

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Appendix 39 to Deadline 1 Submission: Offshore Archaeology Draft Written Scheme of Investigation

Relevant Examination Deadline: 1

Submitted by Vattenfall Wind Power Ltd

Date: January 2019

Application Reference: 8.6

Revision B

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Approved By:	Daniel Bates
Date of Approval:	January 2019
Revision:	B

Revision A	Original Document submitted in the Application
Revision B	Revised Document submitted at Deadline 1
N/A	
N/A	

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THANET EXTENSION OFFSHORE WIND FARM

Offshore Archaeology
Draft Written Scheme of Investigation

Report Ref.: 116080.03
January 2019



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Document Information

Document title Thanet Extension Offshore Wind Farm
Document subtitle Offshore Archaeology Draft Written Scheme of Investigation
Document reference 116080V.03

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WA project code 116080V

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Quality Assurance

Issue & issue date	Status	Author	Approved by
1 16/03/2018	Draft submitted to client	ATH	DEA
2 08/05/2018	Draft submitted to client	ATH	AEM
3 05/12/2018	Draft submitted to client	ATH	AEM
4 08/01/2019	Draft submitted to client	ATH	AEM

DATA LICENCES

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THANET EXTENSION OFFSHORE WIND FARM

Draft Offshore Archaeology Written Scheme of Investigation

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology has been commissioned by GoBe Consultants Ltd (the Client), on behalf of Vattenfall Wind Power Ltd (VWPL) (the Developer), to produce a draft Written Scheme of Investigation (WSI) for the proposed Thanet Extension Offshore Wind Farm (Thanet Extension) (**Figure 1**). The proposed development site comprises: the array, which is located approximately 8 km from the Isle of Thanet off the east Kent coast, covering an area of approximately 70 km², surrounding the previously developed Thanet Offshore Wind Farm (TOWF); and the Offshore Export Cable Corridor (OECC) which extends from the array to Pegwell Bay.

1.1.2 This draft WSI follows on from a marine archaeological Desk-Based Assessment technical report (Wessex Archaeology, 2017a) and an archaeological review of geophysical and geotechnical survey data (Wessex Archaeology, 2018a), both of which were included as appendices in the Preliminary Environmental Information Report (PEIR) (VWPL, 2017), Volume 2: Chapter 13: Offshore Archaeology and Cultural Heritage. Following further consultation, an Environmental Statement (ES) (VWPL, 2018) has been developed in support of Thanet Extension, and this draft WSI forms part of the embedded mitigation.

1.1.3 The PEIR and ES summarise relevant consultation with stakeholders and Archaeological Curators.

1.1.4 This draft WSI was prepared with reference to the draft Marine Licence (DML), and the requirement for an archaeological WSI to be approved pre-construction.

1.1.5 Separate WSIs will be prepared for onshore works. However, as there is an overlap between the onshore and offshore WSI study areas (with the onshore going to MLW and the offshore going to MHW), and therefore there needs to be coordination between the WSIs to ensure a seamless approach to the intertidal area. Therefore, the recently prepared Onshore Archaeology Written Scheme of Investigation covering the Watching Brief for the Site Investigation Works (Wessex Archaeology, 2018b) was consulted for the preparation of this offshore WSI, and any further onshore WSIs will refer to this document.

1.2 Development description

1.2.1 The wind turbine types, foundations and layouts have not been confirmed at this stage, however the maximum parameters of the development have been identified. The maximum capacity will be 340 MW. The maximum number of wind turbines will depend on the turbine size chosen, for example 34 turbines for 8 – 10 MW or 28 turbines for 12 MW, and the final turbine layout will be determined at the wind turbine procurement stage. Only one type of foundation will be selected, although the ones currently being considered include: jackets and variants of this type (jacket with three or four piles, jacket with three or four suction caissons); and monopiles. Where required, there will also be scour protection.



- 1.2.2 There could be up to one Offshore Substation (OSS), however the precise location has not been confirmed and will depend on turbine layout design and other factors. Other infrastructure may include: one meteorological mast (met mast), floating LIDAR devices (FLDs) and up to two wave buoys.
- 1.2.3 Inter-array cables will connect all of the wind turbines and the OSS. The final layout will be determined by the wind turbine layout. Each section of inter-array cable will be laid separately in a single trench, however when approaching the offshore substation or turbine foundations, two or more cables may be installed close together on the seabed. Trench widths and shapes will be the same as the export cables, discussed below. Potential cable laying methodologies are: ploughing; pre-trenching or cutting; and jetting. In some cases, cable protection will be required, and this could include: rock placement; concrete mattresses; frond mattresses; or Uraduct.
- 1.2.4 There will be a maximum of four export cables. Pre-lay works will be required, to ensure the route is free from obstructions. A survey vessel will be used to clear debris in a 'pre-lay grapnel run'. Areas of sandwaves may have to be levelled by dredging, and crossings may be required for cables and pipelines. The preferred construction method and depth of burial have not yet been confirmed. Installation techniques could include: ploughing; jetting; dredging; and trenching. The export cables will likely be buried at depths between 1 – 3 m. The maximum trench width could be 10 m, with the width of disturbance for the ploughing and pre-lay grapnel run adding a further 20 m. In some cases, cable protection will be required, as discussed above. Where cable crossings are required, additional protective elements may be employed, such as concrete mattresses or rock filter bags.
- 1.2.5 The landfall will be situated within Pegwell Bay Country Park. There could be two to four cables through the mud flats and saltmarsh. At the landfall, the offshore cables will be jointed to the onshore cables. Over the intertidal sand and mud flats, the cable could be laid from a flat barge beached at low tide. Over the saltmarsh, it is expected that an open cut trench solution will be used.
- 1.3 Construction programme**
- 1.3.1 The construction programme has not been confirmed but will depend on the final project design. It is expected that installation for all foundations would take a maximum duration of six months. The number and specifications of the vessels employed during construction will be determined by the marine contractor and the construction strategy.
- 1.4 Scope of document**
- 1.4.1 This draft WSI sets out the aims of offshore investigations, and the methodologies and standards that will be employed by the Developer and/ or their representative and Retained Archaeologist to implement the mitigation strategy set out in the ES (VWPL, 2018). In format and content, it conforms to current best practice and to the guidance outlined in the Joint Nautical Archaeology Policy Committee *Code of Practice for Development* (JNAPC, 2006) and the relevant guidance from the Chartered Institute for Archaeologists' (CIfA) (CIfA, 2014a-g), as applicable.
- 1.4.2 This document will be submitted to the Archaeological Curator(s), for approval, prior to the commencement of any investigative work.



2 THE ARCHAEOLOGICAL ASSESSMENT AREAS

2.1 Co-ordinate system

2.1.1 All positions were recorded and expressed as ETRS89 UTM Zone 31 N coordinates.

2.2 Archaeological Assessment Areas

2.2.1 This draft WSI addresses the offshore elements of the current Thanet Extension project to the Mean High Water Springs (MHWS). The onshore elements of the scheme will be addressed in a separate WSI.

2.2.2 The study area comprises the 'OECC' and 'Offshore Array Red Line Boundary', defined by the applicant, in April 2018, which combine to form the 'Offshore Red Line Boundary' (**Figure 1**).

2.2.3 The 'Cable Exclusion Area' on Figure 1 illustrates where no infrastructure will be installed. However, it remains part of the archaeological study area, as it has been retained within the Red Line Boundary for the purposes of anchor handling and other activities that could potentially impact the seabed.

2.3 Ecological and other constraints

2.3.1 Pegwell Bay is designated as an ecologically protected area. It is a Site of Special Scientific Interest (SSSI), a National Nature Reserve, a Special Protection Area (SPA) and a Ramsar Site.

3 AIMS AND OBJECTIVES

3.1 Aims

3.1.1 The aim of the WSI is to put in place the archaeological mitigation set out in the ES (VWPL 2018).

3.2 Objectives

3.2.1 The objectives of this WSI are as follows:

- to fulfil the requirements of Historic England and Kent County Council in respect of archaeological monitoring and mitigation works associated with this project;
- to provide the position and extent of Archaeological Exclusion Zones (AEZs) that may be required, and to establish methods for their monitoring, modification and/ or removal in the future;
- to ensure that any further geophysical and geotechnical investigations associated with the project are subject to archaeological input, review, recording and sampling;
- to ensure that any ROV and/ or diver surveys associated with the project are subject to archaeological input and that any relevant data produced is archaeologically assessed;
- to propose measures for the mitigation of unexpected archaeological remains encountered during further survey work or construction work associated with the project;
- to set out methodologies for post-construction monitoring; and



- to establish the reporting and archiving requirements for the archaeological works undertaken during pre-construction, construction, O&M and post-construction monitoring.

3.3 Addressing questions from the Research Agendas

3.3.1 Data gathered during the pre-construction and construction works have the potential to inform research questions, such as those laid out in regional Research Agendas. The two main Research Frameworks that apply to the study area are the South East Research Framework (East Sussex County Council, Kent County Council, Surrey County Council and West Sussex County Council 2012) and the Maritime and Marine Historic Environment Resource Assessment (Ransley *et al.* 2010). However, questions identified from the Solent Thames Research Framework (Hind and Hey, 2014) may also be of interest.

3.3.2 These Research Frameworks lay out recent research and areas of particular interest. **Table 1** below lays out some of the key themes that could be of interest, but the Research Frameworks and Agendas should be consulted when developing more detailed methodologies and assessments of data.

