625	A2	0.9	0.9	1.2		Small, approx circular anomaly with clearly defined shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7119	Dark reflector	557785	6256330	A2	7.6	2.3	1		Diffuse approx circular anomaly with weak shadow and strong surrounding scour.	
7120	Seafloor disturbance	545957	6256286	A2	19.9	32.4	0		Oblong shaped discrete area containing numerous small approx circular dark reflector. Could be a natural feature.	
7121	Magnetic	550872	6256245	A2	-	-	-	27.24	Medium strength anomaly	
7122	Dark reflector	551141	6256230	A2	0.9	1.1	1.1		Approximately circular anomaly with shadow and scour mark surrounding it.	
7123	Magnetic	547964	6255915	A2	-	-	-	118.38	Strong magnetic anomaly but no sidescan sonar anomaly identified at this location.	
7124	Magnetic	548259	6255825	A2	-	-	-	68.53	Medium sized anomaly, possibly debris.	
7125	Debris	547532	6255565	A2	2.9	1	1		Two small circular anomalies with separate shadows.	
7126	Dark reflector	547614	6255328	A2	0.9	0.7	0.8		Small approximately circular anomaly with shadow and slight scour mark off one side.	
7127	Magnetic	548134	6255298	A2	-	-	-	48.3	Medium sized anomaly.	
7128	Dark reflector	556332	6255277	A2	1.1	1.1	1.1		Oval shaped anomaly with shadow and scour mark surrounding it.	
7129	Dark reflector	549434	6255188	A2	3.8	1	1.3		Short and thick linear with surrounding scour mark.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7130	Dark reflector	549500	6254149	A2	5.3	0.9	0.7		Curvilinear anomaly with elongated straight shadow. Other similar anomalies in the area.	
7131	Dark reflector	547423	6253450	A2	0.7	1.1	0.6		Oval shaped anomaly with extended shadow, in area of coarser sediment.	
7132	Wreck	546968	6252856	A1	78.6	13.6	6.1	54	Elongated area containing numerous parallel linear dark reflectors indicating structure. Wreck is sitting on the seabed upright, one larger piece of debris visible nearby but otherwise appears intact, surrounding seabed is featureless. Further details are given on the wreck sheet (Figure 17A.15).	121116 NMRS, 23563000 27688765 Seazone, 63700000 1074829 Seazone, UKHO 3003
7133	Unknown obstruction	547921	6252714	A3	-	-	-		The UKHO records this location as a Dead Obstruction. The entry appears to be related to a report by the HMS Welcome in the 1950s. A subsequent survey of the location by Gardline in 2008 failed to find any anomaly here and the entry was amended to Dead. It is considered likely that the anomaly recorded in the original survey was confused with UKHO 3003 (WA 7132).	63700000 1074828, SeaZone+ M112, UKHO 3002
7134	Dark reflector	552358	6252598	A2	2.2	1	1.9		Diffuse approximately circular anomaly with shadow and scour mark.	

EXPORT CABLE ROUTE ANOMALIES

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7135	Magnetic	543753	6259498	A2	-	-	-	103.8	Large distinct monopole, though located in an area of numerous natural anomalies.	
7136	Dark reflector	543448	6258357	A2	2.3	0.7	0.6		Two overlapping linears with shadow showing uneven height.	
7137	Magnetic	544053	6257433	A2	-	-	-	49.4	Poss. Dipole, though located in an area of numerous natural anomalies.	
7138	Debris	543748	6257390	A2	4	4	0.5		Circular raised area, possibly natural but might be buried piece of debris.	
7139	Dark reflector	544122	6257331	A2	1.4	0.8	1.1		Weak curvilinear anomaly with scour.	
7140	Debris	544078	6257167	A2	29.6	10.4	0.1		Irregular shaped area containing an almost circular dark reflector with faint intermittent linear dark reflectors at the base. Possibly almost buried debris. Discrete area containing ring shaped dark reflector with intermittent linear running off either side and possibly further curvilinear dark reflector adjacent to ring shaped section.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7141	Recorded wreck	543387	6257055	A3	4	1	0.5		A piece of wreckage, thought to represent either trawling gear or possibly an aircraft was noted at this location in 1995 during a survey by HMS Berkeley. The anomaly was recorded by underwater remote camera and noted to be approximately 4 metres long, 1 metre wide and 0.5 metres high. It is also described as 'broken in half' although no further clarification is given. A subsequent resurvey of the area as part of the Civil Hydrography Programme in 2008 failed to find any trace of wreckage at this point and the UKHO entry was amended to dead as it is no longer considered as a navigational hazard. However this location will still have a potential cultural heritage interest.	NMRS ID 200041, 120972; 63700000 1074967 Seazone, 23563000 27688688 Seazone
7142	Magnetic	544273	6256710	A2	-	-	-	25.9	Poss. Complex anomaly, located in an area of numerous natural anomalies.	
7143	Magnetic	544433	6255660	A2	-	-	-	56.2	Poss. Dipole, though located in an area of numerous natural	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									anomalies.	
7144	Debris	544091	6255398	A2	6.3	2.5	0		Complex looking anomaly, possibly piece of debris consisting of curvilinear dark reflector with attached linear off to one side.	
7145	Dark reflector	543581	6255381	A2	2.1	1.5	0.4		Two oval shaped anomalies one in front of the other both showing height.	
7146	Debris	543443	6255364	A2	2	0.1	0.4		Possibly at least three small anomalies, 2 linear and 1 circular.	
7147	Dark reflector	543883	6254103	A2	1.8	2.7	0.5		Widely v-shaped anomaly which casts a tapered shadow. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7148	Dark reflector	556264	6253545	A2	6.9	1.1	0.3		Elongated oval shaped anomaly, at beginning of survey line.	
7149	Debris	543397	6253426	A2	2	1.3	0		Horse-shoe shaped anomaly.	
7150	Magnetic	552326	6253418	A2	-	-	-	24.3	Poss. monopole, though located in an area of numerous natural anomalies.	
7151	Dark reflector	543558	6253204	A2	2.5	0.6	0.7		Narrow curvilinear, weak with a strong shadow.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7152	Debris	551435	6253017	A2	6.7	1.6	0.6		Indistinct object with irregular faint dark edge, possible shadow.	
7153	Dark reflector	551362	6252899	A2	5.5	1.5	0.4		Faint outline of feature with a dark edge and possible shadow behind. Similar tag to the North (33086).	
7154	Debris	551317	6252792	A2	22.6	5.3	0		Group of about 5 dark reflectors in a line, one seems to be triangular and twisted out, appears that originally they might have formed one continuous feature but have now been broken up.	
7155	Debris	551810	6252710	A2	7.2	5.6	0.5		Oval shaped dark reflector and immediately adjacent a curvilinear weaker dark reflector, appears partially buried. Approximately 120m to the west is an area of multiple anomalies.	
7156	Debris	551040	6252692	A2	5.6	4.3	0.4		Approximately oval shaped dark reflector, appears as a partially buried area of seabed, possibly debris.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7157	Seafloor disturbance	551672	6252675	A2	6.9	2.9	0.9		Discrete area containing at least 9 pointed oval shaped dark reflectors, all appearing partially buried. 1. Long irregular oval shaped feature 6.9 x 2.9 x 0.9m with a dark edge but no discernible shadow 2. Circular dark reflector 1.5 x 1.3m, in an area of smooth seabed but with many dark reflectors nearby 3. Pointed oval shaped dark reflector 8.3 x 3.4m, appears partially buried in the sediment 4. Indistinct small linear dark reflector with white shadow 5. Indistinct dark reflector 7.6 x 3.5 x 0.5m, one of many similar features, Small irregular oval feature with dark edge and no discernible shadow 6. Curved dark reflector 2.4 x 1.8 x 0.3m, edge of an object, cone shaped. 7. Dark outline of a small sub-rectangular shaped feature 3.2 x 2.8m. No discernible shadow 8. Faint dark reflector 5.4 x 1.9m, hard to distinguish between feature and shadow. Seems to be quite long with a curve at	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									one end. 8. Indistinct dark reflector 6.9 x 2 x 0.2m with possible shadow behind, but in same location of similar features 9. Possible dark edge of an object 8.6 x 1.3m, no obvious shadow but located in area of similar features. No associated magnetic anomalies.	
7158	Dark reflector	551746	6252389	A2	6.1	2.7	0.6		Rectilinear anomaly, isolated. Thick v-shaped linear.	
7159	Debris	548381	6252217	A2	5	0.9	0	16	Elongated and curved anomaly which casts no shadow. This is visible in an area of seabed with little height variation. No comparable anomalies or geological features are noted in the area.	
7160	Magnetic	555476	6251975	A2	-	-	-	30.7	Poss. monopole, though located in an area of numerous natural anomalies.	
7161	Debris	543474	6251892	A2	2.7	0.4	0.9		Weak linear dark reflector with second mini linear dark reflector adjacent.	
7162	Dark reflector	555530	6251885	A2	3.4	1.2	0.4		Approximately triangular shaped anomaly with scour.	
7163	Magnetic	548728	6251873	A2	-	-	-	109.1	Large, distinct dipole, identified on more than one line.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7164	Dark reflector	555622	6251872	A2	2.1	1.4	0.9		Possibly two curvilinears in a scour.	
7165	Debris	548352	6251865	A2	2.2	1.1	0.8		Slightly indistinct anomaly which casts a wide, tapered shadow. This is visible in an area of mostly featureless seabed with little height variation. No comparable anomalies are noted in the area.	
7166	Magnetic	555783	6251753	A2	-	-	-	24.8	irregular anomaly identified on more than one line, poss. Natural? Poss same as 4526.	
7167	Dark reflector	549995	6251655	A2	2.9	1.1	0.5		Approximately oval shaped anomaly with rounded shadow.	
7168	Dark reflector	548206	6251544	A2	1.9	0.2	1.3		Elongated, fine anomaly which casts a shadow along its entire length and scour visible. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7169	Dark reflector	556120	6251378	A2	5.7	2.5	0.4		Two anomalies, a curvilinear and a small circular dark reflector, possibly debris.	
7170	Dark reflector	543857	6251374	A2	2	0.5	0.9		Fine anomaly which casts a bright shadow which is detached from the anomaly. This is visible in an area of seabed with little	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									height variation. No comparable anomalies are noted in the area.	
7171	Debris	550426	6251332	A2	4.3	3.7	1.4		At least three anomalies, one amorphous larger anomaly with two tiny circular anomalies right next to it. One larger linear dark reflector with two smaller oval shaped anomalies in front of it. Dark reflector with a distinct edge and bright slanted shadow. Size anomalous. Irregular dark reflector with hard, straight edge. Anomalous large bright shadow. Within a scatter of small dark reflectors on the seabed.	
7172	Debris	543643	6251306	A2	3.2	0.8	0.4		Approximately oval shaped anomaly with straight edged shadow.	
7173	Dark reflector	548182	6251095	A2	2.7	0.2	0.4		Curved anomaly which casts a rounded shadow. Present within a small disturbance. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7174	Dark Reflector	549714	6250910	A2	3.6	1.9	1		Irregular dark reflector with long height shadow, anomalous to the rest of the smooth seabed.	
7175	Dark reflector	548090	6250893	A2	2.8	1.7	1.4		Distinct round anomaly which casts a rounded and irregularly shaped shadow. This is present in a small seabed disturbance, or scour. The surrounding seabed has little height variation. No comparable anomalies are noted in the area.	
7176	Magnetic	556038	6250815	A2	-	-	-	20.1	Irregular anomaly in an area of noise, poss. Part of noise.	
7177	Debris	549390	6250696	A2	17	5.3	0		Round dark reflector with anomalous height shadow in the middle of a slight seafloor disturbance	
7178	Dark reflector	544173	6250684	A2	2.6	0.4	0.3		Thick linear with straight edged shadow and slight scour.	
7179	Dark reflector	547132	6250602	A2	2.8	0.6	0.4		Elongated anomaly which casts a triangular shaped shadow. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7180	Dark reflector	549328	6250339	A2	4.5	1.1	0.6		Small rectangular dark reflector with bright shadow, beside a much smaller feature in an area of	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									smooth seabed.	
7181	Dark Reflector	549119	6250268	A2	5.3	2	1		Indistinct oval dark reflector within dark shadow, slight scour in front and anomalous height shadow. In an area of smooth seabed. Rounded dark reflector surrounded by slight scour and with a long height shadow anomalous to the rest of the seabed.	
7182	Magnetic	555866	6250255	A2	-	-	-	134.9	Large distinct anomaly, located in area of noise at EOL. Not identified on adjacent lines and prob. Noise.	
7183	Dark reflector	555125	6250123	A2	1.1	0.7	1		Small oval shaped anomaly with curvilinear shadow in an oval shaped scour.	
7184	Dark reflector	544146	6249996	A2	1.9	0.6	1.4		Thick linear in a scour but in area of geological debris.	
7185	Dark reflector	547020	6249877	A2	2	0.6	0.7		Distinct anomaly which casts a blunt ended shadow. This is visible in an area of seabed with some height variation. No comparable anomalies are noted in the area.	
7186	Dark reflector	549101	6249855	A2	2.8	0.6	0.3		Thin curvilinear with shadow at one end.	
7187	Dark reflector	543456	6249738	A2	2.9	0.4	0.4		Narrow linear anomaly.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7188	Debris	548441.8	6249527	A2	3.5	1.3	0.5	8	Square dark reflector with an edge, within a slight scour, anomalous to the rest of the features on the seabed	
7189	Dark Reflector	548458	6249463	A2	5.3	1.6	0.7		Anomalous strong dark reflector 5.5 x 1.5 x 1m, possibly slightly stretched, within slight scour and long shadow and approximately 30m to the north-west a small complex oval shaped feature 2 x 2m.	
7190	Debris	547121	6249420	A2	2.5	1.7	1.1		Two anomalies one a circular dark reflector and immediately next to it a slightly elongated, distinct and curved anomaly which casts a shadow with rounded ends. This is visible in an area of seabed with height variation and coarse sediments. No comparable anomalies are noted from the area. Angular anomaly which casts a shadow that extends beyond the data range. The surrounding seabed has significant height variation.	
7191	Dark reflector	544446	6249326	A2	3.1	0.7	0.7		Thick linear anomaly.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7192	Debris	555326	6249243	A2	20.1	4.9	0		Possibly noise but tagged anuwau. Spiral shaped dark reflector in two pieces 20 x 5m , if not something the water then partially buried in seabed. Approximately 60m away is thick linear anomaly with scour 3 x 1 x 0.5m. Position is of the smaller linear anomaly as it lies within the cable route boundary whereas the larger complex anomaly lies just outside it.	
7193	Magnetic	547826	6249223	A2	-	-	-	34.8	Irregular anomaly identified on more than one line	
7194	Dark reflector	548518	6249007	A2	7	1.1	0.2		Crescent shaped dark reflector 7 x 1 x 0.2m with parallel but smaller curvilinear on its outer edge. Possibly associated with Weak approximately circular anomaly 2 x 1 x 0.1m nearby.	
7195	Wreck	544450	6248961	A1	130	30	6.3	324.8	Two areas of complex linear and curvilinear dark reflectors approximately 130m apart. Firstly are several interconnecting linears with considerable height showing some rectangular structure overall measuring 13.5 x 10 x 6.5m. At least two linear	63700000 1074823 Seazone, 23563000 27688778 Seazone