Table 1 Themes/areas for future research from the Research Agendas

Research Agenda	Theme/question
South East Research Framework	<ul style="list-style-type: none">• Palaeolithic remains in fluvial contexts, correlating and dating terrace systems within major river valleys and tributary systems, modelling fluvial deposit zones,• More work needed on reconstructing environmental and geomorphic change in the early medieval period• Changes to the coastline over time, how they influence defense• Transport – considering the evolution of the methods of transport for movement of military forces• Maritime – landscapes/coastscapes, ports and harbours, industries, and transport
Maritime and Marine Historic Environment Resource Assessment	<ul style="list-style-type: none">• Assessing the periods of Palaeolithic, Mesolithic, Neolithic and Early Bronze Age, Later Bronze Age and Pre-Roman Iron Age, Roman, Early medieval, medieval and post-medieval, early modern and modern, within the themes of:<ul style="list-style-type: none">• Coastal change• Maritime settlement and exploitation• Seafaring• Maritime networks• Maritime identities and perceptions of maritime space• Areas of recommended research – Goodwin Sands,



Research Agenda	Theme/question
Solent Thames Research Framework	<ul style="list-style-type: none">• Lower and middle Palaeolithic – improved chrono-stratigraphic framework through additional data analysis• Upper Palaeolithic and Mesolithic – riverine settlements, coastal environments, potential preserved biological remains underwater,• Neolithic and Early Bronze Age – investigating long distance links, beginning of ‘Channel Bronze Age’• Late Bronze Age and Iron Age patterns of transport and waterside activities• Later medieval sea fishing, transportation, shipwrecks• Post medieval and modern – development of maritime network

4 ROLES, RESPONSIBILITIES AND COMMUNICATION

4.1 Schedule

4.1.1 Mitigation measures required to inform the final engineering design for this project must be undertaken, completed and reported on in time to inform the design.

4.2 Retained Archaeologist

4.2.1 The Developer and/ or their representative will commission a Retained Archaeologist during the Thanet Extension pre-construction, construction, O&M and post-construction phases. The Retained Archaeologist will oversee archaeological mitigation to provide consistency throughout the project, as required.

4.2.2 The Developer and/ or their representative will consult the Retained Archaeologist during the planning stages for any further survey work. The Retained Archaeologist will advise the Developer and/ or their representative and appropriate Contractor(s) on which elements warrant archaeological investigation. The Retained Archaeologist will advise the Developer and/ or their representative on necessary interaction with third parties with archaeological interest, and the Archaeological Curator(s).

4.2.3 The Retained Archaeologist will provide archaeological advice at the planning stages for any further surveys, such as geophysical, geotechnical, Unexploded Ordnance (UXO), ROV or diver. The Retained Archaeologist will produce archaeological method statements for further archaeological investigations and will ensure approval from Archaeological Curator(s).

4.2.4 The Retained Archaeologist will report any unexpected discoveries of archaeological material through the Offshore Renewables Protocol for Archaeological Discoveries (ORPAD). The Developer will identify Nominated Contacts for the Protocol.

4.2.5 The Retained Archaeologist will produce reports for approval by the Developer and/ or their representative and the Archaeological Curator(s). The Retained Archaeologist will also prepare project archives in consultation with the appropriate repository/ museum.

4.3 Archaeological Curator(s)

4.3.1 The Archaeological Curator(s) for the offshore heritage environment are as follows.



4.3.2 From Mean High Water Springs (MHWS) to the 12 nm limit, the relevant Archaeological Curator is Historic England Marine Planning Unit, with specialist advice provided by the Historic England South East Science Advisor. The relevant contacts are:

- Stuart Churchley, Marine Planning Archaeological Officer, Historic England, Eastgate Court, 195-205 High Street, Guilford, Surrey, GU1 3EH; and
- Jane Corcoran, Historic England Regional Science Advisor, South East of England Region, Historic England, Eastgate Court, 195-205 High Street, Guilford Surrey, GU1 3EH.

4.3.3 Above the Mean Low Water Mark (MLWM), the relevant Archaeological Curator is Lis Dyson, Head of Heritage Conservation, Kent County Council (KCC), Strategic Planning Directorate, Kent County Council, Invicta House, County Hall, Maidstone, Kent, ME14 1XX.

4.3.4 During the project, communication with the Archaeological Curator(s) will be undertaken via email and/ or telephone contact. Method statements for archaeological works will be submitted to the Archaeological Curator(s) for comment/ approval. After construction has been completed, the final archaeological report(s) or publication(s) for this project will be submitted to the Archaeological Curator(s).

4.4 Archaeological Contractor(s)

4.4.1 Archaeological Contractor(s) may be appointed to carry out specific packages of work, for example works beyond the in-house capabilities of the Retained Archaeologist, or additional works, as required. The Archaeological Contractor(s) may be appointed by the Developer or their appointed representatives (the Client, the Retained Archaeologist or other contractors/ sub-contractors). In these instances, the Retained Archaeologist will have a coordinating role, ensuring works are specified, planned, undertaken and reported in accordance with this WSI.

4.5 Responsibilities

4.5.1 The responsibility for implementing the WSI rests with the Developer and their appointed representatives (including their Contractors).

4.5.2 The Developer and/ or their appointed representatives, or any archaeological body they may appoint to manage the implementation of the WSI, will seek curatorial advice from the Archaeological Curator(s) as appropriate. The remit of the Kent County Council Archaeologists extends to MLWM. Historic England provides advice within English territorial waters, extending from MHWS to the 12 nautical mile limit.

4.5.3 Interaction with the Archaeological Curator(s) will be administered by the Developer and/ or their appointed representatives with advice where appropriate through the Retained Archaeologist. Should a new site be discovered during construction, the Archaeological Curator(s) will be contacted immediately, via ORPAD.

4.5.4 Other offshore archaeological services will be undertaken as required and agreed in advance with the Developer (e.g. archaeological assessments of survey data) and planned and delivered through bespoke method statements if required (**Section 8 and 9**).

4.5.5 The Developer and/ or their appointed representatives will ensure that Contractors make project personnel aware of this WSI, any AEZs in force, and ORPAD.

4.5.6 All relevant Contractors engaged in the construction of the project shall:

- familiarise themselves with the requirements of the WSI and make them available to all of their staff working on the project (e.g. for Protocol briefings and archaeological input into method statements);
- communicate with the Retained Archaeologist in the planning stages of any further survey work, to ensure archaeological objectives are included, as appropriate;
- obey legal obligations in respect of 'wreck' and 'treasure' under the *Merchant Shipping Act 1995* and the *Treasure Act 1996*, respectively;
- respect constraint maps and AEZs;
- assist and afford access to archaeologists employed by the Developer;
- inform the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to the archaeologists' activities; and
- implement ORPAD.

4.6 Stakeholder Liaison

- 4.6.1 The onshore and offshore archaeological resource should be approached seamlessly, particularly in areas of overlap. Therefore, to cover such areas, there should be liaison with stakeholders, including communication between the onshore and offshore Retained Archaeologists, the onshore and offshore archaeological curators, academics, and other interested parties. This could be particularly important with regards to issues concerning the intertidal/ foreshore/ landfall area, to ensure a joined-up approach is consistently applied.

5 ARCHAEOLOGICAL BASELINE SUMMARY

5.1 Introduction

- 5.1.1 The results within this baseline are summarised from the ES (VWPL 2018) and associated annexes: *Thanet Extension Offshore Wind Farm: Marine Archaeological Desk-Based Assessment Technical Report* (Wessex Archaeology, 2017a) and *Thanet Extension Offshore Wind Farm: Archaeological Review of Geophysical and Geotechnical Data* (Wessex Archaeology, 2018a).

5.2 Previous archaeological work

- 5.2.1 Considerable archaeological work has been undertaken in relation to TOWF, and a detailed list of surveys and reports can be found in the ES (VWPL, 2018).
- 5.2.2 Following on from the work undertaken for TOWF, work undertaken for Thanet Extension comprised:
- a Desk-Based Assessment (Wessex Archaeology 2017a) of available information, including data from the National Record for the Historic Environment (NRHE), Kent Historic Environment Record (KHER), and the United Kingdom Hydrographic Office (UKHO). The Desk-Based Assessment also included details of an intertidal walk-over survey to confirm the location of an aircraft crash site;
 - an archaeological assessment of marine geophysical survey and geotechnical data (Wessex Archaeology 2018a) acquired by Fugro in 2016. Datasets included sidescan sonar (SSS), magnetometer, sub-bottom profiler (SBP) and multibeam echosounder (MBES), and geotechnical logs from within the Thanet Extension site. With alterations to the OECC to include part of the Nemo Link cable route, geophysical survey results from Nemo Link have been incorporated.



5.2.3 A detailed list of reports, surveys and samples can be found in **Appendix 1**.

5.3 Summary of known and potential archaeological assets in the Array

Palaeogeographic assessment

5.3.1 There are no designated sites or known sites within the array. However, there is potential for archaeological material of a prehistoric date to exist within the study area.

5.3.2 The background geology is dominated by Cretaceous chalk bedrock, overlain by early Tertiary (Palaeocene) sands and clays. The Pleistocene history of the area has been influenced by repeated glacial/ interglacial cycles, and associated rises and falls in relative sea level, which resulted in large areas of the southern North Sea being periodically exposed as a terrestrial environment. As the area did not experience glaciation, there is potential for currently submerged palaeolandscape features to be well preserved, however the changing routes of river systems resulted in a cyclical deposition of gravel terrace and flood plain deposits and therefore some Pleistocene deposits may have been reworked or removed by subsequent marine transgressions. Overlying these sediments is a sequence of Holocene deposits.

5.3.3 Early hominin access to the area is directly linked to the glacial/ interglacial cycles and associated changes of environment across the region, as during periods of relatively low sea level, the exposed landscape would have provided habitable environments. The occupation of Britain has now been dated to around 900,000 BP. Local sites near Canterbury have provided evidence dating from a rare site of pre-Anglian occupation, dating to 700,000 – 500,000 BP, as well as re-settlement after the Anglian glaciation (425,000 – 250,000). The main source of extant Middle Palaeolithic artefacts is the 'Head/ Brickearth' which has produced numerous handaxes in the Stour Basin and also evidence of the Neanderthal occupation c. 80,000 – 50,000 BP. The material also has potential to contain evidence of final Upper Palaeolithic and Mesolithic remains.

5.3.4 The palaeogeographic assessment of the array identified a number of palaeogeographic features of archaeological potential (**Figure 2**). The shallow geology of the array can be relatively complex. In the south, the shallow geology is dominated by chalk bedrock overlain by seabed sediment, with a few isolated channel features cut into the chalk. In the north, Tertiary deposits overlay the chalk bedrock, which are in turn cut by an extensive complex of channel deposits. The identified geology has been divided into four units:

- Unit 1: Holocene – modern seabed sediment sands and gravels, not of potential in itself, but could cover archaeological sites such as wrecks;
- Unit 2: subdivided into five phases, but in general, early Holocene/ Pleistocene, complex channel deposits, medium to high potential for *in situ* and derived deposits from within and immediately surrounding features:
 - Phase 1 – Initial, large cut of the Thames shortly after its migration south caused by the advancing Anglian ice sheet (75005, 75007, 75008, 75010, and 75014);
 - Phase 2 – Large scour feature cut across the Thames channel, potentially caused by the outflowing of an ice-dammed lake and relating to the Lobourg Channel and formation of the Dover Strait. Filled by marine sediment from the subsequent marine transgression (75016);



- Phase 3 – Series of meandering smaller channels cutting across the landscape after silting up of the main Thames channel (75000 - 4, 75006, 75009, 75011, 75017, 75018 and 75019);
 - Phase 4 – Deposition of sediment over an erosion surface, possibly the land surface associated with Phase 3, potentially with overbank and/or lacustrine deposits (75012, 75013); and
 - Phase 5 – Delta top complex formed during the Holocene marine transgression, as rising sea levels pushed the Thames estuary towards its current position (75015).
- Unit 3 and Unit 4: Tertiary and Cretaceous, pre-date earliest human occupation of the UK

5.3.5 As terrestrial features deposited during periods of known human occupation of the UK, Phases 1, 3, 4 and 5 of Unit 2 are considered of high archaeological potential. Phase 2 is interpreted as medium archaeological potential, partly due to the interpreted marine nature of the fill sediments, and partly due to uncertainties about the interpretation.

Seabed Features

5.3.6 Within the array, a total of 174 geophysical anomalies of potential archaeological interest were identified (**Table 2**) (**Figures 3-7**). None of these sites are designated.

Table 2 Anomalies of archaeological potential within the Thanet Extension Offshore Array Red Line Boundary

Archaeological Discrimination		Interpretation	Number	Description
A1	14	Anthropogenic origin of archaeological interest	8	Wreck or possible wreck
			4	Possible wreck debris
			2	Other areas of debris
A2	130	Uncertain origin of possible archaeological interest	7	Items of debris
			5	Debris fields
			5	Mounds
			67	Dark reflectors
			2	Bright reflectors (indicating their possible construction of material such as plastic, rubber, wood or fiberglass)
			10	Rope/ chain
			7	Seafloor disturbances (potential buried or partially buried wreck sites or debris)
27	Magnetic anomalies with no associated visible material on the seabed			



Archaeological Discrimination		Interpretation	Number	Description
A3	4	Historic record of possible archaeological interest with no corresponding geophysical anomaly.	2	Possible wrecks
			2	Obstructions
TOTAL	148			

Maritime and aviation archaeological potential

Maritime potential

- 5.3.7 The potential for further discoveries has been explored through a review of archaeological discoveries in the wider area, the history of the area, and through assessments of recorded losses, navigational hazards and potential for preservation.
- 5.3.8 There is potential for the presence of archaeological material of a maritime nature, spanning from the Mesolithic period to the present day. Discoveries of early material, such as a dugout canoe thought to date to the Late Neolithic, from Westgate-on-Sea, on the north coast of Thanet, and the sewn plank Bronze Age boat discovered in Dover, highlight the potential for further discoveries related to early maritime activity. The coastline of the study area is where Julius Caesar and Claudius launched the Roman invasion of Britain, and Richborough was a major port from the Roman period until the early medieval period. There is particular potential for discoveries at the mouth of the Wantsum Channel.
- 5.3.9 In the medieval period, there was increasing trade between the UK and Europe, Sandwich was one of the Cinque Ports which increased the prestige and volume of traffic at Ramsgate, and fishing fleets associated with the herring industry expanded. In the post-medieval period, there is potential for wrecks associated with the establishment of the Royal Navy, the Spanish Armada, the Franco-Spanish and the Anglo-Dutch wars, as well as for wrecks associated with continuing local trade and marine exploitation. Ramsgate continued to expand in the 18th and early 19th centuries.
- 5.3.10 In the modern period, there is potential for shipwrecks associated with the First and Second World Wars, including both naval and merchant ships.
- 5.3.11 There are 226 recorded losses in the wider study area (including the array, OECC and a short distance beyond), dating from the early 15th century to the modern period. These are ships that were reported missing but for which no remains have yet been discovered on the seabed, and their recorded location is somewhat arbitrary.
- 5.3.12 The study area is situated in an area of high navigational hazard, as assessed by Bournemouth University (Merrit *et al.*, 2007), due to wide areas of mudflats and proximity to Goodwin Sands. These areas are considered to be of increased potential for further discoveries. An area of archaeological potential, highlighting the general area of the Goodwin Sands, is illustrated on Figures 11-14.
- 5.3.13 The potential for preservation is influenced by the composition of the seabed. Areas of mud provide high levels of preservation. The mudflats of Pegwell Bay provide an opportunity for high levels of preservation. Areas of sand, and to a slightly lesser extent, areas of gravelly sand, the predominant seabed types of the study area, also provide some degree of

protection. Areas of gravel are less likely to afford protection for organic remains, however there is still potential for aluminium and other metal wreckage to be present.

Aviation potential

- 5.3.14 There is potential for 20th century aircraft remains in the array and OECC study areas, particularly in relation to the Second World War. There are 16 recorded losses of aircraft within the study area. All of these relate to generalised locations within the cable corridor, as their remains have not been confirmed on the seabed, their location is not presently known, and they could be discovered in the wider area. All 16 were in military service when they were lost, and therefore all would be protected under the *Protection of Military Remains Act 1986* should their remains be discovered. In addition, there are considerable numbers of other recorded losses around the coast of Kent and numerous British Air/ Sea Rescue operations (Wessex Archaeology 2008), and it is possible that material from these sites could be present in the study areas. The preservation of any aircraft crash site material will be influenced by the wrecking event and the seabed composition, as discussed above.

5.4 Summary of known and potential archaeological assets in the OECC

Intertidal / terrestrial

- 5.4.1 Following the amendment of the OECC in January 2018, there are no longer any known, extant, terrestrial features in the study area. However, evidence from the wider area suggests there is potential for further discoveries, dating from the Neolithic period onwards, and providing evidence of the changing coastline over time and of activities in the intertidal zone. In particular, there is potential for material to relate to settlement and activity on the margins of the Wantsum Channel and remnant material from demolished Second World War features.

Palaeogeography

- 5.4.2 The palaeogeographic assessment of the OECC relies on geophysical interpretation in combination with BGS charts and geotechnical samples acquired from the array, as only one geotechnical sample was acquired along the OECC (**Figure 2**).
- 5.4.3 The palaeogeography of the OECC is considerably simpler than that of the array. Of the stratigraphic units outline above, only three were identified along the OECC: Unit 4, Unit 3 and Unit 1. None of these are considered to be of archaeological potential, although Unit 1 may cover archaeological sites, such as shipwrecks.
- 5.4.4 Pegwell Bay, the landfall site of the OECC, forms the final drainage point of the basin of the River Stour. The Stour Valley is associated with extensive outcrops of Middle-Late Pleistocene fluvial river terrace deposits, that occur along its length but are best studied upstream of the cable landfall. Onshore, there are deeply buried and little investigated Pleistocene fluvial river deposits in the lower ground (potentially including the intertidal and offshore zone). It is also possible that deposits of 'Head/ Brickearth', complex deposits of Pleistocene slope wash and Holocene colluvium, could be present in localised places in the intertidal and offshore zone, however, it is likely that these have been eroded by subsequent marine transgressions.

Seabed Features

- 5.4.5 Within the OECC, a total of 1,058 geophysical anomalies of potential archaeological interest were identified (**Table 3**) (**Figures 8-26**).



Table 3 Anomalies of archaeological potential within the Thanet Extension array area

Archaeological Discrimination		Interpretation	Number	Description
A1	16	Anthropogenic origin of archaeological interest	1	Aircraft crash site
			4	Ship wrecks
			11	Debris
A2	1,027	Uncertain origin of possible archaeological interest	118	Items of debris
			6	Debris fields
			3	Mounds
			100	Dark reflectors
			5	Bright reflectors (indicating their possible construction of material such as plastic, rubber, wood or fiberglass)
			45	Rope/ chain
			2	Seafloor disturbances (potential buried or partially buried wreck sites or debris)
748	Magnetic anomalies with no associated visible material on the seabed			
A3	15	Historic record of possible archaeological interest with no corresponding geophysical anomaly.	1	Aircraft crash site
			6	Possible wrecks
			8	Obstructions
TOTAL	1,058			

5.4.6 The A1 aircraft crash site (**70349**), as an aircraft lost while in military service, is automatically protected under the *Protection of Military Remains Act 1986*. Should material be discovered in the vicinity of the A3 aircraft crash site (**71209**), it would also be protected.

5.4.7 In addition to the anomalies listed above, during the pre-disturbance UXO survey undertaken for the Nemo Link cable route, an area of possible aircraft material (**NEMO_Mag_11081**) was discovered (**Figure 23**). Diver investigations indicated a metallic object approximately 3 m long and 0.4 m wide, however most of the object remained buried. The exposed material comprises thin metal plates fixed by metal rivets. It was identified as the possible remains of an aircraft component, possibly the wing, due to the construction and material of the section uncovered. As there was potential for the material to relate to a military aircraft, which would therefore be protected under the *Protection of Military Remains Act 1986*, the archaeological report (Wessex Archaeology, 2017b) recommended the implementation of a temporary exclusion zone of 100 m around the site.