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									dark reflectors close by so possibly debris further afield. Approximately 130m to the south-east is an area measuring 40 x 25m containing small, diffuse circular and linear dark reflectors with a maximum height of 1m; some of the short curvilinear dark reflectors are parallel and could be interpreted as structural detail but there is also a lot of geological debris in the area. The anomaly continues out of range though so the full extent is not seen to compare it to the UKHO wreck description recorded at this location so it has been interpreted as wreck debris. Further details are given on the wreck sheet (Figure 17A.16).	
7196	Dark reflector	543891	6248954	A2	5	2.3	0.6		Elongated anomaly which casts a pointed shadow to one side. This is visible in an area of seabed with height variation. No comparable anomalies are noted in the area.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7197	Dark reflector	546443	6248910	A2	2	0.3	0.6		Slightly elongated anomaly which casts a blunt shadow. This is visible in an area of seabed with height variation. No comparable anomalies are noted in the area.	
7198	Magnetic	546333	6248898	A2	-	-	-	44.9	Distinct monopole, identified on more than one line	
7199	Magnetic	548481	6248808	A2	-	-	-	264.2	Large, distinct dipole, though not identified on adjacent lines.	
7200	Dark reflector	543987	6248478	A2	6.6	5.6	0		Two objects, one larger pointed oval shaped anomaly and a second smaller oval anomaly next to it.	
7201	Magnetic	544433	6248475	A2	-	-	-	64.9	Poss. Monopole, though located in an area of noise and could be noise.	
7202	Magnetic	546458	6248435	A2	-	-	-	22.1	Poss. Dipole, though located in an area of numerous natural anomalies.	
7203	Debris	546799	6248429	A2	3.3	3	0		Small rounded disturbance. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7204	Dark reflector	553604	6248393	A2	4.3	1.7	0.4		Oval shaped anomaly with narrow linear adjacent.	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7205	Dark reflector	546982	6248385	A2	2	1.3	0.8		Distinct anomaly which casts a long shadow. This is present within a disturbance seen as a dark area of the seabed. It is located at a high point on the seabed. No comparable anomalies are noted in the area.	
7206	Debris	543697	6248260	A2	2.2	0.7	0.7	15.5	V-shaped anomaly with slight scour.	
7207	Dark reflector	543777	6248227	A2	0.6	0.2	0.6		Anomaly which casts a thin tapered shadow. This is located in a depression, and is likely geological. The surrounding seabed is relatively flat. No comparable anomalies are noted in the area.	
7208	Magnetic	546963	6248170	A2	-	-	-	23.7	Poss. Anomaly, though located in an area of numerous natural anomalies.	
7209	Debris	554054	6248105	A2	3.1	2.9	0.7	21	Curvilinear dark reflector suggesting small oval shaped raised area with semi-circular shadow and scour, possibly debris. Possible associated with magnetic anomaly lightly to the south.	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7210	Dark reflector	546580	6247920	A2	2.3	0.8	0.5		Indistinct v-shaped anomaly which casts a tapered shadow. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area. Slightly elongated anomaly which casts a angled shadow. This is visible in an area of seabed with little height variation.	
7211	Debris	546359	6247870	A2	135.1	1.3	0.3		Larger curvilinear dark reflector, in area of lots of geological debris. Anomalous dark reflector with slight scour and bright shadow. Possibly two separate features. Definitely not 135m long.	
7212	Magnetic	547798	6247865	A2	-	-	-	20.6	Poss. Anomaly, though located in an area of numerous natural anomalies.	
7213	Magnetic	545771	6247848	A2	-	-	-	24.4	Poss. Anomaly on edge of natural feature.	
7214	Debris	546533	6247779	A2	8.8	1.9	0.6		One anomaly. Large diffuse curvilinear anomaly in area of geological debris. Linear feature, with a bend at one end, or possibly two separate dark reflectors. Anomalous bright shadow, Linear dark reflector with a	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									kink. Bright shadow behind. Anomalous to all other features Rectilinear anomaly, lots of geological debris in the area.	
7215	Debris	546389	6247293	A2	3.6	1.7	0		Two parallel linear anomaly, striation like with gap in between, possibly piece of debris.	
7216	Dark reflector	543695	6247198	A2	4.6	0.8	0.6		Thick curvilinear anomaly with straight edged shadow.	
7217	Dark reflector	544116	6247058	A2	2	0.7	0.5		Narrow linear anomaly in discrete area of scour.	
7218	Magnetic	552858	6246923	A2	-	-	-	30.5	Poss. monopole, though located in an area of numerous natural anomalies.	
7219	Dark reflector	545775	6246883	A2	2.5	0.4	0.6		Elongated anomaly which casts a shadow of varying height along its length. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7220	Dark reflector	543776	6246816	A2	1.5	0.4	0.6		Thick short linear with scour.	
7221	Magnetic	552568	6246773	A2	-	-	-	23.9	Poss. monopole, though located in an area of numerous natural anomalies.	



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7222	Debris	545468	6246743	A2	5.3	2.7	0.9		Discrete approximately circular area containing numerous small circular dark reflectors, maybe a small mound of debris. No structure visible though.	
7223	Dark reflector	552673	6246706	A2	2.3	0.9	0.7		Bar shaped anomaly with surrounding scar.	
7224	Dark reflector	545292	6246553	A2	2	1	0.5		Approximately circular anomaly with rounded shadow.	
7225	Dark reflector	545072	6246551	A2	4	1	1.1		Four dark reflectors with largest being a curved anomaly which casts an elongated, rounded anomaly. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7226	Magnetic	545581	6246425	A2	-	-	-	20.8	Poss. Dipole, though located in an area of numerous natural anomalies.	
7227	Dark reflector	551570	6246338	A2	2.4	0.8	1.2		Bar-shaped rectangular anomaly with slight scour.	
7228	Dark reflector	543453	6246235	A2	2	1.5	0.3		Approximately circular smudged looking anomaly with strong scour surrounding it.	
7229	Debris	545454	6246161	A2	6.5	2.4	0.2		Discrete area containing weak possibly circular dark reflectors, no obvious structure but different	



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									appearance to other geological debris in the surrounding area.	
7230	Debris	552907	6246161	A2	10.5	7.4	0.4		Small discrete area containing at least four separate objects, one is two circular dark reflectors attached to a linear and the rest are small circular dark reflectors.	
7231	Magnetic	543383	6246103	A2	-	-	-	54.4	Distinct monopole, though located in an area of numerous natural anomalies.	
7232	Magnetic	544438	6246035	A2	-	-	-	25.2	Poss. monopole, though located in an area of numerous natural anomalies.	
7233	Dark Reflector	545269	6246030	A2	4.5	3	0		Possibly two dark outlines, no discernible shadow	
7234	Magnetic	544273	6245833	A2	-	-	-	50.4	Poss. monopole, though located in an area of numerous natural anomalies.	
7235	Magnetic	543383	6245563	A2	-	-	-	28.2	Poss. Dipole, though located in an area of numerous natural anomalies.	
7236	Magnetic	547631	6245508	A2	-	-	-	21.3	Poss. Anomaly, though located in an area of numerous natural anomalies.	

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7237	Magnetic	543383	6245480	A2	-	-	-	35.7	Poss. Dipole, though located in an area of numerous natural anomalies.	
7238	Dark reflector	543870	6245470	A2	4.6	2.2	0.9		V-shaped anomaly which casts a tapered shadow. This is visible in an area of seabed with height variation. No comparable anomalies are noted in the area.	
7239	Dark reflector	545074	6245399	A2	2.9	0.5	0.4		V-shaped anomaly which casts a tapered shadow. This is set within a small depression. The surrounding seabed has little height variation. No comparable anomalies are noted in the area.	
7240	Dark reflector	552334	6245379	A2	3.8	2.2	0		Two parallel narrow linear dark reflectors with area of bright reflector in between.	
7241	Dark reflector	544230	6245227	A2	3.1	0.6	0.7		Strong linear with strong scour.	
7242	Dark reflector	544287	6245183	A2	2.2	1	0.8		Large anomaly which casts a significant tapered shadow. This is present in an area of seabed disturbance. The surrounding seabed is of roughly even height. No comparable anomalies are noted nearby.	
7243	Seafloor disturbance	547760	6245155	A2	151.7	52.5	0		Large rectilinear area of diffuse areas of dark	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									reflection with area of bright reflector in between. Possibly structural piece of debris, if it's a pipe/cable it doesn't lead anywhere, modern debris probably.	
7244	Magnetic	545731	6244830	A2	-	-	-	61.6	Large distinct monopole	
7245	Dark reflector	544115	6244610	A2	4.4	2.3	0.5		Two anomalies, one a thin curvilinear and adjacent a thicker linear dark reflector.	
7246	Debris	544197	6244570	A2	2.5	0.4	1.2		Curved anomaly which casts a round shadow. This is visible in an area of seabed with little height variation. No comparable anomalies are noted in the area.	
7247	Magnetic	543683	6244553	A2	-	-	-	38.1	Poss. Dipole, though located in an area of numerous natural anomalies.	
7248	Magnetic	543791	6244260	A2	-	-	-	81.1	Distinct dipole, identified on more than one line. Poss. Same as 4522.	
7249	Dark reflector	544076	6244247	A2	1.9	0.5	0.5		Oval shaped anomaly with rounded shadow and scour.	
7250	Debris	545209	6244048	A2	9.2	8.5	2.5		Approximately circular shaped anomaly with thin linear extending off one side. Possibly piece of debris.	
7251	Magnetic	543843	6244043	A2	-	-	-	42.6	Poss. Dipole, though located in an area of numerous natural	



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									anomalies.	
7252	Magnetic	544003	6243538	A2	-	-	-	28.1	Distinct dipole	
7253	Dark Reflector	542927	6242977	A2	4.8	1.3	0.6		Strong irregular dark reflector with bright shadow, anomalous in size	
7254	Debris	542344	6242285	A2	100	1	0.5		Two dark reflectors approximately 100m apart. Anomalous long, thin strong dark reflector 6 x 1 x 0.5m with bright shadow. Small curved strong dark reflector 3.5 x 1 x 0.5m with anomalous bright shadow .	
7255	Magnetic	542428	6242080	A2	-	-	-	112.7	Distinct but complex anomaly, only identified on one line., Poss. Natural/noise?	
7256	Dark reflector	542633	6241758	A2	2.8	1.5	0.2		Circular shaped anomaly with scour, could be natural but isolated.	
7257	Magnetic	542603	6241613	A2	-	-	-	25.7	Distinct dipole	
7258	Dark Reflector	541762	6241546	A2	9.8	3.5	1.3		Oval of dark reflector with bright shadow inside, suggesting height at one side of the object	
7259	Debris	542191	6241527	A2	4	3	0		Oval shaped bright reflector with curvilinear dark reflector on one side, could be an object with shadow but it's not clear.	

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7260	Dark Reflector	541640	6240940	A2	3.1	1.3	0.5		Two anomalies approximately 30m apart. Anomalous strong pointed dark reflector 3 x 1.5 x 0.5m with a pointed shadow. Irregular shaped strong dark reflector with anomalous large shadow. Small faint line of dark reflector at either side of the main object with slight scour in front. And a square dark reflector 3 x 2 x 0.2m with dark edge and bright square shadow behind.	
7261	Magnetic	541748	6240880	A2				40.5	Distinct dipole	
7262	Magnetic	542103	6240735	A2	-	-	-	188.6	Large, distinct anomaly though not identified on adjacent lines.	
7263	Magnetic	541618	6239873	A2	-	-	-	90.3	Distinct dipole	
7264	Magnetic	541046	6239323	A2	-	-	-	167.1	Possible large anomaly on the edge of anomaly caused by pipeline.	
7265	Magnetic	541048	6239318	A2	-	-	-	357.8	Large, distinct linear anomaly. Prob. Pipeline.	
7266	Debris	541273	6238917	A2	9.6	9	0.9		Larger rectangular shaped dark reflector with two small approximately circular dark reflectors nearby.	
7267	Debris	540740	6238831	A2	8.6	1.2	0.3		Narrow linear in between two shorter parallel linear dark reflectors with narrow shadow only showing height	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									in the middle of the anomaly.	
7268	Magnetic	540203	6238570	A2	-	-	-	22.5	Distinct dipole	
7269	Debris	540196	6238568	A2	2.9	1	0.3	8	Small solid dark reflector with large shadow	
7270	Debris	540196	6238568	A2	2.9	1	0.3		Small solid dark reflector with large shadow	
7271	Dark Reflector	540369	6238249	A2	1.8	1.4	0.3		Small pointed dark reflector on the edge of the trackplot with anomalous sized shadow	
7272	Dark Reflector	540166	6237577	A2	2.7	1.4	0.4		Oval shaped strong dark reflector with bright shadow. Size anomalous to the rest of the reflectors in the surrounding seabed.	
7273	Dark Reflector	539817	6237311	A2	4.9	1.1	0.8		Dark reflector with anomalous bright shadow and scour in front	
7274	Magnetic	539763	6236503	A2	-	-	-	28.7	Distinct monopole	
7275	Dark reflector	539268	6236303	A2	7.6	1.8	0.9		Thick bar shaped linear with shadow exhibiting uneven height.	
7276	Debris	539121	6235128	A2	3.5	3.2	0.8		Complex curvilinear and crossing linear dark reflectors, probably piece of debris.	
7277	Dark Reflector	539253	6234291	A2	7.3	1.8	0.3		Irregular strong dark reflector. Possibly small round object with another small linear at an angle.	

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									Scouring in front and anomalous bright shadow following the slant.	
7278	Magnetic	539088	6234190	A2	-	-	-	26.7	Distinct dipole	
7279	Dark Reflector	539308	6233957	A2	3.3	1.1	0.6		Strong rectangular dark reflector with strong bright shadow. Size anomalous to the rest of the seabed	
7280	Magnetic	539763	6233828	A2	-	-	-	20.9	Small but distinct dipole	
7281	Magnetic	539541	6233155	A2	-	-	-	24.7	Distinct dipole	
7282	Magnetic	538701	6232885	A2	-	-	-	36.8	Distinct monopole	
7283	Magnetic	539453	6232808	A2	-	-	-	27	Distinct dipole	
7284	Dark Reflector	538392	6231353	A2	2.4	1.7	0.5		Strong rectangular dark reflector with faint shadow. Size anomalous to the rest of the seabed. In area criss-crossed by seabed scars.	
7285	Magnetic	538868	6230800	A2	-	-	-	31.7	Distinct dipole	
7286	Magnetic	538713	6230755	A2	-	-	-	56.4	Distinct dipole	
7287	Magnetic	538376	6230055	A2	-	-	-	32.1	Distinct dipole	
7288	Magnetic	537603	6229478	A2	-	-	-	45	Distinct anomaly on edge of a natural feature	
7289	Magnetic	537966	6229470	A2	-	-	-	48.6	Distinct dipole	
7290	Magnetic	536768	6228900	A2	-	-	-	50.2	Distinct but irregular anomaly.	
7291	Magnetic	536798	6228788	A2	-	-	-	74.7	Distinct dipole	
7292	Magnetic	537316	6228510	A2	-	-	-	51.6	Distinct anomaly identified on more than one line, poss. Same as 4355	



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7293	Magnetic	537318	6228465	A2	-	-	-	87.6	Distinct anomaly identified on more than one line, poss. Same as 4349	
7294	Magnetic	535941	6228235	A2	-	-	-	71.5	Distinct dipole	
7295	Magnetic	535763	6227858	A2	-	-	-	33.1	Distinct monopole	
7296	Magnetic	535551	6227828	A2	-	-	-	20.3	Poss. Dipole, located in an area of numerous small anomalies.	
7297	Magnetic	535621	6227650	A2	-	-	-	47.3	Distinct dipole	
7298	Magnetic	535531	6227625	A2	-	-	-	112.6	Large distinct dipole, though not identified on adjacent line.	
7299	Magnetic	535783	6227505	A2	-	-	-	20.3	Poss. Dipole, located in an area of numerous small anomalies.	
7300	Magnetic	535938	6227490	A2	-	-	-	33.7	Distinct dipole	
7301	Magnetic	535231	6227388	A2	-	-	-	22.8	Poss. Dipole, located in an area of numerous small anomalies.	
7302	Magnetic	536453	6227265	A2	-	-	-	24.3	Complex anomaly, natural?	
7303	Magnetic	535088	6227003	A2	-	-	-	46.2	Distinct dipole	
7304	Magnetic	536101	6226888	A2	-	-	-	54.6	Distinct monopole	
7305	Magnetic	534663	6226273	A2	-	-	-	26.8	Poss. Dipole, located in an area of numerous small anomalies.	
7306	Magnetic	534528	6226083	A2	-	-	-	38.2	Complex anomaly, poss. Natural?	
7307	Dark Reflector	534079	6225325	A2	5.3	2.2	0.8		Strong dark reflector with bright shadow. Size anomalous tot he rest of the empty seabed.	