5.4.8 None of the other anomalies are designated or protected.



Maritime and aviation archaeological potential

- 5.4.9 There is potential for as yet undiscovered shipwreck and aircraft crash sites in the OECC study area. The potential for these has been discussed in the array section, above.
- 5.4.10 The potential for preservation is influenced by the composition of the seabed and the mudflats of Pegwell Bay provide an opportunity for high levels of preservation. Therefore, Pegwell Bay is also considered an area of archaeological potential and has been illustrated on Figures 23-26.

6 POTENTIAL IMPACTS

6.1 Introduction

- 6.1.1 The ES (VWPL, 2018) has identified the potential effects on offshore archaeology, which might occur from the construction, operation, and decommissioning of Thanet Extension.
- 6.1.2 Mitigation measures have been embedded within the project design to reduce effects on known offshore archaeology. These include:
- the development of this WSI to detail mitigation measures; and
 - the avoidance of AEZs.

6.2 Construction

Direct Impacts

- 6.2.1 The direct impacts resulting in potential adverse effects upon archaeological receptors as part of construction works are those involving contact with the seabed or the removal of seabed sediments. Offshore archaeological receptors with height, such as shipwrecks, may also be impacted by activities that occur within the water column. Impacts may include: seabed preparation, installation of turbine foundations, placement of scour protection, installation of the offshore substation, ancillary installations, cable laying, cable protection, vessel moorings, jack-up barges and anchoring.
- 6.2.2 There could be permanent physical loss or disturbance of potential seabed receptors in shallow sediments from seabed preparation and construction activities. These receptors could include shallowly buried shipwrecks or aircraft crash sites. Areas of particular concern include areas of concentration of A2 anomalies (particularly buried magnetic anomalies with no surface expression) and the area close to the Goodwin Sands.
- 6.2.3 There could also be permanent physical loss or disturbance of known and potential palaeogeographic features from construction activities where activities penetrate the surface.

Indirect Impacts

- 6.2.4 Indirect impacts occur as a result of changes to sedimentation and erosion patterns during construction. The Marine Geology, Oceanography and Physical Processes assessment undertaken for the ES (VWPL, 2018) indicates that the magnitude of impact is expected to be negligible.

6.3 Operation and Maintenance (O&M)

Direct Impacts

- 6.3.1 Activities undertaken as part of O&M works have the potential to directly impact marine archaeological receptors on or under the seabed. Direct impacts could include anchors of



vessels deployed during periodic overhauls and scheduled or unscheduled O&M, and seabed contact by the legs of jack-up vessels.

Indirect Impacts

- 6.3.2 Indirect impacts could include changes to hydrodynamic and sedimentary regimes from the presence of foundation structures. However, based on the Marine Geology, Oceanography and Physical Processes assessment undertaken for the ES (VWPL, 2018) these are expected to be negligible.

6.4 Decommissioning Phase

Direct Impacts

- 6.4.1 Activities undertaken as part of decommissioning works could have direct impacts, including: where required, the removal of turbine and offshore substation foundations, scour protection, cable protection and cables; anchors of vessels employed for decommissioning; and seabed contact by the legs of jack-up vessels.

Indirect Impacts

- 6.4.2 There could be indirect impacts due to changes in hydrodynamic and sedimentary regimes, caused by the removal of foundation structures.

7 MITIGATION

7.1 Introduction

- 7.1.1 Mitigation measures for Thanet Extension have been set out in the ES (VWPL 2018). This section provides a brief overview for each of the receptor types. More detailed information about the types of mitigation and the way that they will be implemented can be found in the **Scheme of Investigations (Section 9)**.

7.2 A1s

- 7.2.1 Best practice favours the preservation *in situ* of archaeological remains as the first option, and therefore the ideal mitigation is avoidance (Wessex Archaeology, 2007; DECC, 2011b). For Thanet Extension, impact to A1 geophysical anomalies will be avoided through the implementation of AEZs. All development and related activities that could impact the seabed are prohibited within the boundaries of an AEZ, therefore AEZs do not restrict remote survey work (eg vessels entering the zone to acquire geophysical datasets).
- 7.2.2 The final development layout will take into account the locations of all AEZs. All AEZs will be marked on the scheme masterplans. Although AEZs are fixed, provision should be made for them to be refined or removed (with agreement of the Archaeological Curator(s)), if required, subject to additional archaeological assessment of subsequent surveys that may be required. Surveys could include further geophysical, ROV, or diver surveys (see the **Scheme of Investigations (Section 9)** for more details). In addition, in order to maximise the archaeological benefits of the surveys, and surveys covering AEZs should include archaeological advice in the planning stages.
- 7.2.3 If impacts to A1 geophysical anomalies cannot be avoided, measures to reduce, remedy or offset disturbance will be agreed with the Archaeological Curator(s), but could include further survey through to complete excavation.



7.3 A2 geophysical anomalies

- 7.3.1 AEZs have not been recommended at this time for features assigned A2 archaeological potential ratings, and in order to facilitate the design of the development scheme, buffers are not currently proposed for any of these anomalies. However, avoidance of these features by micro-siting is recommended. If there is potential for them to be impacted by the development, they will need to be assessed on a case-by-case basis, in order to accurately position the site and effectively confirm its character, in agreement with the Archaeological Curator(s). This will allow an assessment of the anomaly's relative value. The methodologies for assessing the features could include further geophysical survey, ROV survey, for example in combination with a UXO survey, or diver survey, and these are discussed in more detail in the **Scheme of Investigations (Section 9)**. Should any further surveys be planned, archaeological advice should be included at the planning stage, to maximise results for archaeological assessment.
- 7.3.2 It is possible that these anomalies could represent material from wreck sites of considerable age and be of higher archaeological value and importance than those already suggested for AEZs, and therefore further AEZs could be instituted if required. However, it is also possible that these anomalies could comprise modern debris of no archaeological significance. The provision of archaeological advice is particularly important in areas of high sensitivity, such as where the proposed export cable route extends close to the Goodwin Sands area, and specifically Brake Sand.
- 7.3.3 If it is not possible to preserve *in situ* A2 geophysical anomalies or findspots, disturbance will be offset by appropriate and satisfactory measures, also known as 'preservation by record'. In these circumstances, the extent of the further survey required will be determined based on the assessed value or importance of the feature, and through discussions with the Archaeological Curator(s). Further works could include survey, recording and/ or excavation, to any depth likely to be impacted, prior to the impact occurring (Wessex Archaeology, 2007), and will be detailed in a specific method statement. The impact of the development, if and where appropriate, may also be remedied by restablisng sites that have already been destabilised but not destroyed, or by offsetting damage to a site by detailed analysis and safeguarding of otherwise comparable sites elsewhere.
- 7.3.4 Information gathered through further survey or other archaeological works must be disseminated, for example through reporting (as discussed in **Section 12.3**).

7.4 Unexpected discoveries

- 7.4.1 Should any previously unknown sites or material be encountered during development works, measures will be taken to reduce the level of impact. In order to provide for these unexpected discoveries, ORPAD (TCE and Wessex Archaeology, 2014) will be adopted.
- 7.4.2 ORPAD is a system for reporting and investigating unexpected archaeological discoveries encountered during pre-construction, construction and post-construction activities, with Wessex Archaeology (the Implementation Service) providing guidance and advising industry staff on the implementation of the Protocol. ORPAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt advice, and, if necessary for archaeological inspection of important features prior to further construction in the vicinity. Its implementation is important across the development area, but in particular in areas of high archaeological potential, such as in the OECC in proximity to Goodwin Sands. ORPAD provides a mechanism to comply with the *Merchant Shipping Act 1995*, including notification of the Receiver of Wreck, and accords with the *Code of Practice for Seabed Developers* (JNAPC, 1995, 1998).

7.4.3 More details about the implementation of ORPAD can be found in the **Scheme of Investigations (Section 9)** and in **Appendix 2**.

7.5 Palaeogeographic assessment

7.5.1 Within the array, a number of palaeogeographic features of archaeological potential have been identified, and all of these are associated with the offshore route of the Thames and its associated tributaries. The Stage 1 geoarchaeological assessment of geotechnical logs indicated a number of vibrocores were acquired from within palaeogeographic features of archaeological potential. It has been recommended that samples from VC002, VC003, VC004, VC006 and VC007 should be subject to Stage 2 geoarchaeological recording at the pre-construction phase if these samples remain available (see the **Scheme of Investigations (Section 9)** for more details).

7.5.2 Should any further geotechnical sampling be planned (e.g. vibrocore or borehole) within the Thanet Extension array area at the post-consent/ pre-construction phase, provision should be made for archaeological advice at the planning stage of the geotechnical survey, to ensure that the survey methods will maximise the results for archaeological investigation.

7.5.3 No palaeogeographic features of archaeological interest were identified along the OECC, and no further work is recommended in that area at this time. However, the assessed data did not include the landfall area, so should data be acquired in the intertidal zone or landfall area (either geophysical or geotechnical), it is recommended that it be made available for archaeological assessment to ensure a full assessment of the cable route is achieved. However, it should be noted that BGS borehole data suggests the shallow geology of the intertidal area comprises modern sediment over Tertiary deposits, and so the potential for palaeogeographic features of high archaeological potential within Pegwell Bay is relatively low. It is likely that the loess/ brickearth deposits present inland, known to be archaeologically significant, have been eroded away within Pegwell Bay and beyond, and only survive as isolated outliers, if at all.

7.5.4 Any works planned in the intertidal area should ensure that both onshore and offshore curators are consulted. To achieve the best results and correlation between onshore and offshore there will need to be close liaison between the onshore and offshore geoarchaeological teams. Should results provide sufficient information, creation of a deposit model could address the interface between onshore and offshore and the distribution of underlying sediments of archaeological potential, which would enable a reasoned judgement as to the extent of linkages between the offshore and onshore deposits.