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7308	Magnetic	534681	6225300	A2	-	-	-	31.9	Poss. Dipole, though located in an area of numerous natural anomalies.	
7309	Dark Reflector	534076	6225073	A2	2.4	1.8	-0.4		Circle of bright reflector with a surrounding dark edge	
7310	Magnetic	533393	6224908	A2	-	-	-	39.1	Distinct dipole	
7311	Magnetic	534766	6224903	A2	-	-	-	207.2	Large irregular anomaly, though located in an area of numerous natural anomalies.	
7312	Dark Reflector	533746	6224883	A2	2.2	4	0.4		Tight cluster of 4 small dark reflectors, anomalous to the surrounding smooth seabed.	
7313	Debris	534031	6224442	A2	4.4	3.1	1.4		Triangular shaped dark reflector with slight scour and a ring shaped weak dark reflector, possibly attached but lying adjacent to it.	
7314	Magnetic	532838	6224240	A2	-	-	-	108.8	Large distinct dipole, though not identified on adjacent line.	
7315	Dark Reflector	533035	6223990	A2	1.3	0.8	0.6		Small square dark reflector with straight shadow	
7316	Dark Reflector	533031	6223985	A2	2.3	0.5	0.7		Small dark edge of a reflector with anomalous bright shadow	
7317	Dark Reflector	532425	6223467	A2	4.1	1.6	0.5		Anomalous large dark reflector with long height shadow in area of small	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									reflectors on the seabed	
7318	Debris	533505	6223431	A2	3.8	1.2	0.6		Narrow short linear with small circular adjacent, possibly piece of debris.	
7319	Magnetic	532376	6223345	A2	-	-	-	42.3	Poss. Monopole, though located in an area of numerous natural anomalies.	
7320	Magnetic	532253	6223333	A2	-	-	-	103.4	Poss. Dipole, though located in an area of numerous natural anomalies.	
7321	Magnetic	531956	6223123	A2	-	-	-	63.3	Poss. Dipole, though located in an area of numerous natural anomalies.	
7322	Magnetic	532303	6223093	A2	-	-	-	31.9	Distinct dipole	
7323	Dark Reflector	531976	6222965	A2	4.3	1.6	0.3		Strong dark reflector, slightly bent, with a small shadow behind. In an area of disturbed seabed but anomalous to the surrounding reflectors.	
7324	Magnetic	531763	6222965	A2	-	-	-	58.3	Poss. Dipole, though located in an area of numerous natural anomalies.	
7325	Magnetic	531671	6222895	A2	-	-	-	3059.6	very large distinct anomaly, though located in an area of numerous natural anomalies.	

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7326	Magnetic	531601	6222838	A2	-	-	-	545.4	Large distinct anomaly, though located in an area of numerous natural anomalies.	
7327	Dark Reflector	531356	6222797	A2	2.7	1.1	0.6		Square dark reflector with an edge and an anomalous bright shadow	
7328	Dark Reflector	531742	6222618	A2	2.7	1	0.7		Two small round dark reflectors next to each other. One has a pointed shadow behind, the other has a small scour in front. Size anomalous to the rest of the reflectors on the seabed.	
7329	Dark Reflector	531037	6222528	A2	4.1	1.3	0.4		Rectangular dark reflector with bright shadow, anomalous to surrounding objects on the seafloor	
7330	Dark Reflector	530790	6222515	A2	2.6	0.9	0.4		Two dark reflectors next to each other. One with large anomalous shadow	
7331	Dark Reflector	531405	6222501	A2	12	1.4	0.3		Two anomalies approximately 10m apart. Small strong irregular dark reflector with bright shadow 1.5 x 1.5 x 0.3m and distinct rectangular dark reflector 2 x 1 x 0.5m with anomalous height shadow.	
7332	Magnetic	529193	6221200	A2	-	-	-	48.1	Distinct monopole	
7333	Dark Reflector	529128	6221144	A2	2.9	0.8	0.4		Strong square dark reflector with anomalous bright	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									shadow	
7334	Magnetic	528131	6220573	A2	-	-	-	59.1	Irregular anomaly.	
7335	Magnetic	528051	6220470	A2	-	-	-	131.5	Large distinct monopole	
7336	Magnetic	527836	6220443	A2	-	-	-	44.2	Irregular anomaly, probably same as 4182	
7337	Magnetic	527843	6220378	A2	-	-	-	143.6	Large distinct monopole, probably same as 4169	
7338	Magnetic	528368	6220268	A2	-	-	-	206.7	Poss. Large, distinct monopole within a broad natural anomaly. Only definitively identified along one line.	
7339	Magnetic	528811	6220118	A2	-	-	-	33.7	Distinct monopole	
7340	Magnetic	526996	6220103	A2	-	-	-	67.3	Distinct dipole	
7341	Magnetic	526666	6220048	A2	-	-	-	26.6	Distinct monopole	
7342	Magnetic	527631	6219715	A2	-	-	-	21.3	Distinct monopole	
7343	Magnetic	526891	6219405	A2	-	-	-	24.7	Complex anomaly, poss. Two adjacent features.	
7344	Magnetic	524916	6219320	A2	-	-	-	896.4	Large, distinct dipole, only identified on one line. Located in an area of large, broad, natural anomalies.	
7345	Magnetic	524738	6219153	A2	-	-	-	168.6	Large distinct monopole	
7346	Magnetic	524653	6219113	A2	-	-	-	49.6	Poss. Anomaly on edge of natural feature.	
7347	Magnetic	524688	6218730	A2	-	-	-	40.7	Distinct dipole	
7348	Debris	523154	6218453	A2	5.4	12.1	0		Small oval area of dark and bright reflectors anomalous to the surrounding seabed. No magnetic contact tho	

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7349	Magnetic	524058	6218400	A2	-	-	-	67.4	Distinct dipole	
7350	Debris	522619	6218331	A2	9.7	7.1	0		Small area of bark and bright reflectors. Looks almost a dipole. Anomalous to the surrounding smooth seabed	
7351	Magnetic	524166	6218293	A2	-	-	-	50.7	Distinct dipole	
7352	Magnetic	522371	6218245	A2	-	-	-	32	Poss. Monopole in noisy data, though could be noise. Poss. Part of 4088.	
7353	Magnetic	522236	6218178	A2	-	-	-	186.1	Large, broad anomaly identified on more than one line. Poss. Natural though no seabed feature identified. Poss. Related to 4075 and 4087.	
7354	Magnetic	522611	6217910	A2	-	-	-	37.9	Distinct dipole, identified on more than one line.	
7355	Magnetic	520058	6217708	A2	-	-	-	32	Distinct dipole	
7356	Debris	519992	6217691	A2	2.8	1.7	0.7	23.6	Oval shaped dark reflector with pointed bright shadow with a distinct monopole magnetic anomaly.	
7357	Magnetic	518661	6217380	A2	-	-	-	223.1	Distinct monopole, adjacent to similar anomaly 4080. Poss identified on more than one line	
7358	Magnetic	518606	6217370	A2	-	-	-	188	Distinct monopole, adjacent to similar anomaly 4081. Poss identified on more than one line	
7359	Magnetic	520293	6217370	A2	-	-	-	27.5	Poss. Anomaly on edge of natural feature.	



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7360	Dark Reflector	517572	6217359	A2	5.4	2.4	0.7		Small dark reflector within a slight disturbance. Anomalous large shadow.	
7361	Magnetic	517896	6217210	A2	-	-	-	80.5	Distinct dipole	
7362	Magnetic	518388	6217130	A2	-	-	-	42.8	Distinct dipole	
7363	Debris	516402	6217015	A2	7.5	4.5	0.5	225.5	Large circular dark reflector with small curved bright shadow. Dark looks like data issue but not clear if shadow is part of this. Large distinct dipole, poss. Identified on more than one line.	
7364	Magnetic	516571	6216960	A2	-	-	-	1726.2	Very large, distinct dipole. Only definitively identified on one line.	
7365	Magnetic	516001	6216920	A2	-	-	-	62.3	Distinct dipole, poss identified on more than one line	
7366	Magnetic	515936	6216810	A2	-	-	-	52.7	Distinct monopole, poss. Part of a larger natural feature.	
7367	Magnetic	517226	6216743	A2	-	-	-	24.5	Distinct dipole	
7368	Magnetic	516858	6216618	A2	-	-	-	49.6	Distinct monopole, poss. Identified on more than one line	
7369	Magnetic	515841	6216530	A2	-	-	-	134.1	Poss. Anomaly within an area of large, broad natural anomalies.	
7370	Magnetic	516706	6216530	A2	-	-	-	44.2	Distinct dipole	
7371	Magnetic	514251	6216520	A2	-	-	-	35	Distinct dipole	
7372	Magnetic	514586	6216400	A2	-	-	-	33.8	Distinct monopole	

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7373	Magnetic	513533	6216358	A2	-	-	-	26.9	Distinct dipole in area of noisy data.	
7374	Magnetic	516033	6216325	A2	-	-	-	29.4	Poss. Anomaly within an area of large, broad natural anomalies, could be two separate anomalies.	
7375	Magnetic	515578	6216218	A2	-	-	-	21.6	Poss. Anomaly within an area of large, broad natural anomalies.	
7376	Wreck	513250	6216134	A1	1000	275	0.5	6.6 - 26.9	Large but discrete area containing spread of small pieces of debris, at least 14 seen in the sidescan sonar but there could potentially be a lot more buried and dispersed. Anomalies vary in length between 2 and 7m and in width between 0.5 and 2.6m with the greatest height of 0.5m. The pieces of debris are described as follows: Two small anomalies adjacent to each other possibly originally part of the same object. Small strong dark reflector 2 x 1 x 0.2m with thick bar shaped dark reflector 4.5 x 2 x 0.5m which is possibly debris. Irregularly shaped strong dark reflector 2.3 x 2.5 x 0.3m with bright shadow anomalous to the surrounding seabed. Faint	NMRS ID 289393

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
									dark reflector with strong bright shadow. An NMRS record from an entry in Whitaker (1998) states that the Malta was a wooden steam trawler which sank in 1891 after a collision off Fidra. Further details are given on the wreck sheet (Figure 17A.17).	
7377	Magnetic	514991	6216128	A2	-	-	-	41.6	Poss. dipole in area of noise, though could be noise.	
7378	Magnetic	515151	6216100	A2	-	-	-	85.3	Distinct dipole	
7379	Magnetic	515023	6216093	A2	-	-	-	55.3	Distinct monopole	
7380	Magnetic	514838	6216080	A2	-	-	-	105.8	Distinct dipole, identified on more than one line.	
7381	Magnetic	513621	6216073	A2	-	-	-	25.5	Poss. Monopole in area of noise, though could be noise.	
7382	Magnetic	512028	6216063	A2	-	-	-	27.8	Poss. Monopole in area of larger, broader anomalies. Located near a feature identified from seazone hydrospatial data as a pipeline area but it is a single anomaly and not typical of a pipeline.	
7383	Magnetic	514448	6216058	A2	-	-	-	33.3	Distinct monopole	
7384	Magnetic	514343	6216028	A2	-	-	-	23.2	Irregular anomaly, poss. Natural?	
7385	Magnetic	514266	6216015	A2	-	-	-	29.8	Distinct monopole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7386	Magnetic	514991	6215920	A2	-	-	-	46.1	Distinct dipole	
7387	Magnetic	513176	6215910	A2	-	-	-	27.9	Small but distinct dipole	
7388	Magnetic	513778	6215805	A2	-	-	-	22.1	Distinct anomaly, poss. Part of a natural linear feature.	
7389	Magnetic	512446	6215800	A2	-	-	-	20	Small but distinct dipole	
7390	Magnetic	512386	6215780	A2	-	-	-	39.9	Broad but distinct anomaly, poss. Two separate features.	
7391	Magnetic	513388	6215755	A2	-	-	-	185.5	Distinct dipole, identified on more than one line.	
7392	Magnetic	511951	6215540	A2	-	-	-	51.1	Distinct monopole	
7393	Magnetic	512411	6215513	A2	-	-	-	32.5	Distinct dipole, identified on more than one line.	
7394	Magnetic	512153	6215475	A2	-	-	-	21.4	Distinct dipole	
7395	Debris	511465	6215445	A2	19.4	6.2	0		Group of dark reflectors anomalous to the surrounding smooth seabed.	
7396	Magnetic	511308	6215395	A2	-	-	-	52.9	Distinct dipole	
7397	Magnetic	511806	6215153	A2	-	-	-	25.7	Small but distinct monopole.	
7398	Magnetic	511516	6214988	A2	-	-	-	101	Distinct dipole, poss part of 4047?	
7399	Magnetic	510648	6214898	A2	-	-	-	24	Possible small anomaly in area of larger, broad anomalies.	
7400	Magnetic	511118	6214880	A2	-	-	-	47.3	Distinct dipole	
7401	Magnetic	511191	6214805	A2	-	-	-	394.5	Distinct but irregular anomaly, identified on more than one line.	
7402	Magnetic	510318	6214755	A2	-	-	-	51.4	Distinct monopole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7403	Magnetic	510853	6214668	A2	-	-	-	30	Distinct dipole	
7404	Magnetic	510016	6214640	A2	-	-	-	20.6	Possible small anomaly in area of larger, broad anomalies.	
7405	Magnetic	510703	6214638	A2	-	-	-	21.8	Possible small anomaly in area of larger, broad anomalies.	
7406	Magnetic	510113	6214585	A2	-	-	-	44.1	Distinct anomaly, poss. Same as 4008.	
7407	Magnetic	509846	6214539	A2	-	-	-	54.1	Distinct dipole in area of larger, broad anomalies.	
7408	Debris	510410	6214505	A2	3.8	2	0.3		Amorphous shaped anomaly, isolated.	
7409	Magnetic	510248	6214435	A2	-	-	-	22.5	Small but distinct monopole.	
7410	Magnetic	509648	6214363	A2	-	-	-	80.9	Distinct dipole in area of larger, broad anomalies.	
7411	Magnetic	509951	6214313	A2	-	-	-	48	Distinct dipole	
7412	Magnetic	509828	6214305	A2	-	-	-	360.3	Large distinct monopole, poss. On more than one line.	
7413	Magnetic	509746	6214260	A2	-	-	-	146.6	Large distinct monopole, poss. On more than one line.	
7414	Seafloor Disturbance	509010	6214108	A2	46.7	29.7	0		Disturbance of irregular dark and bright reflectors. Two more prominent anomalies within it, an irregular dark reflector 4 x 3.2 x 0.6m and linear dark reflector 5.7 x 0.3m	
7415	Magnetic	509328	6213950	A2	-	-	-	28.1	Small but distinct dipole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7416	Magnetic	509468	6213798	A2	-	-	-	117.4	Distinct dipole, though not identified on adjacent line.	
7417	Magnetic	509408	6213770	A2	-	-	-	133.2	Distinct dipole, though not identified on adjacent line.	
7418	Magnetic	509331	6213718	A2	-	-	-	72.9	Distinct dipole, though not identified on adjacent line.	
7419	Magnetic	509499	6213984	A2	-	-	-	8.35	Distinct dipole	
7420	Magnetic	509256	6213908	A2	-	-	-	9.92	Distinct dipole	
7421	Magnetic	508695	6213246	A2	-	-	-	9.97	Distinct dipole	
7422	Magnetic	508516	6212934	A2	-	-	-	4.58	Distinct dipole	
7423	Debris	508250	6212731	A2	8.7	2.4	0.3		Two joined rectangular dark reflectors with a further circular dark reflector off one end, looks structural as regular in appearance but probably debris as relatively small feature. No magnetic anomaly associated.	
7424	Magnetic	508309	6212716	A2	-	-	-	4.36	Distinct dipole	
7425	Recorded wreck	505793	6210061	A3	-	-	-	-	The RCAHMS database includes an entry at this location. This is based on an entry in Larne and Larne (1998). It is unclear which record in Larne and Larne relates to this entry but the possible candidates there all seem to be derived from a superseded version of the UKHO database and therefore this is considered to be a located record.	NMRS ID 200001

WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7426	Debris	505661	6209861	A2	17	5	0.1		Complex irregular looking dark reflector, mainly curvilinear but that could be an artefact from weather noise during data collection. Thin linear dark reflector with one end in a slight scour. Thin linear which thicken progressively toward one end where it display the greatest height as though one section or a pole is still upright. Right near the coast.	
7427	Magnetic	504952	6209064	A2	-	-	-	10.62	Distinct dipole	
7428	Magnetic	504222	6208570	A2	-	-	-	6.58	Distinct dipole	
7429	Magnetic	503948	6208276	A2	-	-	-	15.63	Distinct dipole	
7430	Magnetic	504121	6206853	A2	-	-	-	12.62	Distinct dipole	
7431	Magnetic	504337	6206700	A2	-	-	-	8.2	Distinct dipole	
7432	Magnetic	504189	6206693	A2	-	-	-	18.08	Distinct dipole	
7433	Magnetic	502390	6206546	A2	-	-	-	6.83	Distinct dipole	
7434	Magnetic	502474	6206472	A2	-	-	-	5.22	Distinct dipole	
7435	Debris	502445	6206413	A2	13	0.6	0		Narrow intermittent linear with circular dark reflector at one end, possibly piece of debris partially buried.	
7436	Magnetic	504377	6206356	A2	-	-	-	47.69	Distinct dipole	
7437	Magnetic	504374	6206293	A2	-	-	-	14.63	Distinct dipole	
7438	Magnetic	504053	6206115	A2	-	-	-	10.21	Distinct dipole	
7439	Magnetic	504134	6206089	A2	-	-	-	3.21	Distinct dipole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7440	Magnetic	504277	6206075	A2	-	-	-	23.44	Distinct dipole	
7441	Magnetic	504369	6206069	A2	-	-	-	124.47	Distinct dipole	
7442	Magnetic	504065	6206069	A2	-	-	-	6.62	Distinct dipole	
7443	Magnetic	504272	6206014	A2	-	-	-	19.25	Distinct dipole	
7444	Magnetic	504085	6205990	A2	-	-	-	19.53	Distinct dipole	
7445	Magnetic	504356	6205953	A2	-	-	-	16.35	Distinct dipole	
7446	Magnetic	501691	6205858	A2	-	-	-	10.58	Distinct dipole	
7447	Magnetic	504316	6205852	A2	-	-	-	8.14	Distinct dipole	
7448	Magnetic	504252	6205739	A2	-	-	-	11.05	Distinct dipole	
7449	Magnetic	504227	6205730	A2	-	-	-	13.07	Distinct dipole	
7450	Magnetic	504364	6205696	A2	-	-	-	8.6	Distinct dipole	
7451	Magnetic	504305	6205694	A2	-	-	-	5.17	Distinct dipole	
7452	Magnetic	504269	6205649	A2	-	-	-	4.46	Distinct dipole	
7453	Magnetic	504057	6205638	A2	-	-	-	32.27	Distinct dipole	
7454	Magnetic	504102	6205578	A2	-	-	-	9.08	Distinct dipole	
7455	Debris	504149	6205544	A2	34.1	5.9	0.2		Discrete area but in the vicinity of outcropping bedrock. Irregular complex curvilinear dark reflector at one end with short linears leading off of it, no obvious structure but could indicate something partially buried.	
7456	Magnetic	501572	6205510	A2	-	-	-	5.14	Distinct dipole	
7457	Magnetic	504269	6205224	A2	-	-	-	18.14	Distinct dipole	
7458	Magnetic	504145	6205206	A2	-	-	-	12.28	Distinct dipole	
7459	Magnetic	504231	6205161	A2	-	-	-	15.97	Distinct dipole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7460	Magnetic	504208	6205157	A2	-	-	-	4.62	Distinct dipole	
7461	Magnetic	504210	6205127	A2	-	-	-	24.32	Distinct dipole	
7462	Magnetic	504298	6205122	A2	-	-	-	12.33	Distinct dipole	
7463	Magnetic	501044	6205109	A2	-	-	-	12.04	Distinct dipole	
7464	Magnetic	501058	6205073	A2	-	-	-	9.44	Distinct dipole	
7465	Magnetic	504225	6205064	A2	-	-	-	7.14	Distinct dipole	
7466	Magnetic	504205	6205058	A2	-	-	-	17.99	Distinct dipole	
7467	Magnetic	500785	6205054	A2	-	-	-	9.92	Distinct dipole	
7468	Magnetic	504290	6205017	A2	-	-	-	11.94	Distinct dipole	
7469	Magnetic	504062	6205004	A2	-	-	-	9.77	Distinct dipole	
7470	Magnetic	504172	6204938	A2	-	-	-	9.48	Distinct dipole	
7471	Magnetic	504199	6204924	A2	-	-	-	4.86	Distinct dipole	
7472	Magnetic	500971	6204916	A2	-	-	-	46.4	Distinct dipole	
7473	Magnetic	504198	6204901	A2	-	-	-	6.21	Distinct dipole	
7474	Magnetic	500930	6204869	A2	-	-	-	11.29	Distinct dipole	
7475	Magnetic	500808	6204854	A2	-	-	-	6.22	Distinct dipole	
7476	Magnetic	500955	6204847	A2	-	-	-	12.89	Distinct dipole	
7477	Magnetic	500837	6204834	A2	-	-	-	8.7	Distinct dipole	
7478	Magnetic	500948	6204823	A2	-	-	-	16.41	Distinct dipole	
7479	Magnetic	500965	6204808	A2	-	-	-	7.84	Distinct dipole	
7480	Magnetic	500792	6204790	A2	-	-	-	8.04	Distinct dipole	
7481	Magnetic	500727	6204769	A2	-	-	-	9.72	Distinct dipole	
7482	Magnetic	500870	6204748	A2	-	-	-	9.19	Distinct dipole	
7483	Magnetic	500831	6204715	A2	-	-	-	6.22	Distinct dipole	
7484	Magnetic	504028	6204697	A2	-	-	-	21.4	Distinct dipole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7485	Magnetic	504274	6204688	A2	-	-	-	16.45	Distinct dipole	
7486	Magnetic	504137	6204533	A2	-	-	-	13.94	Distinct dipole	
7487	Magnetic	504305	6204507	A2	-	-	-	13.5	Distinct dipole	
7488	Magnetic	504271	6204326	A2	-	-	-	12.84	Distinct dipole	
7489	Magnetic	504169	6204164	A2	-	-	-	7.92	Distinct dipole	
7490	Magnetic	500402	6204160	A2	-	-	-	25.68	Distinct dipole	
7491	Magnetic	504626	6204129	A2	-	-	-	12.97	Distinct dipole	
7492	Magnetic	500283	6204085	A2	-	-	-	10.65	Distinct dipole	
7493	Depression	500516	6204046	A2	9.5	4.5	0		Thick curvilinear bright reflector encasing an oval shaped diffuse dark reflector. Wide V-shaped dark reflector with a depression in front of it.	
7494	Magnetic	500444	6204009	A2	-	-	-	12.26	Distinct dipole	
7495	Magnetic	500398	6203979	A2	-	-	-	14.51	Distinct dipole	
7496	Magnetic	500425	6203974	A2	-	-	-	53.54	Distinct dipole	
7497	Magnetic	500468	6203939	A2	-	-	-	6.46	Distinct dipole	
7498	Magnetic	500488	6203859	A2	-	-	-	33.74	Distinct dipole	
7499	Magnetic	504402	6203850	A2	-	-	-	4.14	Distinct dipole	
7500	Magnetic	500760	6203838	A2	-	-	-	14.48	Distinct dipole	
7501	Magnetic	504125	6203817	A2	-	-	-	24.17	Distinct dipole	
7502	Magnetic	500589	6203478	A2	-	-	-	4.88	Distinct dipole	
7503	Magnetic	500783	6203420	A2	-	-	-	15.53	Distinct dipole	
7504	Magnetic	500748	6203417	A2	-	-	-	9.3	Distinct dipole	
7505	Magnetic	501452	6203316	A2	-	-	-	23.61	Distinct dipole	
7506	Magnetic	501414	6203306	A2	-	-	-	10.95	Distinct dipole	



WA ID	Name Classification	Easting UTM z30N	Northing UTM z30N	Arch. Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External Refs
7507	Magnetic	501392	6203298	A2	-	-	-	12.04	Distinct dipole	
7508	Magnetic	500910	6203269	A2	-	-	-	8.39	Distinct dipole	
7509	Magnetic	500972	6203196	A2	-	-	-	5.64	Distinct dipole	
7510	Magnetic	501503	6202956	A2	-	-	-	12.73	Distinct dipole	
7511	Magnetic	501462	6202879	A2	-	-	-	6.29	Distinct dipole	
7512	Magnetic	501327	6202677	A2	-	-	-	6.13	Distinct dipole	

ANNEX 17A.4: CASUALTIES

Canmore ID (RCAHMS)	Name	Year of Loss	Description	Easting (UTMz30N)	Northing (UTMz30N)
273813	Unknown	1808	The RCAHMS database includes an entry for a fishing boat 'upset' a few yards off Cockenzie with four of the crew lost. This entry is derived from Whitaker (1998).	502313	6203100
270651	<i>Eliza</i>	1811	The <i>Eliza</i> was on passage from Eyemouth to Grangemouth when it was lost with all of its crew in 'Fidra Roads' in December 1811. The RCAHMS entry for the site suggests that this is the anchorage area to the east of the island. The vessel was registered in Dundee.	513755	6214067
315707	<i>Jessie</i>	1823	The <i>Jessie</i> was a sloop of 78 tons built in 1812. It was wrecked with a cargo of slate on Fidra in 1823. Its coordinates are given in the RCAHMS database based upon the approximate position of its reported loss. Whitaker (1998) has suggested that a spread of wreckage found through hydrographic survey (under a separate entry here) some distance to the north may be the <i>Jessie</i> although this has not been confirmed.	513355	6214061
273970	<i>Isabella</i>	1830	A fishing boat 'upset' off Cockenzie and recorded in Whitaker (1998, 229).	502313	6203100
258920	<i>Union</i>	1840	A wooden smack of 39 tons built around 1840 and registered in Belfast. It was lost with a cargo of ballast after parting its cables and being driven ashore at Cockenzie.	501328	6202086
315708	<i>Lawton</i>	1841	A sloop registered in Arbroath wrecked on Fidra in 1841. It was 39 tons with a length of 13m and a beam of 4m.	513355	6214061
273258	<i>Jasper</i>	1842	This entry is based on the estimated position of loss of a 19th century cargo ship. The <i>Jasper</i> was a sloop with a cargo of gunpowder and herrings which was driven from its moorings and wrecked 'a little to the east of Cockenzie' It was built in 1828 and was recorded as 15m long and 57 tons.	502313	6203100
273283	<i>Emanuel</i>	1843	The <i>Emanuel</i> was a galliot registered in Hanover. It was wrecked while on passage from St. David's to Hambro after stranding two miles west of North Berwick.	512167	6213244
247907	<i>Vine</i>	1851	The <i>Vine</i> was a schooner, registered in Dundee of 83 tons with a crew of 5. It was stranded two miles west of Broad Sands in North Berwick in bad weather while on passage from Dundee to Sutherland with a cargo of ballast. The RCAHMS entry for the vessel is derived from a historical Admiralty list of wrecks and casualties but is not included in the current list. The RCAHMS entry for the site suggests that the vessel may have been refloated as it is not mentioned in Whitaker (1998).	512167	6213244

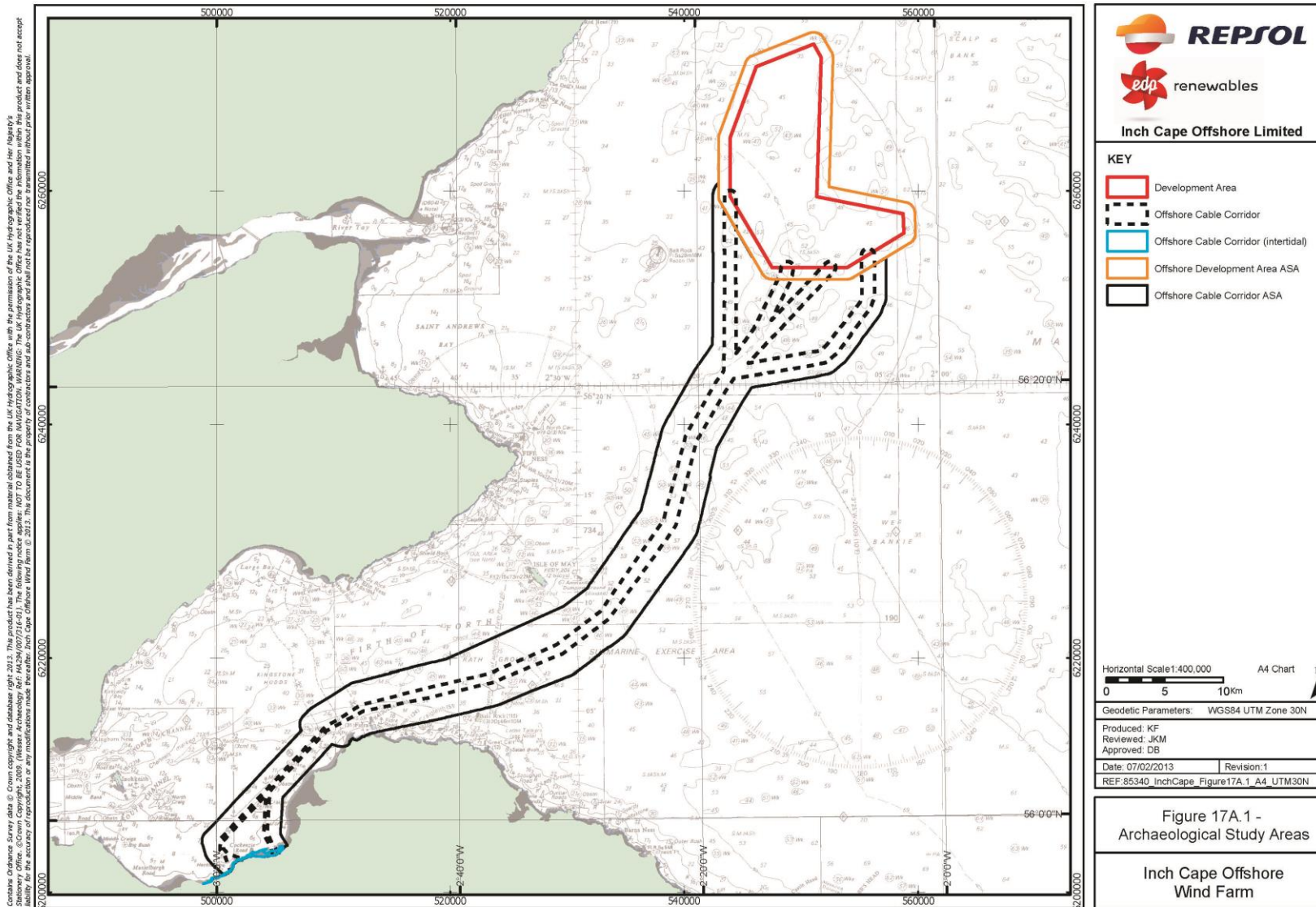
Canmore ID (RCAHMS)	Name	Year of Loss	Description	Easting (UTMz30N)	Northing (UTMz30N)
283037	<i>Jeans</i>	1853	A schooner with a cargo of sleepers was reported as having beached four miles west of North Berwick. The RCAHMS entry suggests that this may have been successfully recovered.	511167	6213229
273816	<i>Rifle</i>	1862	The <i>Rifle</i> was a ship of unspecified type reported to be lost after stranding on rocks near Cockenzie Harbour in 1862. It had been on passage from Berwick to Plymouth with a cargo of potatoes.	501328	6202086
200073	<i>Waterlilly (Possibly)</i>	1862	This entry is included under the title ' <i>Waterlilly</i> '. No further info is given. Another entry (197407) for the same ship states that it was a schooner of 17 tons that founded about a mile WNW of the Lamb Island, near North Berwick in 1862 with a cargo of coals.	510862	6215615
282209	<i>Ondreming</i>	1862	En route Elbing to Aberdeen, carrying bones, abandoned by crew.	551523	6257817
274316	<i>Henry</i>	1865	The <i>Henry</i> was a schooner registered in Shields. It was abandoned at anchor in 1865 after springing a leak while on passage from Bo'ness to Berwick with a cargo of pig iron at Fidra Roads. The RCAHMS entry for the site suggests that this is the anchorage area to the east of the island.	513755	6214067
289418	<i>Matchless</i>	1865	Whitaker (1998, 215) records that a yawl registered in Newhaven was lost in this general area on the 20th of February 1865. No further information or source is given.	515446	6215391
257964	<i>Lawton</i>	1875	The <i>Lawton</i> was a wooden sloop on 30 tonnes, with a crew of 3. It was stranded with the loss of one life at Fidra while on passage from Arbroath to Newcastle in 1875. It was reported as 40 years old which suggests it was built around 1835.	513353	6214161
198456	<i>Falcon</i>	1879	A wooden schooner of 77 tons, registered in Newcastle was lost with its cargo of oats in 1879 after stranding on Fidra Rocks. The crew survived.	513355	6214061
199256	<i>Elim</i>	1888	A wooden schooner of 146 tons, registered in Norway was lost in 1888 after stranding three miles west of North Berwick.	511167	6213229
199930	<i>Gratitude</i>	1889	A wooden ketch with a cargo of coal stranded one mile west of Gullane in 1889. It is suggested in the RCAHMS entry that this loss may be equated with a known wreck outside the ASA (NT48SE 8006).	506211	6210157
199427	<i>Malta</i>	1891	A duplicate entry in the RCAHMS database. Whitaker (1998) states that the Malta was a wooden steam trawler built in 1886 which sank in 1891 after a collision off Fidra with the death of two of its crew.	513138	6215258
289393	<i>Malta (Possibly)</i>	1891	A duplicate entry in the RCAHMS database. Whitaker (1998) states that the Malta was a wooden steam trawler built in 1886 which sank in 1891 after a collision off Fidra with the death of two of its crew.	513523	6216263