7.6 Areas not yet covered by survey data

7.6.1 Some areas of the offshore study area have not yet been covered by geophysical or geotechnical survey data, for example: Pegwell Bay and parts of the OECC only partially covered by Nemo data (**Figure 1**).

7.6.2 Any areas that have not yet been covered by survey data (**Figure 1**), that are likely to be impacted are required to be covered by future surveys, for example by a UXO survey or further geophysical assessment, to ensure a comprehensive understanding of the archaeological assets in these areas. Any further surveys planned should be subject to archaeological advice at the planning stage, to ensure the survey methods will maximise the results for archaeological investigation. More details can be found in **Scheme of Investigations (Section 9)**. In addition, for some of the turbine layouts, such as the 28 WTG



perimeter layout (**Figures 3-7**), have turbines within 70 m of the Site Investigation Boundary. Should this layout be taken forward, it may be advisable to gather additional survey data within a buffer of at least 100 m around these turbines.

7.7 Areas of high archaeological potential

7.7.1 There are two main areas of high archaeological potential in the offshore study area.

7.7.2 One is Pegwell Bay (**Figure 23-25**) which of archaeological potential due to the mud sediments that provide excellent conditions for the preservation of archaeological material. In addition, geophysical survey has not yet been undertaken in the area, and therefore the potential of the area has not been fully explored.

7.7.3 The second is the area in close proximity to the Goodwin Sands (**Figure 11-14**), and its archaeological potential is due to the mobile nature of sandwaves in the area, where sediment movement could reveal unexpected material, as well as the potential for high levels of preservation.

7.7.4 The 'Area of High Archaeological Potential' illustrated on the figures provides an approximate area of importance, but it is also possible for material of archaeological interest to be discovered beyond their extents.

8 METHOD STATEMENTS

8.1.1 This draft WSI provides a framework for further archaeological investigations for Thanet Extension. All works will be undertaken in accordance with the methodology set out within this WSI and in compliance with the relevant standards outlined by the ClfA (ClfA, 2014a-g), excepting where they are superseded by statements made below.

8.1.2 Detailed method statements will be produced prior to survey or construction work, as required, in order to provide a detailed methodology for further archaeological works, such as those identified in the **Scheme of Investigations (Section 9)**. Each archaeological method statement will correspond to a package of works, for example, archaeological assessment of marine geophysical data, archaeological assessment of ROV data from a UXO survey, archaeological investigation using divers and/or ROVs, and post-construction monitoring.

8.1.3 Method statements will provide details about:

- Form of commission and contractual relationship with the Developer;
- Relation between the method statement, the WSI and the license condition(s);
- Context in terms of relevant construction works;
- Context in terms of previous archaeological works (e.g. table in **Appendix 1**);
- Specific objectives of archaeological works;
- Extent of investigation;
- Investigation methodology
- Anticipated post-investigation actions, including processing, assessment and analysis of finds and samples;
- Reporting;



- Timetable;
- Monitoring arrangements; and
- Health, safety and welfare.

8.1.4 Method statements will be provided to the Developer and/ or their representative for comment. On receipt of comments, the Retained Archaeologist will produce a final method statement addressing these comments.

8.1.5 Method statements will be submitted to the Archaeological Curator(s) for approval and will include provision for the relevant Archaeological Curator(s) to monitor the progress of the archaeological works, as appropriate, be that through site visits or meetings with the Developer, the Client, the Contractor(s), and/ or the Retained Archaeologist.

9 SCHEME OF INVESTIGATIONS

9.1 Introduction

9.1.1 The **Mitigation** section (**Section 7**) above provided a brief overview of the type of further archaeological investigations recommended for archaeological receptors, as set out in the ES (VWPL 2018). This **Scheme of Investigations** section sets out how these investigations will be undertaken. It has been informed by the *Historic Environment Guidance for the Offshore Renewable Energy Sector* (Wessex Archaeology, 2007) and *Model Clauses for Archaeological Written Schemes of Investigation* (TCE, 2010), as well as the standards and guidance listed below, as applicable.

9.1.2 The Retained Archaeologist will provide input on Contractors' proposed survey method statements to ensure data collection is optimised so that it can be used to identify and characterise features of archaeological importance that could be impacted by development works and inform mitigation proposals such as avoidance of wrecks and debris.

9.2 Standards and guidance

9.2.1 The method statements and specifications in this document are based on archaeological best practice and guidance for offshore development. The principal sources are:

- *Historic Environment Guidance for the Offshore Renewable Energy Sector* (Wessex Archaeology, 2007);
- *Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy* (Oxford Archaeology and George Lambrick Archaeology and Heritage, 2008);
- *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (Gribble and Leather, 2011);
- *Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects* (TCE, 2010);
- *Protocol for Archaeological Discoveries: Offshore Renewables Projects* (TCE, 2014);
- *Code for Practice for Seabed Development* (JNAPC, 2006);
- *Standard and guidance for archaeological field evaluation* (ClfA, 2014a);
- *Standard and guidance for nautical archaeological recording and reconstruction* (ClfAe, 2014g);

- *Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers* (English Heritage, 1998);
- *Military Aircraft Crash Sites: Guidance on their Significance and Future Management* (English Heritage, 2002);
- *Wind Energy and the Historic Environment* (English Heritage, 2005);
- *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment* (English Heritage, 2008);
- *Ships and Boats: Prehistory to Present – Designation Selection Guide* (Historic England, 2012);
- *Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes* (English Heritage, 2013);
- *Managing Significance in Decision-Taking in the Historic Environment: Historic Environment Good Practice Advice in Planning: 2* (Historic England, 2015c);
- *Preserving Archaeological Remains: Decision-taking for Sites under Development* (Historic England, 2016); and
- *Our Seas – A Shared Resource: High Level Marine Objectives* (Department for Environment, Food and Rural Affairs (DEFRA), 2009).

9.3 Archaeological exclusion zones (AEZs)

- 9.3.1 *In situ* preservation is favoured by government policy and international best practice as the first option (Wessex Archaeology, 2007), and the principle means used to preserve *in situ* any features or deposits of potential or known archaeological interest are AEZs. AEZs are placed around discrete sites, or more extensive areas identified by the impact assessment, and prohibit development related activities within their extents, however they do not restrict remote survey work or other activities that do not impact the seabed. The TCE document *Model Clauses for Archaeological Written Schemes of Investigation* (TCE, 2010) states that AEZs are formed by establishing a buffer around the known extents of sites for which the available evidence suggests that there could be archaeological material present on the seabed.
- 9.3.2 The final development layout will take into account the locations of all AEZs. All AEZs will be marked on the scheme masterplans. The Developer will require its Contractor(s) to conduct all construction activity in such a way as to prevent any impacts by construction or related works within any AEZs, and keep records that this can be evidenced, if required.
- 9.3.3 Once established, AEZs may be altered (enlarged, reduced, moved or removed) as a result of further archaeological assessment of data or field evaluation, however, the alteration of AEZs will only be undertaken with the agreement of the relevant stakeholders and the Archaeological Curator(s). Following alteration, a new plan giving details of the current AEZs will be drawn up and issued to each relevant party.
- 9.3.4 If it becomes apparent that activities have taken place within any AEZ without prior consent, the party responsible will obtain advice from the Retained Archaeologist in accordance with their obligations with respect to the WSI, and the AEZ may require monitoring to determine the level and extent of impact.
- 9.3.5 The AEZs recommended for sites in the array are summarised in **Table 4 (Figures 3-7)**.



Table 4 Sites recommended for AEZs in the array

WA_ID	Discrimination	Description	Buffer (m)
70018	A1	Wreck	50
70032	A3	Recorded wreck	100
70033	A3	Recorded wreck	100
70034	A1	Wreck	50
70039	A1	Debris	20
70040	A1	Wreck	50
70052	A1	Wreck	50
70056	A1	Wreck and associated debris	50
70067	A3	Recorded obstruction	100
70069	A1	Wreck	50
70085	A3	Recorded obstruction	100
70104	A1	Debris	20
70117	A1	Wreck	50
70128	A1	Wreck	50

9.3.6 Due to the potential significance of known sites, AEZs are recommended around all eight wrecks within the Thanet Extension array. The AEZs consist of 50 m around the extents of the wrecks, as recorded in the sidescan sonar and multi-beam data. Of the non-wreck A1 anomalies, four are objects of debris likely to be related to the wrecks and covered within the wreck AEZs. Anomalies 70042 and 70058 are both wreck debris, however their 20 m buffer extends slightly beyond that of the wreck, and in these cases, the wreck's 50 m AEZ has been merged with the 20 m buffer to make one buffer. Anomalies 70039 and 70104 are both debris items with associated UKHO records. Although nothing was identified on the most recent geophysical data to indicate a wreck, both features have been given a precautionary buffer based on record details. Of the five A3s, four have been given precautionary 100 m buffers based on their associated UKHO records. Anomaly 70049 has not been given an AEZ at this time, as there is no indication in the UKHO record of the features being a wreck.

9.3.7 The AEZs recommended for sites in the OECC are summarised in **Table 5 (Figures 3 – 7)**.

Table 5 Sites recommended for AEZs in the OECC

WA_ID	Discrimination	Description	Buffer (m)
70210	A3	Recorded Wreck	100
70219	A1	Wreck	50
70257	A1	Wreck	50
70346	A1	Debris – includes the aircraft crash site 70349	20
70366	A1	Wreck	50
70379	A3	Recorded wreck	100
71099	A1	Wreck	50
71130	A1	Wreck	50



WA_ID	Discrimination	Description	Buffer (m)
NEMO_Mag_11081	N/A	Aircraft material discovered through pre-disturbance survey	100

9.3.8 In the OECC, AEZs have been implemented around all five wrecks. Of the 11 non-wreck A1 anomalies, six are objects of debris likely to be related to the wrecks and covered within the AEZs listed above. Anomalies 70346-49 are items of debris with an A1 discrimination, thought to be related to the wreckage of an American B-24 Liberator bomber and German submarine UB 12, and as such has been given an AEZ of 50 m. Anomalies 70346 and 70347 are both potentially related to UB 12, however they are slightly offset and have been recommended AEZs of 20 m. Anomaly 70349 is likely related to the wreckage of an American B-24 Liberator bomber and has a recommended AEZ of 50 m. Due to the proximity of these four anomalies, their recommended AEZs impact one another and, as a result have been merged into one large AEZ. Debris item 70486 is thought to be the spilt cargo of a stone carrier barge that sank in 1983. Although the feature is related to a wreck, no AEZ is recommended at this time as the debris is deemed to be modern, however the site should probably be avoided based on operational grounds. NEMO_Mag_11081 represents possible aircraft material identified during the pre-disturbance survey undertaken for Nemo Link, and was recommended for a temporary 100 m buffer following archaeological assessment.

9.3.9 Anomaly 71209 comprises the centrepiece of a 1 km radius circle – the recorded location in the NRHE of a B-17G Flying Fortress. The positional data for the site is quite vague, and could represent the recorded loss location rather than the position of aircraft material on the seabed. Another position, that records actual material on the seabed for this site, is recorded approximately 1.5 km to the south. Although there is unlikely to be material at the 71209 location, it has been retained, and the original 1 km circle has been reduced to a 100 m buffer due to uncertainty and the potential for buried debris. It should be considered an area of archaeological potential, rather than an AEZ.

9.4 Micrositing

9.4.1 Where possible, the turbines, associated infrastructure, cables, legs of jack-up crane vessels and/ or anchors of other vessels will be microsited to avoid the AEZs and A2 geophysical anomalies of archaeological potential.

9.5 Marine geophysical investigations

9.5.1 No surveys solely for archaeological purposes are currently planned, however, there is potential for further surveys to be undertaken as part of a UXO assessment, and covering areas where there are data gaps. Therefore, the Developer will allow for archaeological involvement in the planning, acquisition and review of further geophysical surveys related to the UXO survey and/ or any further geophysical investigations, should they be undertaken. In the event that further work is recommended by the Retained Archaeologist, the Historic England Science Advisor must be contacted to discuss the scope and evidential value of such works. This is to ensure that the extent, coverage and line spacing of geophysical survey data, and its associated capabilities and limitations, can be weighed against the high potential for archaeological remains within the upper layers of seabed stratigraphy.



- 9.5.2 For all aspects of marine geophysical investigations, the Developer will adhere to applicable standards and guidance. For example, geophysical surveys will be undertaken in line with *Marine Geophysics Data Acquisition, Processing and Interpretation* (English Heritage, 2013) and the *Model Clauses* (TCE, 2010).
- 9.5.3 The specification of any proposed marine geophysical survey whose primary aim is non-archaeological (ie: UXO, engineering or environmental) will be subject to advice from the Retained Archaeologist to ensure that archaeological input is provided at the planning stage and to enable archaeological considerations to be taken into account without compromising the primary objective of the survey. The archaeological input will comprise advice from an appropriately qualified marine archaeologist on the following points:
- available details of sites and/ or anomalies identified in the desk-based technical report (Wessex Archaeology, 2017a) and archaeological assessment of geophysical survey data (Wessex Archaeology, 2018a);
 - archaeological potential of areas where no existing sites and/ or anomalies are yet known;
 - geophysical sources/ equipment;
 - methodologies, including survey specifications, spacing and orientation of lines and cross lines;
 - source/ equipment settings; and
 - requirements for post-processing, interpreting and archiving resulting data.
- 9.5.4 Where archaeological objectives have been added to a survey whose primary objectives are non-archaeological, consideration will be given to having an archaeologist or geophysicist with appropriate archaeological experience on-board during the acquisition of data. The on-board representative responsible for archaeology will advise on the suitability for archaeological purposes of the data being acquired and be able to propose, through communication with the Retained Archaeologist, minor changes to the survey method, settings, etc., in order to optimise archaeological results, and thereby minimise the need to repeat surveys.
- 9.5.5 Should any surveys be carried out primarily for archaeological purposes, the specification should be prepared by a suitably qualified archaeologist or marine geophysicist. In addition, the survey should be carried out by a survey company with appropriate archaeological expertise and including geophysicists with appropriate archaeological expertise on board, if required.
- 9.5.6 The results of further geophysical interpretation will be compiled as an Archaeological Report by the Retained Archaeologist, consistent with the provisions on reporting within this WSI (**Section 12.3**).

9.6 Marine geoarchaeological investigations

Existing vibrocores

- 9.6.1 The Stage 1 geotechnical assessment reviewed logs from 11 locations (**Table 6**).

Table 6 Geotechnical logs subject to Stage 1 assessment

Location	Easting	Northing	Sample Type	Location
001	410897	5702000	VC and CPT	Fugro, Wallingford
002	407557	5701680	VC and CPT	Fugro, Wallingford



Location	Easting	Northing	Sample Type	Location
003	409499	5699455	VC and CPT	Fugro, Wallingford
004	403321	5702423	VC and CPT	Fugro, Wallingford
005	409601	5697392	VC and CPT	Fugro, Wallingford
006	396717	5701852	VC and CPT	Fugro, Wallingford
007	398973	5701189	VC and CPT	Fugro, Wallingford
008	399485	5698585	VC and CPT	Fugro, Wallingford
009	409006	5694927	CPT	Fugro, Wallingford
011	405812	5694431	CPT	Fugro, Wallingford
013	400717	5692265	VC and CPT	Fugro, Wallingford

- 9.6.2 The VCs comprise physical samples that can undergo further testing, however the CPT logs consist only of logs, not physical samples.
- 9.6.3 The assessment recommended that samples from VC002, VC003, VC004, VC006 and VC007 should be subject to Stage 2 geoarchaeological recording at the pre-construction phase. The vibrocores have been kept in storage, and it has been confirmed that they are available for further assessment, however they are likely to have already been tested on for engineering purposes, and sections are therefore likely to be missing. What remains of these cores should be archaeologically reviewed. Archaeological review will determine if the samples are suitable for further assessment, in order to target and further explore Unit 2, considered to be of archaeological potential. The Stage 2 report will state the results of archaeological recording and will indicate whether any Stage 3 work is warranted (**Table 7**). However, as these cores may not be ideal for further archaeological assessment, further geotechnical work is recommended.
- 9.6.4 To help frame marine geoarchaeological investigations, Wessex Archaeology has developed a five-stage approach, encompassing different levels of investigation appropriate to the results obtained at each stage, accompanied by formal reporting of the results obtained at the level achieved (**Table 7**). In the event that further work is recommended by the Retained Archaeologist, the Historic England Science Advisor must be contacted to discuss the scope and evidential value of such works.

Table 7 Geoarchaeological programme of analysis

Stage	Method	Description
1	Assessment	A desk-based archaeological assessment of the borehole and CPT logs generated by geotechnical contractors aims to establish the likely presence of horizons of archaeological interest and broadly characterise them, as a basis for deciding whether and what Stage 2 archaeological recording is required. The Stage 1 report will state the scale of Stage 2 work proposed.
2	Geoarchaeological Recording	Archaeological recording of selected retained or new core samples will be undertaken. This will entail the splitting of the cores, with half of each core being cleaned and recorded. The Stage 2 report will state the results of the archaeological recording and will indicate whether any Stage 3 work is warranted.



Stage	Method	Description
3	Sampling and Assessment	Dependent upon the results of Stage 2, sub-sampling and palaeoenvironmental assessment (pollen, diatoms and foraminifera) may be required. Subsamples will be taken from one core-half, with the other core-half retained intact for further sub-sampling, should it be required. Assessment will comprise laboratory analysis of the samples to a level sufficient to enable the value of the palaeoenvironmental material surviving within the cores to be identified. Subsamples will also be taken and retained at this stage in case radiocarbon dating is required during Stage 4. The Stage 3 report will set out the results of each laboratory assessment together with an outline of the archaeological implications of the combined results, and will indicate whether any Stage 4 work is warranted.
4	Analysis and Dating	Full analysis of pollen, diatoms and/or foraminifera assessed during Stage 3 will be undertaken. Typically, Stage 4 will be supported by radiocarbon dating of suitable subsamples. Stage 4 will result in an account of the successive environments within the coring area, a model of environmental change over time, and an outline of the archaeological implications of the analysis.
5	Final Report	If required Stage 5 will comprise the production of a final report of the results of the previous phases of work for publication in an appropriate journal. This report will be compiled after the final phase of archaeological work, whichever phase that is.

9.6.5 Cores should be split in half prior to any further sampling to enable further analysis if required. More detail about geoarchaeological assessment can be found in the *Model Clauses* document (TCE, 2010).

9.6.6 Further recommendations can be provided should any further stages of geoarchaeological assessment be deemed necessary, through to Stage 5, if required. Reporting will be undertaken following **Section 12.3**.

Further geotechnical sampling

9.6.7 Should any further geotechnical sampling be planned (e.g. vibrocore or borehole) within the Thanet Extension array area, provision should be made for archaeological advice at the planning stage of the geotechnical survey, to ensure that the survey methods and locations will maximise the results for archaeological investigation. Archaeological advice will be compliant with recommendations set out in the *Model Clauses* document (TCE, 2010), and *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (Gribble and Leather, 2011). The advice will specifically include recommendations for the locations of geotechnical sampling, for example highlighting areas of Pleistocene/ Early Holocene archaeological potential, as well as providing a detailed methodology for assessment. Material needs to be retrieved in a manner so that the whole sequence can be sampled and reviewed, in the most continuous sequence possible. In addition, there should be archaeological advice at the outset to determine methods for subsequent storage of recovered material.

9.6.8 As part of the survey planning, and prior to survey works commencing, a method statement covering the geotechnical programme of work will be provided to the Archaeological Curator(s) for comment.