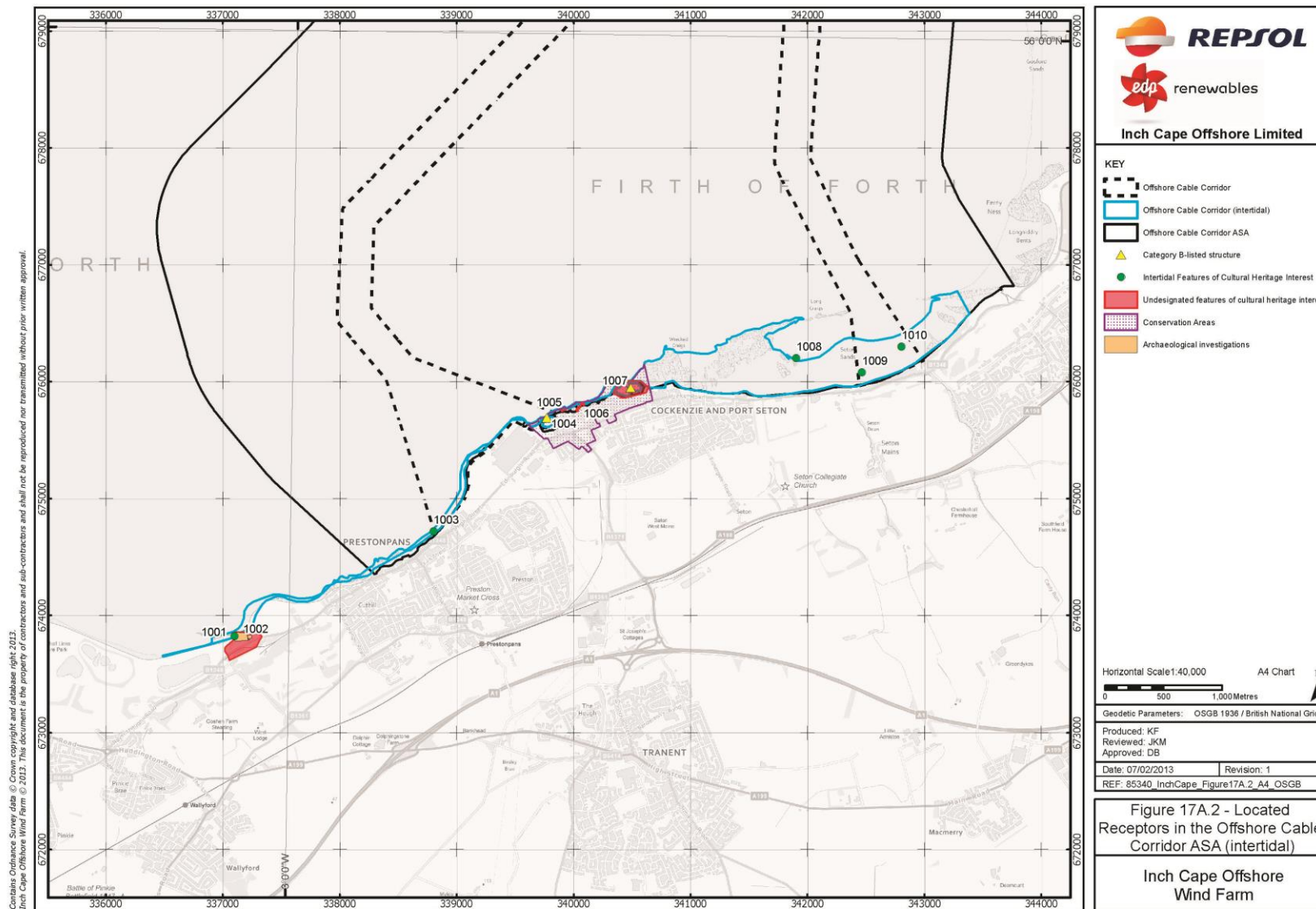
Canmore ID (RCAHMS)	Name	Year of Loss	Description	Easting (UTMz30N)	Northing (UTMz30N)
251751	<i>Jane</i>	1892	A wooden schooner of 94 tons and a crew of 5, registered in Great Yarmouth. This vessel stranded on Eyebroughy Rock in 1892.	511562	6213535
251409	<i>Heather Bell</i>	1895	This was a wooden lugger of 14 tons with a crew of 3. It was lost with its cargo of coal after it was driven from its moorings and stranded at Fidra in 1895. It is recorded in the RCAHMS database, in Whitaker (1998) and in the Abstracts of Shipping Casualties on Coasts, or in Rivers and Harbours of the UK July 1894-95 (1896 [C.8247] LXXV.489).	513353	6214161
200249	<i>Bertha</i>	1900	This is classified as a wooden lighter or dumb barge. It was lost with a cargo of salvage gear after being driven from its mooring beside a stranded steamer, and was itself stranded at 'Ibris' Rock. RCAHMS have suggested that 'Ibris' Rock may be the tidal islet of Eyebroughy	511562	6213535
289354	<i>Tinto</i> (Possibly)	1902	SS <i>Tinto</i> was a steamship built in 1895 and registered in Bo'ness that was recorded as having foundered 3.5 miles NE of the Bass Rock. There are two duplicate entries for the vessel in the RCAHMS database. Only one of these has a location, based on an estimate made by Whitaker (1998, 213) from the reported location of sinking.	528150	6221376
200690	<i>Ann Wilson</i>	1906	A wooden smack of 22 tons registered at Newhaven. It was lost with a cargo of ballast when it wrecked near the pier at Fidra in 1906.	513453	6214162
315711	<i>Lark</i>	1906	A ketch lost at Fidra 'Harbour' in 1906. The RCAHMS entry for the site notes that the island of Fidra has no harbour as such, but that 'Fidra Harbour' is probably the Lighthouse Pier on the east side of the island.	513453	6214162
315712	<i>Menamoi</i>	1909	A wooden smack lost at Fidra 'Harbour' in 1909. It was registered in North Queensferry and was 14 tons. The RCAHMS entry for the site notes that the island of Fidra has no harbour as such, but that 'Fidra Harbour' is probably the Lighthouse Pier on the east side of the island.	513513	6214173
289427	Bristol Beaufighter VI	1944	Whitaker (1998) records that a Bristol Beaufighter VI crashed into the sea 1.5 miles north-east of North Berwick on the 15th June 1944.	518137	6215330
199975	<i>Gosford</i>	WWII	The RCAHMS database includes an entry at this location, described as a dumb barge dating to the 20 th century. This appears to be based on an entry in Larn and Larn (1998). It is unclear which record in Larn and Larn relates to this entry but the possible candidates there seem to be derived from a superseded version of the UKHO database. The entry is also referenced by Ridley (1992). A duplicate entry in the RCAHMS database(102101) states that this was a dumb barge lost in WWII.	503652	6207320

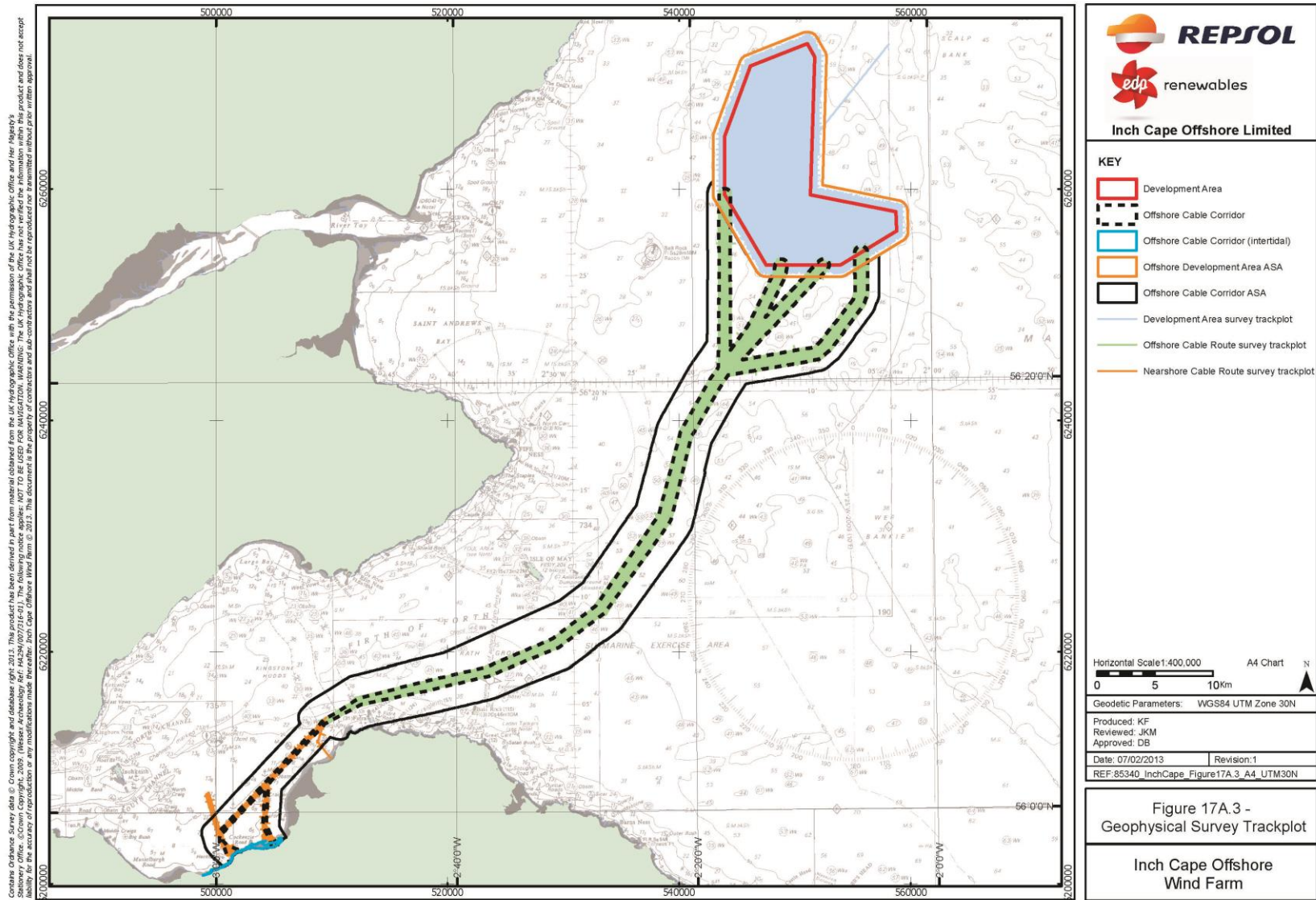
Canmore ID (RCAHMS)	Name	Year of Loss	Description	Easting (UTMz30N)	Northing (UTMz30N)
199716	<i>Caterer</i>	-	A wooden fishing lugger of unknown age was driven from its moorings and stranded at Cockenzie.	501328	6202086
120034	Unknown: Gullane Point	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Baird (1993). No further info is given. The wreck is not mapped in the most recent edition of Shipwrecks of the Forth and Tay (Baird 2009).	505560	6210258
200040	Unknown	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Larn and Larn (1998). Although this is listed as a casualty the ultimate source seems to be an amended UKHO wreck record although no UKHO ID number is given by Larn and Larn and the coordinates given do not match with any current UKHO record.	528490	6221331
102072	Unknown	-	An obstruction recorded in the NMRS database and derived from the Kingfisher book of tows – Vol. 1. It also seems to have been listed in the UKHO database but is not included in the most recent dataset.	532004	6219731
199955	Unknown	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Larn and Larn (1998). It is unclear which record in Larn and Larn relates to this entry but the possible candidates there seem to be derived from a superseded version of the UKHO database.	532857	6221584
316119	Unknown: North Sea	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Whitaker (1998). Although no source is given in Whitaker the RCAHMS database entry notes that UKHO chart no. 190 (1978, revised 1996) charts this wreck as P (osition) A (Approximate) and this seems to be derived from a superseded version of the UKHO database. The nearest wreck in the current dataset is over 800m away so there is no clear correspondence.	533946	6228560
96666	Unknown	-	An obstruction recorded in the NMRS database and derived from the Kingfisher book of tows - Vol 1. It also seems to have been listed in the UKHO database but is not included in the most recent dataset.	533948	6225680
315926	Unknown: North Sea	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Whitaker (1998). No further info is given in Whitaker and the RCAHMS entry suggests this may be a net snag (fisherman's fastener).	534004	6224561
200112	Unknown: Isle Of May	-	A loss of unknown date is recorded at this location in the RCAHMS database and is derived from Larn and Larn (1998). It is unclear which record in Larn and Larn relates to this entry but the possible candidates there seem to be derived from a superseded version of the UKHO database.	534019	6229021

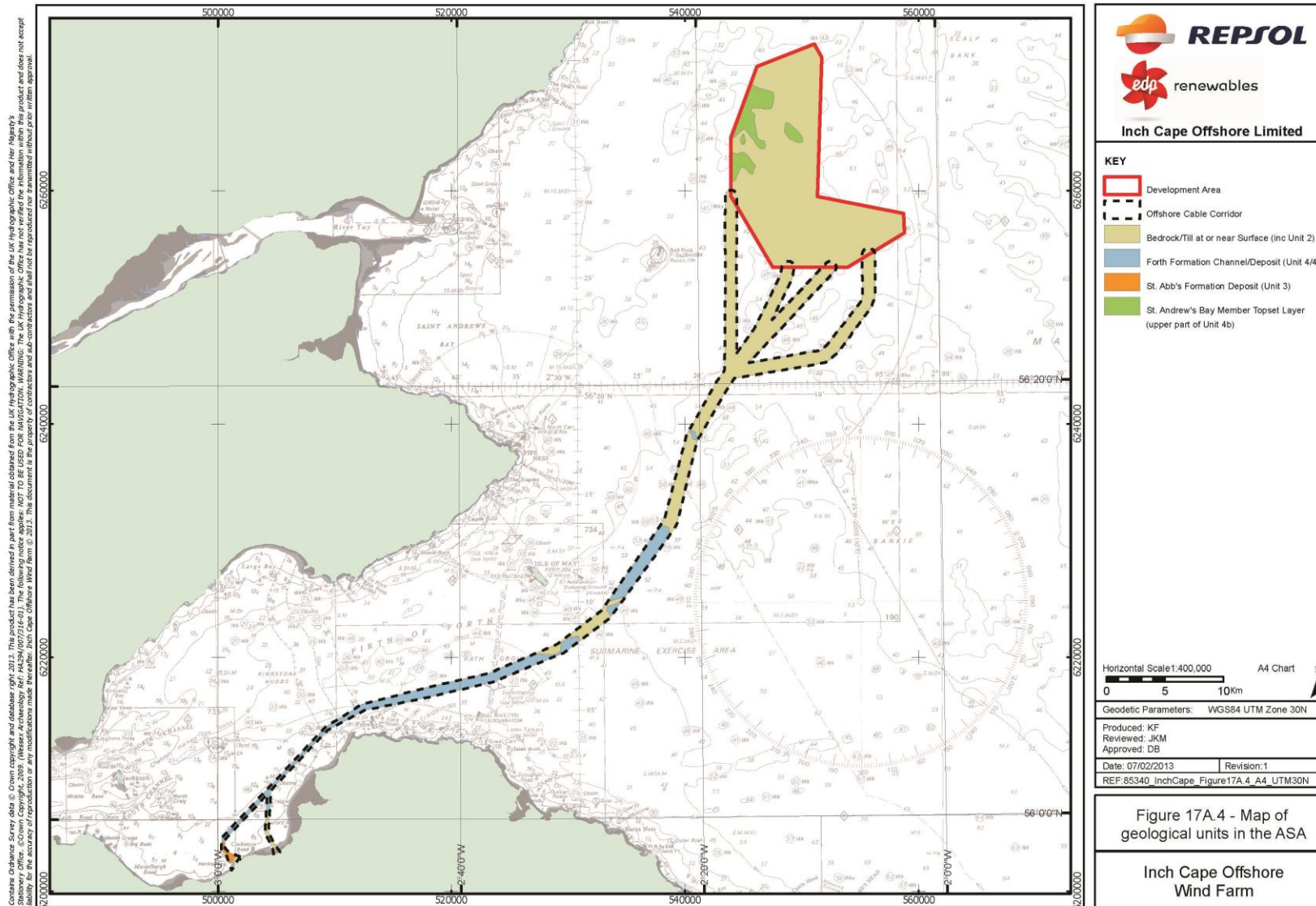


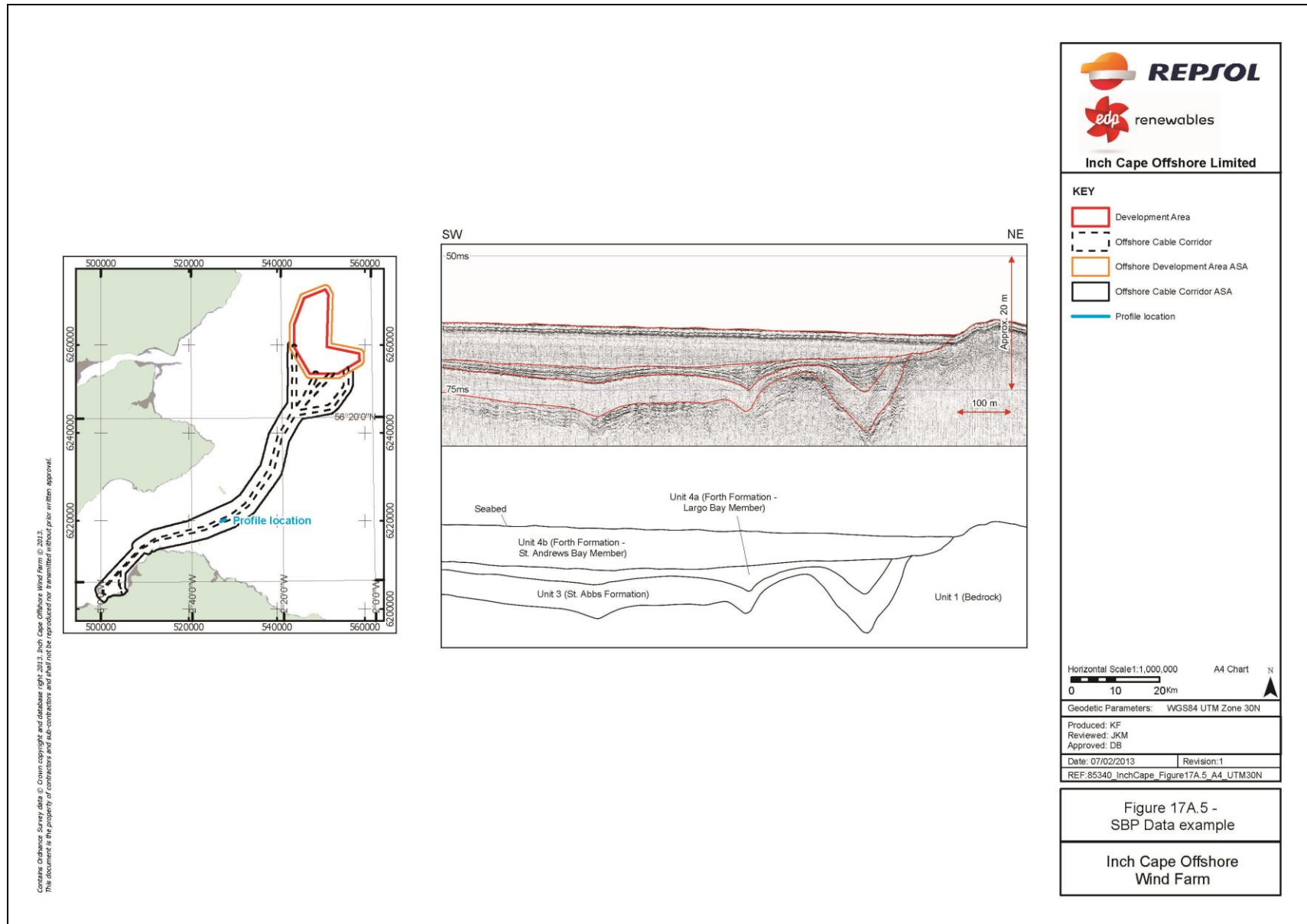
Canmore ID (RCAHMS)	Name	Year of Loss	Description	Easting (UTMz30N)	Northing (UTMz30N)
96705	Unknown	-	This appears to be an incomplete or deleted record in the NMRS database relating to a vessel en route from Aberdeen to Sunderland when it was torpedoed by a submarine. According to the entry three lives were lost. No further information is given although the entry is apparently derived from a list of World War I Shipping Losses. It is likely that this partial record relates to another complete entry elsewhere in the database.	538780	6230360