- 9.6.9 For the array, geotechnical sampling should target locations where Unit 2 is present (**Figure 2**). Unit 2 can be further subdivided into five Phases, and in general comprises early Holocene/ Pleistocene, complex channel deposits with medium to high potential for *in situ* and derived deposits from within and immediately surrounding features, with Phases 1, 3, 4 and 5 of particular interest. The locations of these samples should be chosen to maximise the most continuous sequence possible, and the cores recovered should be managed to ensure subsequent sampling and dating is not compromised.
- 9.6.10 It is important to note that despite the identification of a single unit of high potential, there are complex landscape characteristics that will need to be explored and understood in more detail across the proposed development area. Geotechnical survey results should provide adequate levels of information for a palaeogeographic assessment and deposit model. This will enable a detailed understanding of the significance of the recorded deposits, and past landscapes, which will lead to a coherent and comprehensive understanding of the stratigraphy of the area. If relevant, the results of survey and the deposit model should be combined with the results of any onshore geotechnical work to ensure a seamless approach.
- 9.6.11 No palaeogeographic features of archaeological interest were identified along the OECC, and no further work is recommended in that area at this time, based on the results of the archaeological assessment of geophysical survey data. However, the assessed data did not include the landfall area, so should data be acquired in the intertidal zone or landfall area (either geophysical or geotechnical), it is recommended that it be made available for archaeological assessment, to ensure a full assessment of the OECC is achieved. It should be noted, however, that BGS borehole data suggests that the shallow geology of the intertidal area comprises modern sediment over Tertiary deposits, and so the potential for palaeogeographic features of high archaeological potential within Pegwell Bay is relatively low. It is likely that the loess/ brickearth deposits present inland, known to be archaeologically significant, have been eroded away within Pegwell Bay and beyond, and only survive as isolated outliers, if at all.
- 9.6.12 Any works planned in the intertidal area should ensure that both onshore and offshore curators are consulted. Offshore and onshore geoarchaeological teams will need to liaise closely to ensure that mitigation is designed where it is most effective to obtain the best results. Results of any terrestrial, offshore and intertidal investigations will be shared between the offshore and onshore teams. Should results provide sufficient information, a deposit model including both offshore and onshore results could be developed to illustrate the interface of the distribution of underlying sediments of archaeological potential, which would enable an assessment of the extent of linkages between the offshore and onshore deposits.
- 9.6.13 Historic England has recommended the acquisition of dedicated archaeological cores. However, the Retained Archaeologist will work with, and communicate early on with, the Geotechnical Contractor to ensure that should any cores of archaeological potential be required for other assessment, that they will undergo archaeological assessment first. This process will be recorded in the method statement.
- 9.6.14 If boreholes and/ or vibrocores are going to be assessed on-board the survey vessel, Historic England has advised that consideration be made for an archaeologist to be on-board during the geotechnical survey. If geotechnical material will not be assessed on-board, but rather be recovered to lab facilities for assessment on shore, the presence of an archaeologist on-board during acquisition would not be required, however an archaeologist should be present in the lab when the cores are split.



9.6.15 Any further investigations will follow the staged approach set out in the **Existing Vibrocores** Section above, and reporting will follow **Section 12.3**.

9.7 Archaeological assessment of UXO survey data

9.7.1 The Client has indicated that a UXO survey may be undertaken to assess the potential for UXO material on and/ or under the seabed. The UXO survey will include high resolution geophysical survey, ROV video survey and potentially diver survey. With regards to any geophysical survey, the **Geophysical Survey (Section 9.5)** should also be referred to. In addition, archaeological advice must be sought at the planning stage of a UXO survey in order to maximise the results for archaeological assessment.

9.7.2 Archaeological advice will include:

- details of AEZs within the development area. Should there be any potential for impact, these should be incorporated into the survey for the purposes of archaeological review;
- details of the A2 geophysical anomalies within the development area. Should there be any potential for impact, these should be incorporated into the survey for the purposes of archaeological review;
- the archaeological potential of areas where no existing sites and/ or anomalies are yet known;
- the type and level of ROV/ diver positioning, video/ still recording to be utilised;
- the use of laser siting to provide a scale for seabed features; and
- the provision of clear guidance on the types of sites and finds that are to be reported and recorded, and the level of recording required for sites of archaeological potential.

9.7.3 Archaeological advice in the development of the survey methodology is particularly important in relation to the large number of A2 anomalies within the OECC (with particular concentrations visible in **Figures 18 – 20, 23 – 24**). A large number of these are magnetic anomalies without any associated material visible on the seabed, and if these anomalies will potentially be impacted, they will need to be effectively identified and accurately positioned. Therefore, it is recommended that any ROV be equipped with a small dredge and excavating arm to expose buried material.

9.7.4 Advice regarding the high potential for discovery of buried material in the area around Goodwin Sands will also be provided.

9.7.5 A method statement should be prepared for a UXO survey, including archaeological objectives and requirements.

9.7.6 Data collected during a UXO survey should be reviewed by an appropriately qualified and experienced archaeologist. The assessment will include any investigation reports, video stills, video data, blue view sonar or other geophysical data, and the location and nature of any obstructions encountered.

9.7.7 The results of the archaeological assessment would need to be disseminated, as per **Reporting (Section 12.3)**. The reporting must include the investigative and visual outcomes, which can provide insightful and significant information.



9.8 Further surveys using divers and/or ROVs

- 9.8.1 The Model Clauses document (The Crown Estate 2010: 21) states that the developer should seek archaeological input at the planning stages of any proposed diver/ ROV surveys undertaken primarily for engineering, ecological, or other purposes, in order to maximise the potential benefits. Archaeological input could include advice from the Retained Archaeologist on whether the surveys are likely to cover any areas of archaeological interest, such as AEZs, A2s, areas where unexpected discoveries have been made, and areas of archaeological potential, or whether the surveys are not likely to be of archaeological interest.
- 9.8.2 Therefore archaeological advice should be sought at the planning stages for any ROV and/or diver surveys, for example undertaken as part of route clearance or other activities, and, if appropriate, a separate method statement could be produced, in order to maximise the survey results for archaeological assessment.
- 9.8.3 These surveys could be used to validate, alter or remove existing AEZs, in conjunction with discussions with the Archaeological Curator(s), or to identify and characterise material on the seabed, for example A2 geophysical anomalies or unexpected discoveries.

9.9 Archaeological watching briefs

- 9.9.1 For the proposed offshore works, due to their nature, no Archaeological Watching Briefs are proposed, and ORPAD will be used to deal with any finds of unexpected archaeological material that come to light during construction. Should archaeological material of high archaeological importance be reported through ORPAD, an archaeological watching brief could be instituted, following discussions with the Archaeological Curator(s). The archaeological watching brief would require a works specific method statement, which would be based on the specifics in this WSI and would be undertaken in line with the *Standard and Guidance for an archaeological watching brief* (ClfA, 2014c), and should be approved by the Archaeological Curator(s) prior to works being undertaken.
- 9.9.2 A watching brief may be required for intertidal works, should works be undertaken in areas of archaeological sensitivity.

9.10 The Offshore Renewable Protocol for Archaeological Discoveries (ORPAD)

- 9.10.1 ORPAD is a safety net for any unexpected discoveries made during the course of development works. In the instances where the Developer and/ or their representative have made provision for other archaeological investigations (for example archaeological assessment of ROV survey data), then the archaeological method statement relating to this provision will take precedence. However, where no specific archaeological provision has been made, then reporting should be made through ORPAD (**Appendix 2**).
- 9.10.2 The aim of ORPAD is to reduce any adverse effects of the development on the historic environment by enabling people working on the development to report archaeological discoveries in a manner that is both convenient to their everyday work and effective with regard to the requirements of the Archaeological Curator(s).
- 9.10.3 Any discoveries by Project Staff are reported to a Site Champion on their vessel or site (usually the senior person on-board or on site). The Site Champion could be a UXO specialist, Vessel Master, a Construction Foreman, or any other person in a position to control the immediate works. The Site Champion then reports to the Nominated Contact, who has been formally identified by the Developer and/ or their representative to co-ordinate



the implementation of the Protocol. The Nominated Contact will in turn inform the Implementation Service and the Developer's Project Manager(s).

- 9.10.4 The Implementation Service will in turn liaise with the Nominated Contact, the Developer and/ or their representative, the Archaeological Curator(s) and others, as necessary. Provision will be made by the Developer and/ or their representative, in accordance with the Protocol, for the prompt reporting/ recording to the Archaeological Curator(s) of archaeological remains encountered or suspected during the works. If the find constitutes 'wreck' within the terms of the *Merchant Shipping Act 1995*, then the Implementation Service will also make a report to the Receiver of Wreck within 28 days of recovery. Should a find comprise material suspected to be from an aircraft lost while in military service, the MoD will be notified, as the material could be protected under the *Protection of Military Remains Act 1986*.
- 9.10.5 For discoveries of high archaeological importance, call-out investigations could be instituted, following discussions with the Archaeological Curator(s).
- 9.10.6 As the Protocol is designed to operate when an archaeologist is not present, it is recognised that for the Protocol to be effective, participants (such as the Nominated Contact, Site Champions and Project Staff) should receive Protocol Awareness training. Project Staff involved with the following works in particular should undergo training: UXO survey(s), pre-lay grapnel runs, clearance works, and any other works with potential for the discovery of material on the seabed and/ or recovery of material to the surface. This will ensure that staff are familiar with ORPAD, are able to recognise finds of archaeological potential, understand how to record them, and are aware of the reporting process.
- 9.10.7 Protocol Awareness talks can be undertaken by the Implementation Service for all relevant staff, through short 'Toolbox Talks', and hard copies of the Protocol can be made available for use on board vessels. The relevant staff on all pre-construction, construction, O&M and decommissioning vessels will be informed of the Protocol, details of the find types that may be of archaeological interest, and the potential importance of any archaeological material encountered. The Developer and/ or their representative should ensure that all staff are aware of any areas to be considered to be of archaeological sensitivity, such as the area near the Goodwin Sands, and should be informed to exercise due vigilance during any works in these areas.
- 9.10.8 Full contact details for all relevant parties will be held by the Retained Archaeologist.