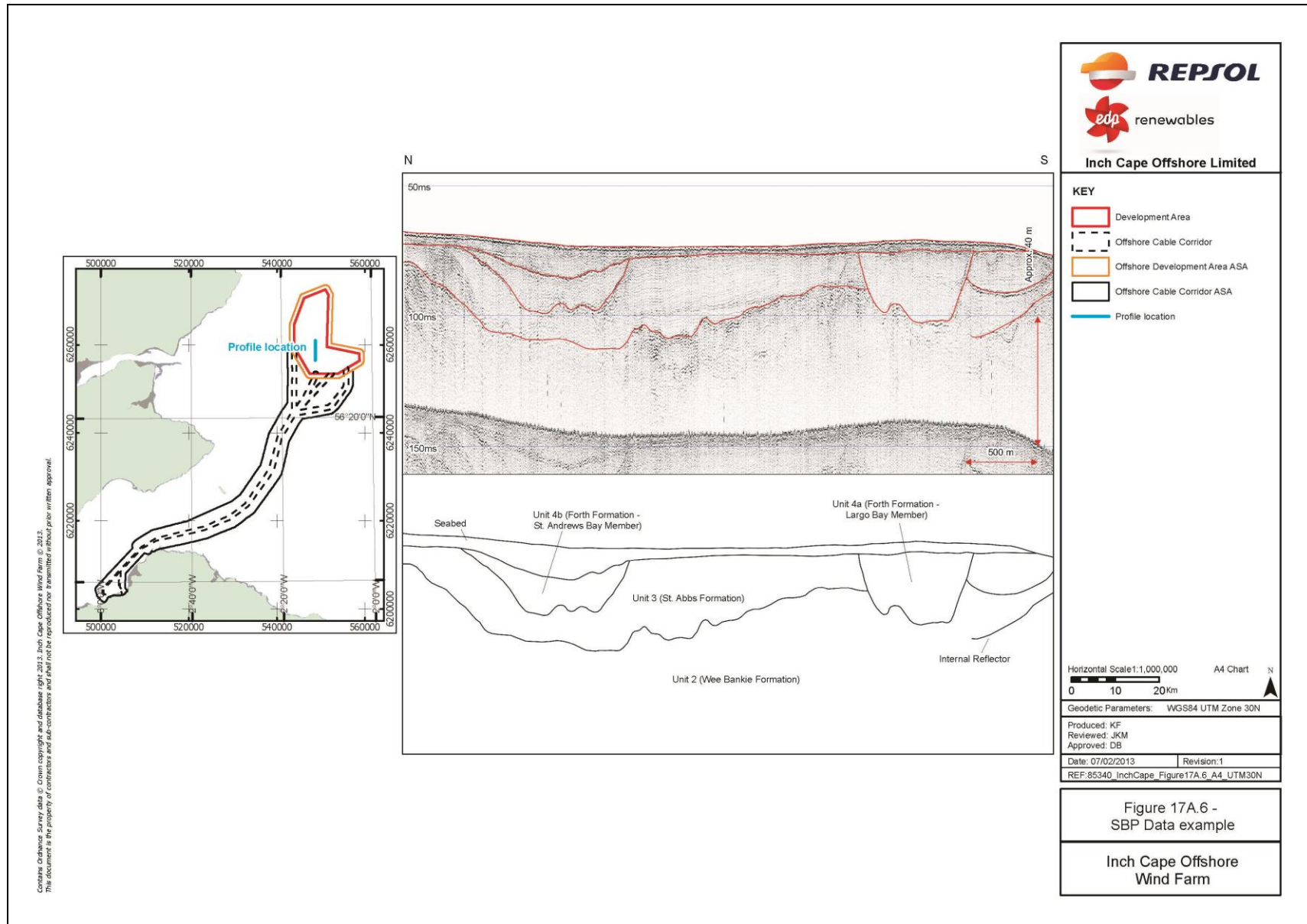


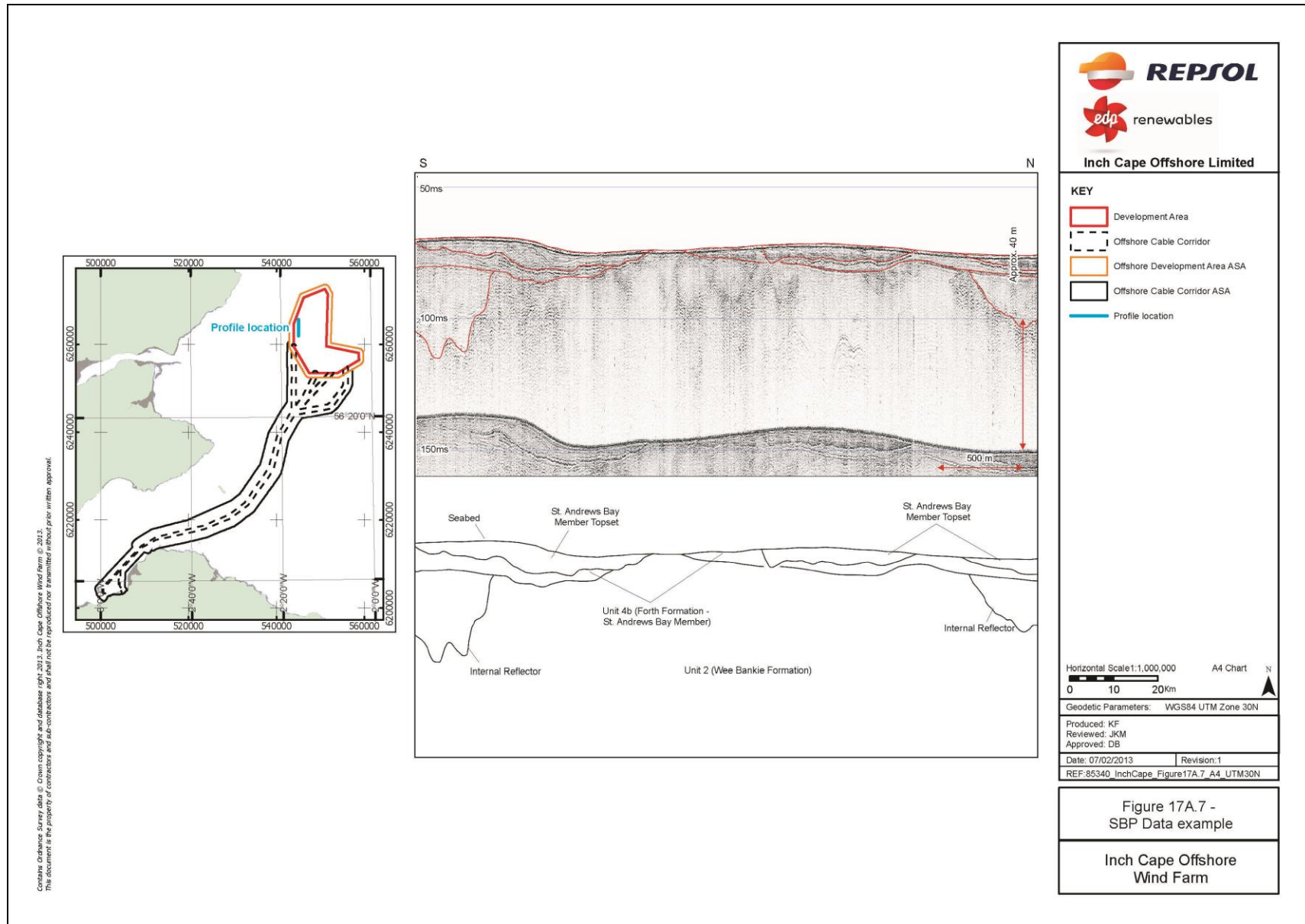


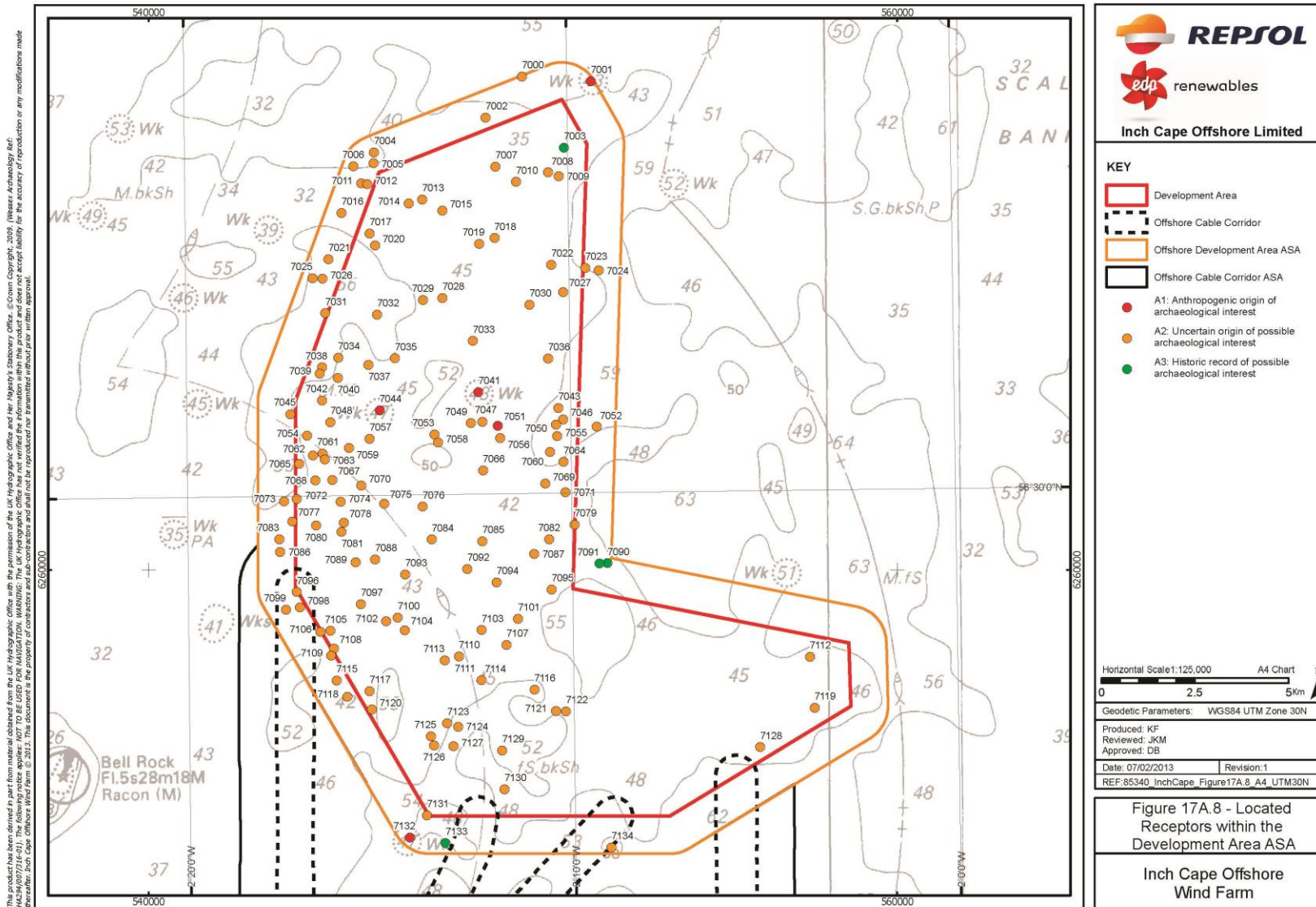


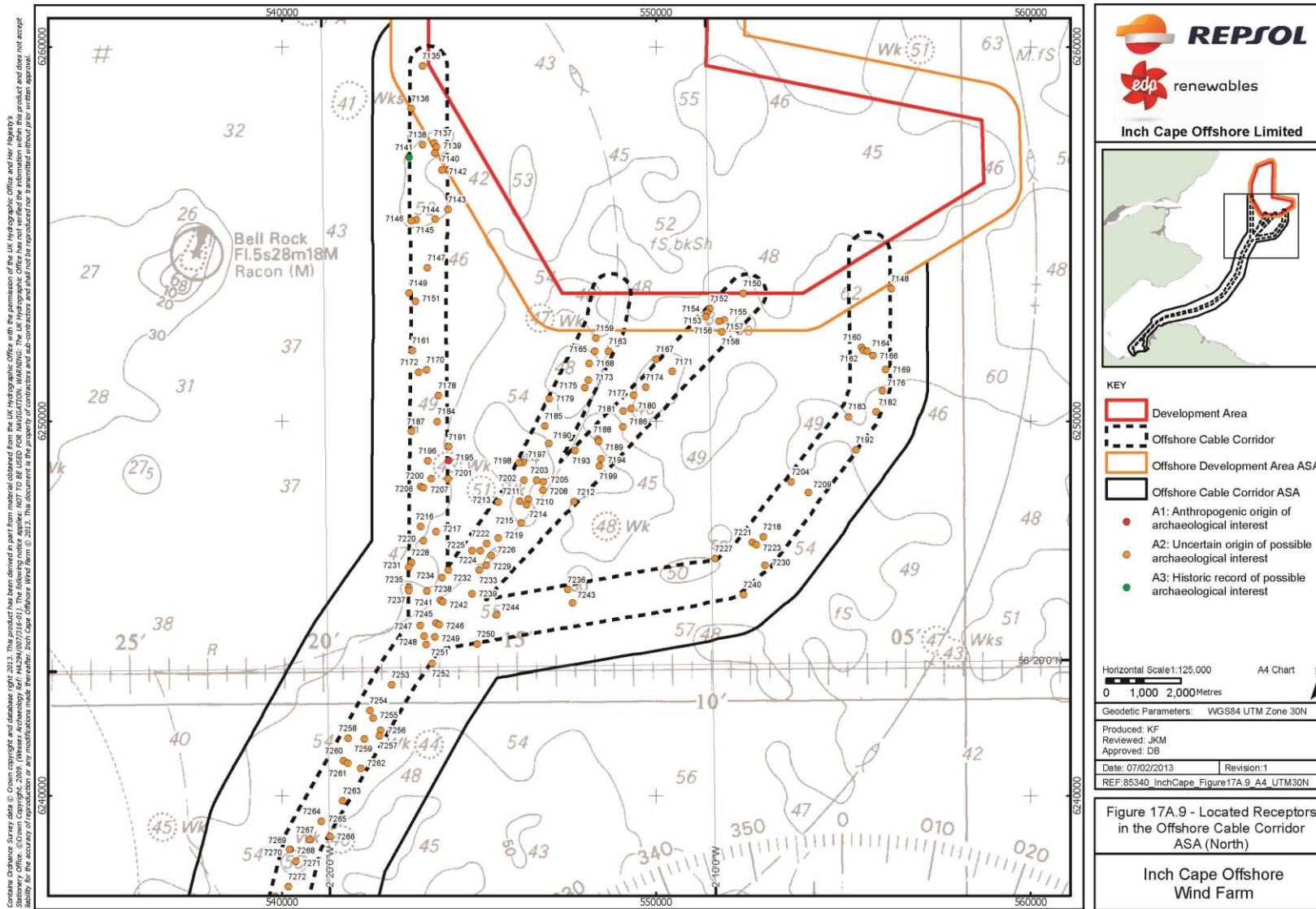


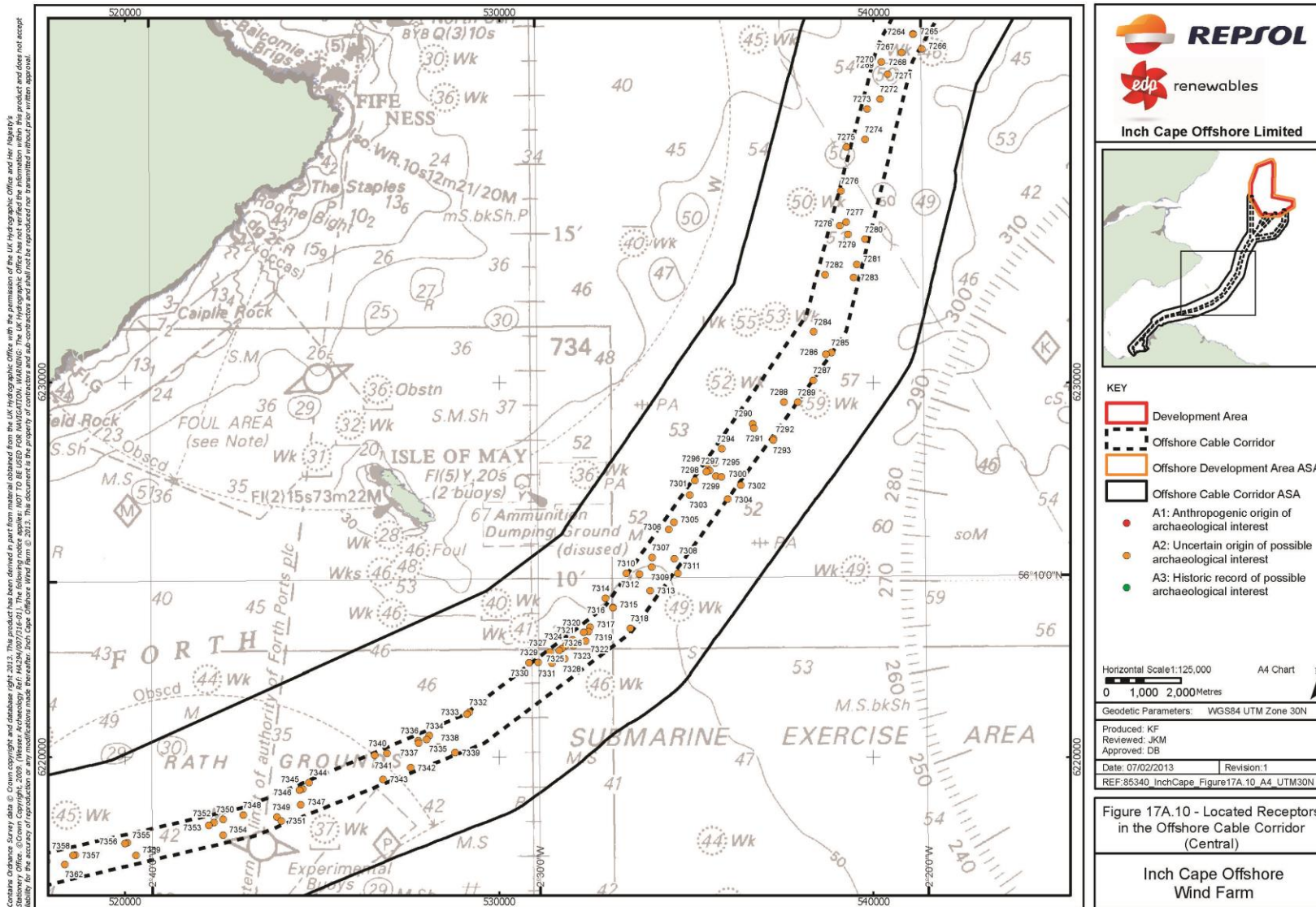




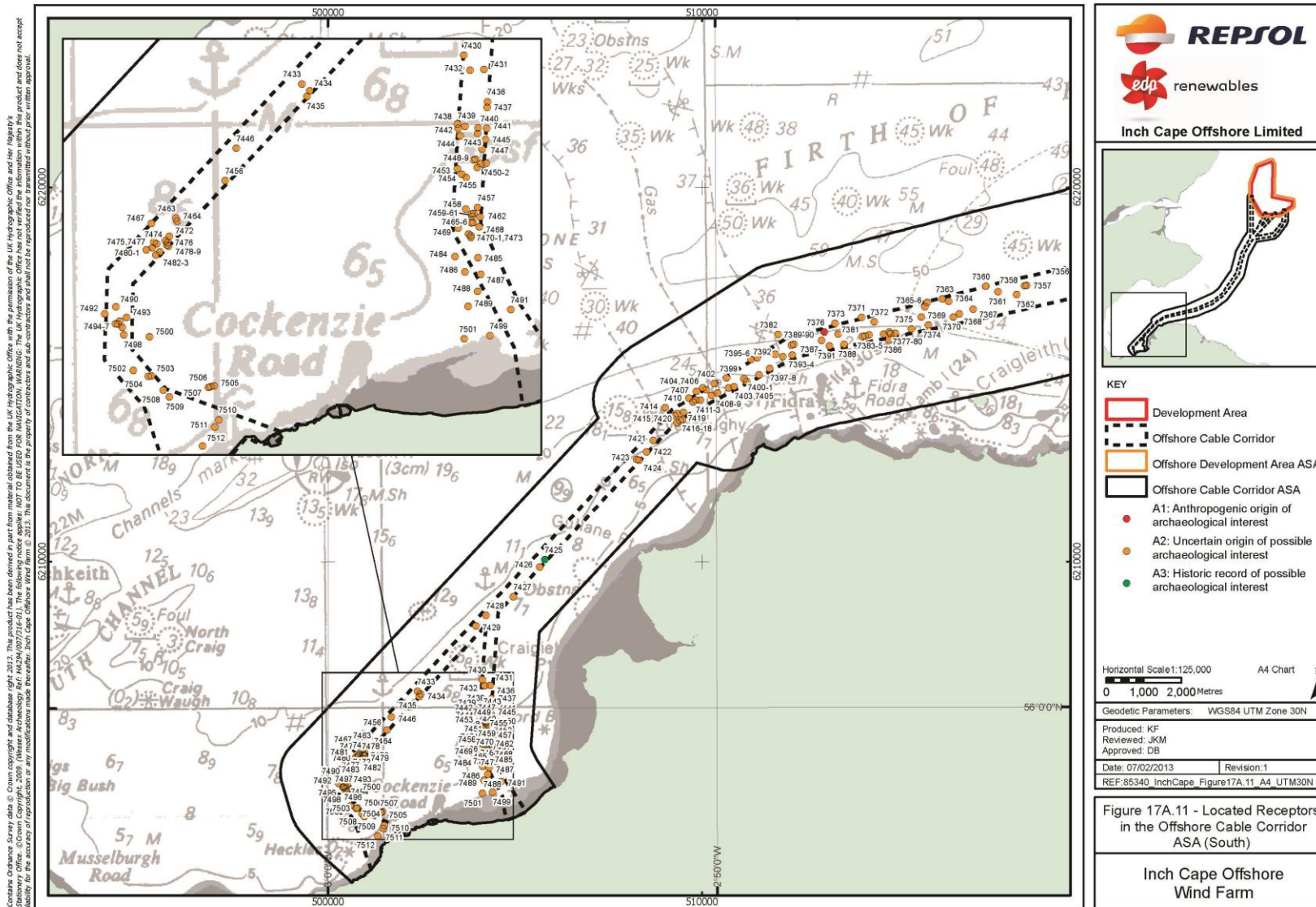


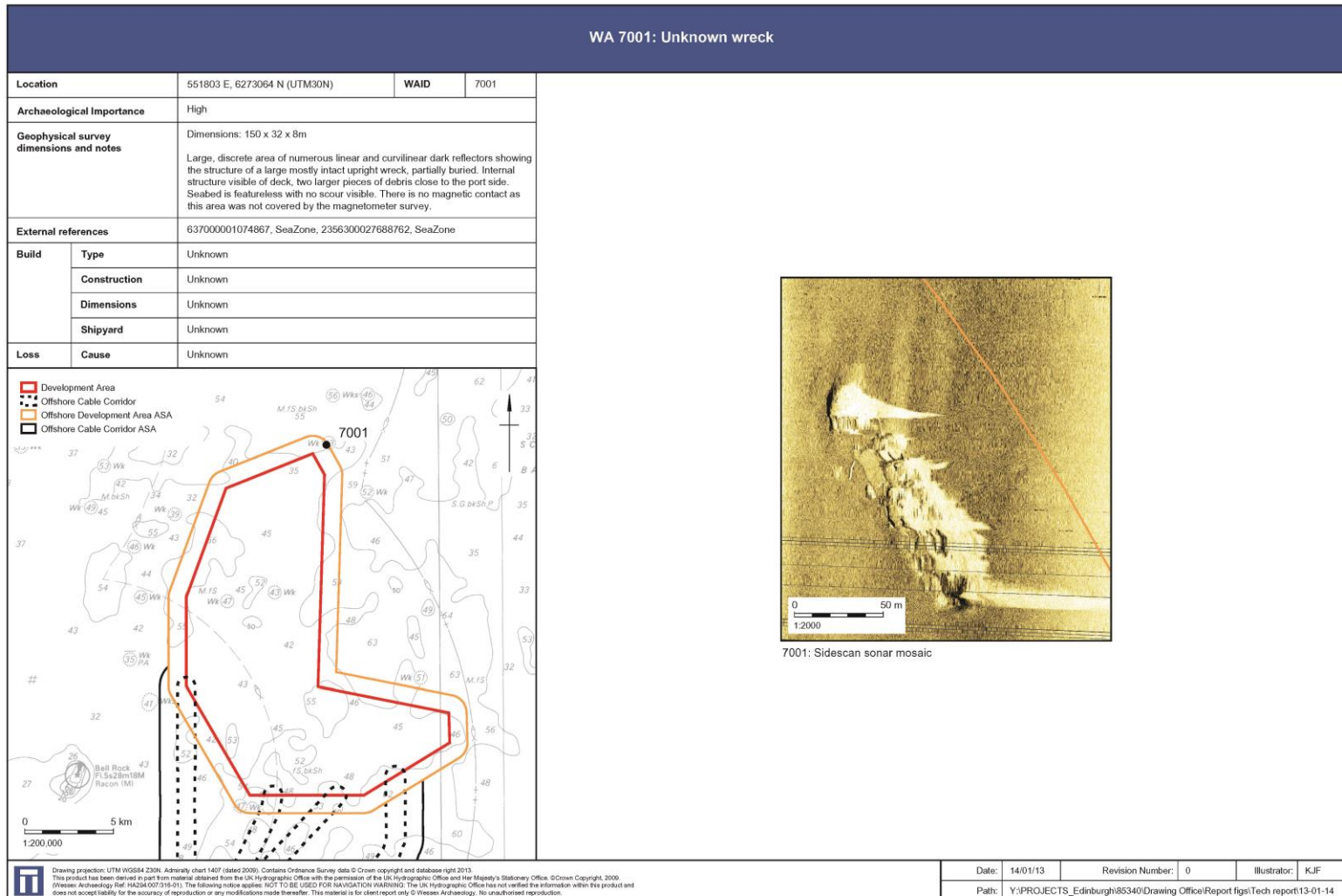






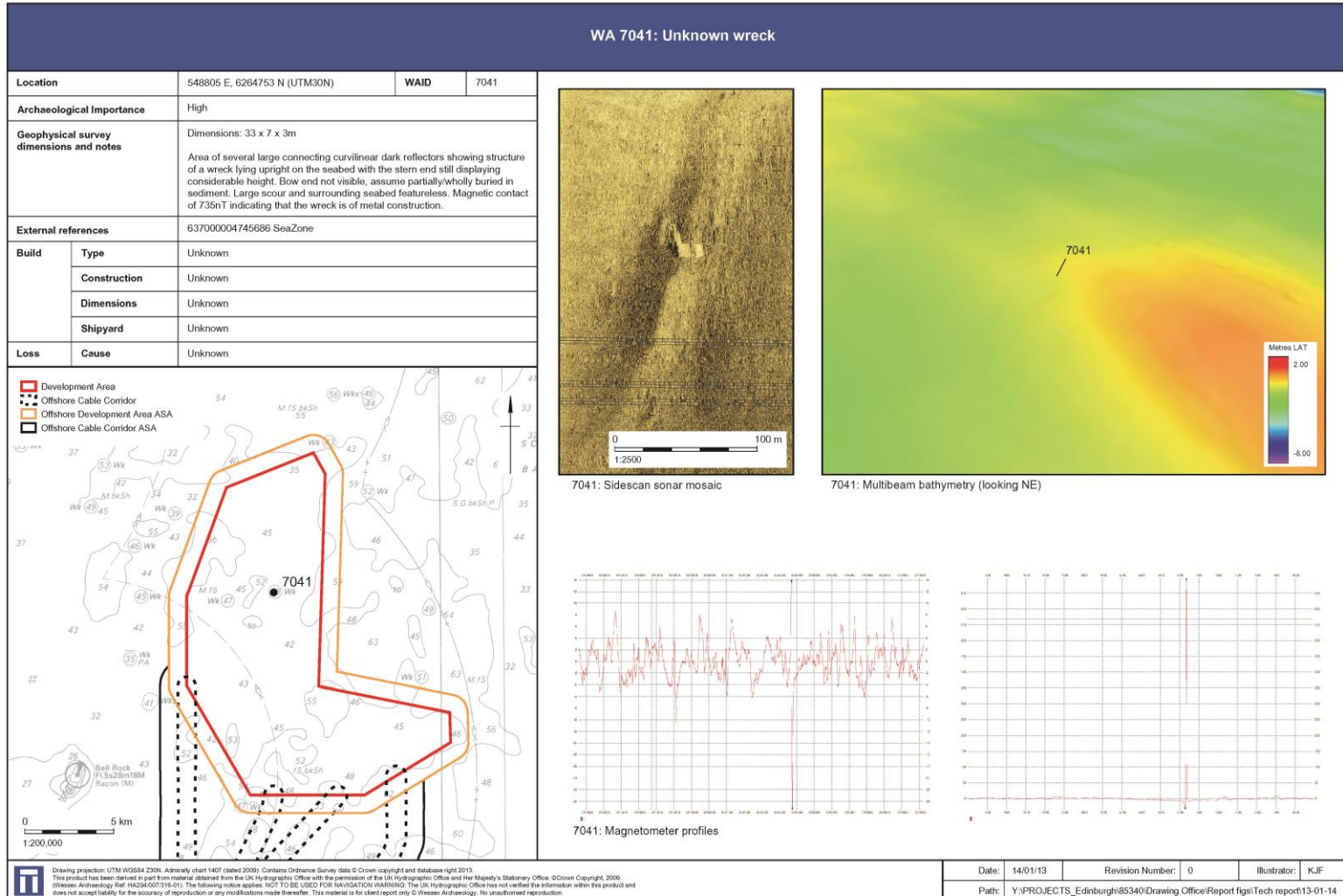
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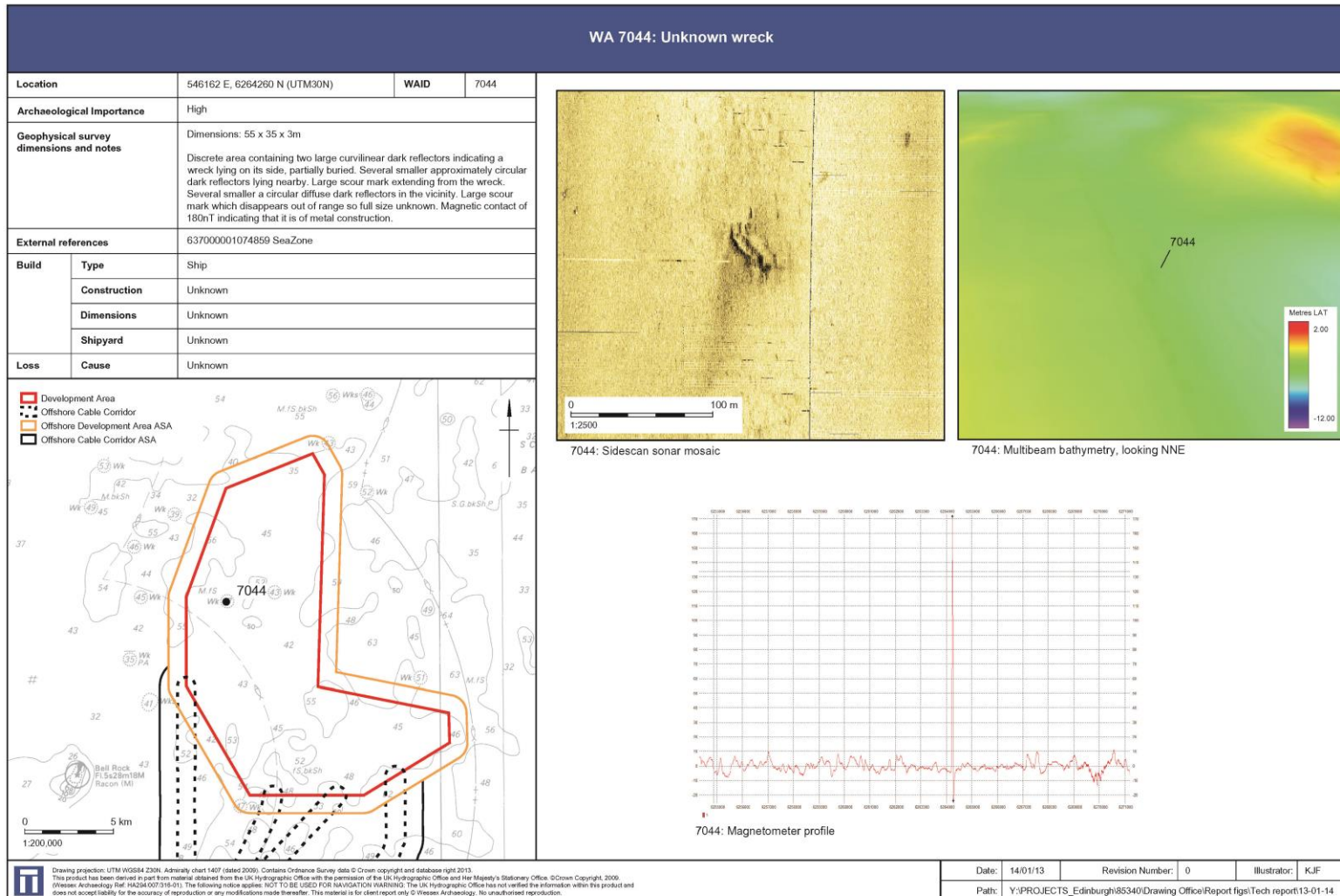
Wreck sheet WA 7001

Figure 17A.12



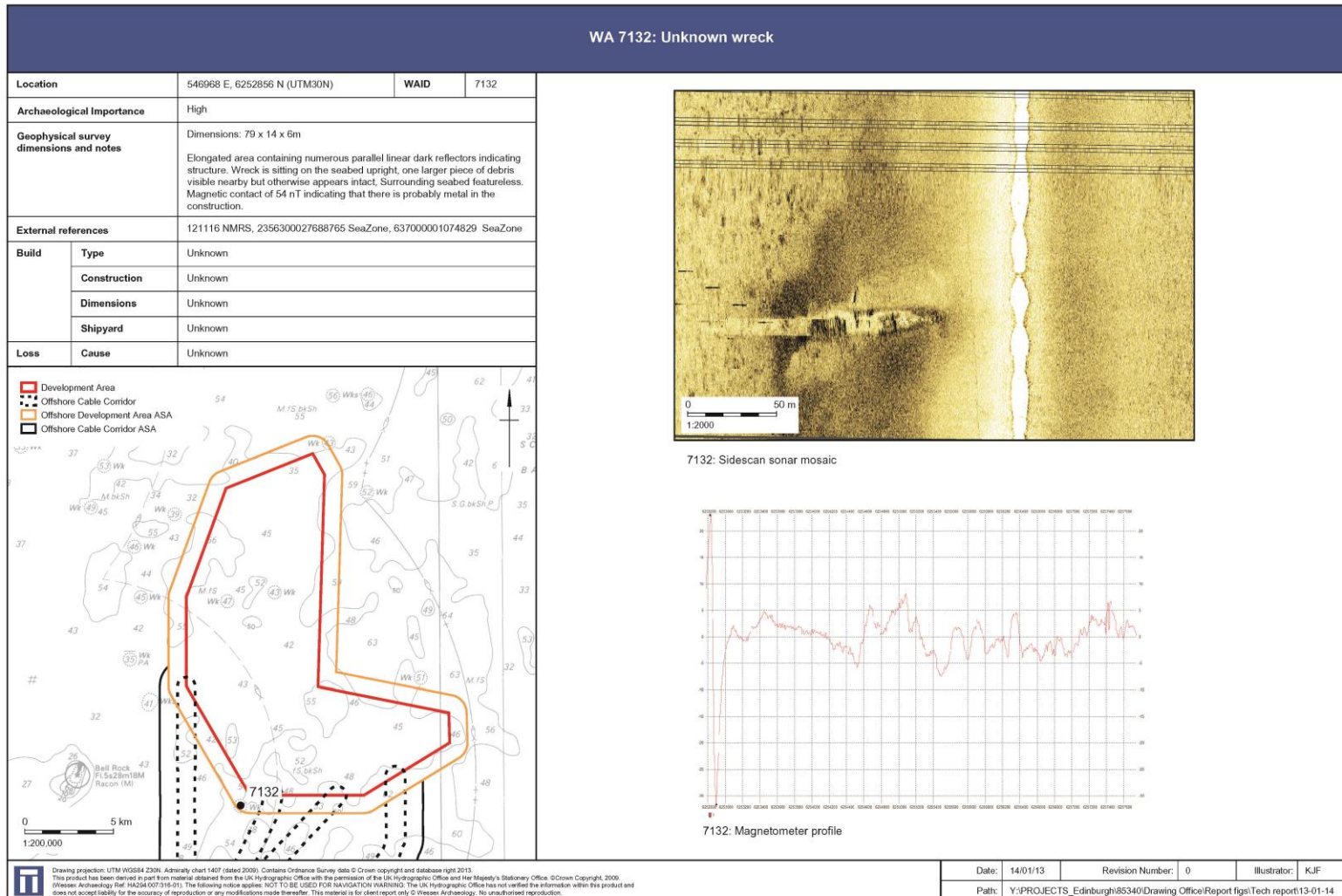
Wreck sheet WA 7041

Figure 17A.13



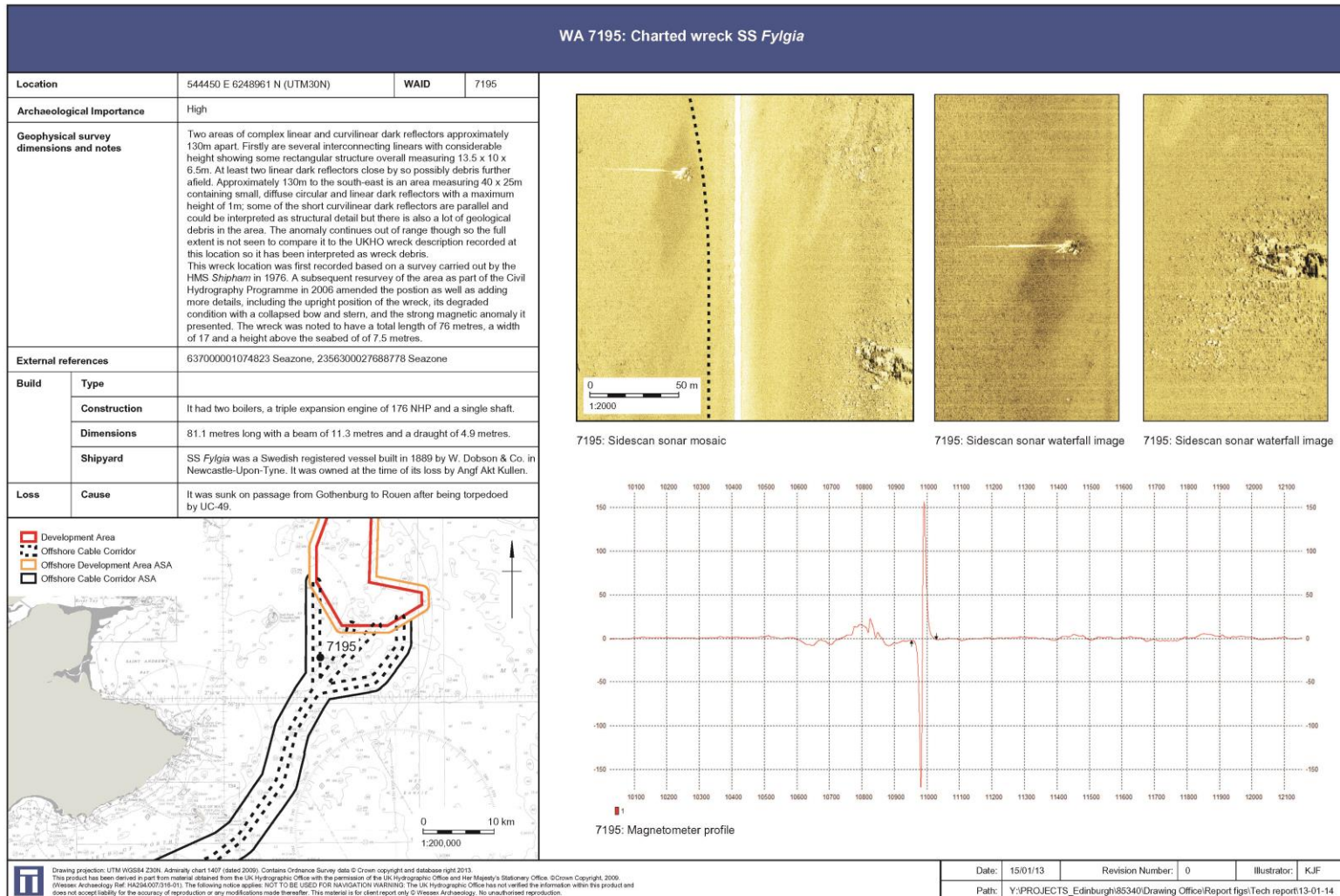
Wreck sheet WA 7044

Figure 17A.14



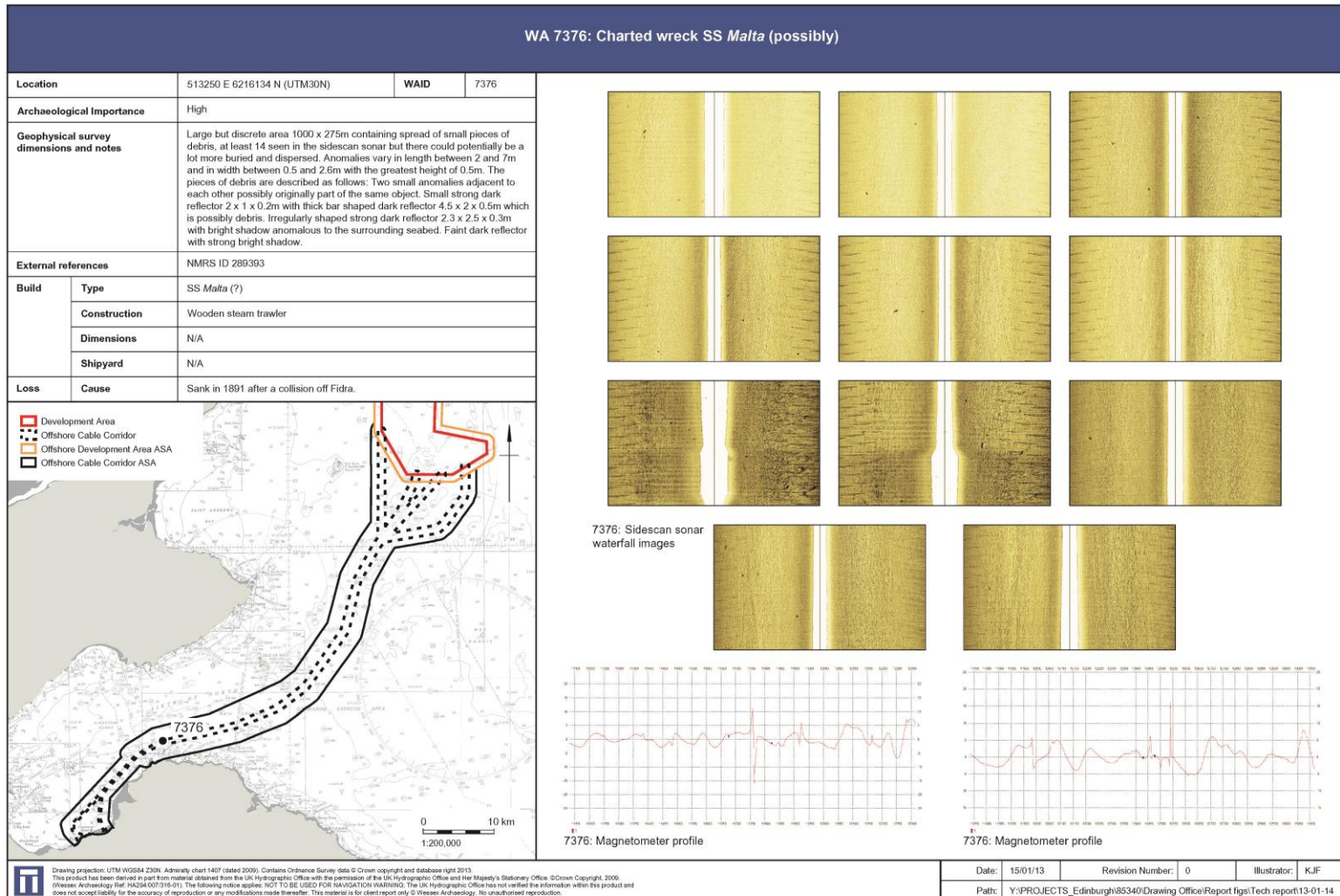
Wreck sheet WA 7132

Figure 17A.15



Wreck sheet WA 7195

Figure 17A.16



Wreck sheet WA 7376

Figure 17A.17