10 POST-CONSTRUCTION MONITORING

- 10.1.1 With the implementation of the recommended mitigation, AEZs and A2 geophysical anomalies will be avoided, and therefore no impact from the construction works will have occurred. However, post-construction monitoring is recommended to confirm and demonstrate that impacts have been as negligible as anticipated.
- 10.1.2 Post-construction monitoring for engineering and O&M purposes is likely to include geophysical survey, for example to assess scour. Archaeological post-construction monitoring could therefore include archaeological input at the planning stages of any survey work likely to cover areas of archaeological interest (such as AEZs, A2 geophysical anomalies, areas where unexpected discoveries have been made, and areas of archaeological potential), as well as provision for the archaeological assessment of the resulting survey data



- 10.1.3 Archaeological method statement(s) will provide advice for the post-construction monitoring.
- 10.1.4 It is recommended that based on the results of an initial assessment, any further requirements during the post-construction operation and maintenance phase should be agreed in consultation with the Archaeological Curator(s). It is proposed that further monitoring may only be necessary if significant changes to coastal and offshore processes are identified, maintenance or other operations impact the seabed within AEZs, and/ or upon receipt of new information relevant to the integrity of archaeological important items.

11 FINDS AND ENVIRONMENTAL

11.1 Finds

General

- 11.1.1 All artefacts identified from material recovered will be retained, processed and recorded in accordance with the ClfA's *Standard and Guidance for Archaeological Field Evaluations* (ClfA, 2014a) and *Standard and guidance for the collection, documentation, conservation and research of archaeological material* (ClfA, 2014b).
- 11.1.2 All finds and other items of archaeological interest recovered from the seabed have an owner, but the law regarding ownership varies according to the character of the material, the environment in which it was found and national legislation. For example, finds and other items of archaeological interest recovered offshore in the course of investigation are generally the property of TCE as the landowner, with the exception of all human remains, 'wreck' for the purposes of the *Merchant Shipping Act 1995*, and material covered by the *Protection of Military Remains Act 1986*.
- 11.1.3 From the point of discovery, all finds will be held by the Developer and/ or their representative or the Retained Archaeologist in appropriate conditions pending further recording, investigation, study or conservation. Apart from items with ownership identified by the Receiver of Wreck which may require further investigation, ownership will be transferred to the institution receiving the archive, unless other arrangements are agreed with the Archaeological Curator(s).
- 11.1.4 Unexpected artefacts that are exposed or recovered in the course of the scheme of works will be reported through ORPAD.
- 11.1.5 Recovered objects that require immediate conservation treatment to prevent deterioration will be treated according to guidelines laid down in *First Aid for Finds* (Watkinson and Neal, 1998) and *First Aid for Underwater Finds* (Robinson, 1998). A full record will be made of any treatment given. These recovered finds will be primarily conserved, bagged and boxed in accordance with guidelines set out in the United Kingdom's Institute for Conservation (UKIC)'s *Conservation Guidelines No 2* (UKIC, 1984). Any objects that are recovered will be selected, retained or disposed of in accordance with the policy agreed with the institution receiving the archive, and in consultation with the Archaeological Curator(s).
- 11.1.6 Subject to the agreement reached with the receiving institution regarding selection, retention and disposal of material, the Retained Archaeologist will retain all recovered objects unless they are undoubtedly modern debris and/ or of no archaeological interest. Any objects discarded will, however, be noted on object records and in the project database. In these circumstances, sufficient material will be retained to characterise the date and function of the deposit from which it was recovered, if applicable.



- 11.1.7 In the event of the discovery of items that may be eligible for legal protection, the Contractor will immediately notify the Retained Archaeologist, who will notify the relevant legal authority as soon as possible.
- 11.1.8 The Retained Archaeologist will prepare and implement a finds monitoring and maintenance programme, which will cross reference finds to management/ monitoring systems maintained by the Retained Archaeologist.
- 11.1.9 Contingency will be made for specialist advice and conservation needs on-site should unexpected, unusual, or extremely fragile and delicate objects be recovered, and the advice and input from an appropriate Conservation Specialist will be sought through the Retained Archaeologist. A range of internal and external specialists will be consulted as appropriate.

11.2 Ordnance

- 11.2.1 If items of ordnance are discovered, they will be treated with extreme care. Company Health & Safety policies and established operational procedures should always take priority over archaeological reporting of munitions and ordnance.
- 11.2.2 Depending on the item's age, ordnance may be of archaeological interest, and therefore if it is safe to do so, it should be recorded and reported.
- 11.2.3 Any firearms and ammunition are likely to be subject to the Firearms Acts (various dates). Ammunition should be regarded as ordnance, regardless of its size.

11.3 Human remains

- 11.3.1 Any human remains (articulated or disarticulated, cremated or unburnt) discovered, will be left *in situ*, covered and protected. A Ministry of Justice licence will be obtained by the Retained Archaeologist before any further excavation (including where remains are to be left *in situ*). Following discussions with the Developer and/ or their representative and the Archaeological Curator(s), and with advice from an osteoarchaeologist, the Retained Archaeologist will determine the need for and appropriateness of their excavation/ removal or sampling as part of the evaluation. Should human remains require excavation, they will be fully recorded, excavated and removed from the site in compliance with the terms of the Ministry of Justice licence.
- 11.3.2 Any excavation and post-excavation processing of human remains will be undertaken in accordance with current guidance documents (eg, McKinley, 2013) and ClfA standards (McKinley and Roberts, 1993). Appropriate specialist guidance will be provided by an osteoarchaeologist, with site visits undertaken if required. The final deposition of human remains, following analysis, will be in accordance with the terms of the Ministry of Justice licence.

11.4 Treasure

- 11.4.1 The Retained Archaeologist will immediately notify the Developer and/ or their representative and the Archaeological Curator(s) on discovery of any material covered, or potentially covered, by the *Treasure Act 1996* (as amended by *The Coroners and Justice Act 2009*). All information required by the *Treasure Act* (ie, finder, location, material, date, associated items etc.) will be reported to the Coroner within 14 days. Items falling under the *Treasure Act* will be removed from the site by the Retained Archaeologist and stored in a secure location, pending a decision by the Coroner.



11.5 Aircraft

- 11.5.1 The majority of aircraft wrecks are military and therefore fall under the *Protection of Military Remains Act 1986*. All military aircraft crash sites in the UK, its territorial waters, or British aircraft in international waters, are controlled sites under this Act. It is an offence under this Act to tamper with, damage, move or unearth any items at such sites, unless the Ministry of Defence (MoD) has issued a licence authorising such activity. Consequently, anyone wishing to recover a military aircraft or excavate a military aircraft crash site in the UK is required to obtain a licence from the Joint Casualty and Compassionate Centre (JCCC). A licence is required irrespective as to whether the aircraft was in the service of another nation's armed forces.
- 11.5.2 Any finds that are suspected of being military aircraft will be reported immediately to the Retained Archaeologist. In the case of a military aircraft being investigated under licence, any human remains will be reported immediately.

11.6 Wreck

- 11.6.1 Archaeological artefacts that have come from a ship are 'wreck' for the purposes of the *Merchant Shipping Act 1995*. The Developer and/ or the Client, via the Retained Archaeologist, should ensure that the Receiver of Wreck is notified within 28 days of recovery, for all items of wreck that have been recovered.

11.7 Environmental

- 11.7.1 Deposits (i.e. sediments) of archaeological/historical/cultural interest that do not comprise artefactual remains will not be considered to be 'finds' but may be subject to sampling. Any artefactual material subsequently discovered in the course of processing such samples would be treated as finds thereafter.
- 11.7.2 The method statement for each programme of archaeological work will set out the environmental sampling strategies and methods – including methods for processing, assessing and/or analysing samples.
- 11.7.3 Approaches and methods will be consistent with *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage, 2011) and *Geoarchaeology: using earth sciences to understand the archaeological record* (Historic England, 2015b).

11.8 Conservation and storage

- 11.8.1 All recovered materials, from land or underwater, will be subject to a Conservation Assessment to gauge whether special measures are required while the material is being held. This Conservation Assessment will be carried out by the Retained Archaeologist or an Archaeological Contractor with an appropriate level of expertise, with advice from appropriate specialists. The Retained Archaeologist or an Archaeological Contractor with appropriate expertise will implement recommendations arising from the assessment. If no special measures are recommended, finds will be conserved, bagged, boxed and stored in accordance with industry guidelines (ClfA, 2014b).



12 POST-EXCAVATION AND REPORTING

12.1 Finds

- 12.1.1 All retained finds will, as a minimum, be washed, weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the investigation. The report will include a table of finds by period and/ or feature group.
- 12.1.2 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by the Retained Archaeologist, or by another approved conservation centre.
- 12.1.3 Artefacts and other finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b) and the Museums and Galleries Commissions *Standards in the Museum Care of Archaeological Collections* (1992).

12.2 Environmental

- 12.2.1 Bulk environmental soil samples will be processed by standard flotation methods and scanned to assess the environmental potential of deposits. The flot will be retained on a 0.25 mm mesh, with residues fractionated into 5.6/4 mm, 2 mm, 1 mm and 0.5 mm and dried if necessary. Coarse fraction (>5.6/4 mm) will be sorted, weighed and discarded, with any finds recovered given to the appropriate specialist. Finer residues will be retained until after any analyses, and discarded following final reporting (in accordance with the Selection policy, below).
- 12.2.2 In the case of samples from cremation-related deposits the flots will be retained on a 0.25 mm mesh, with residues fractionated into 4 mm, 2 mm and 1 mm. In the case of samples from inhumation deposits, the sample will be artefact sieved through 9.5 mm and 1 mm mesh sizes. The coarse fractions (9.5 mm) will be sorted with any finds recovered given to the appropriate specialist together with the finer residues.
- 12.2.3 Any waterlogged or mineralised samples will be processed by standard waterlogged flotation methods.

12.3 Reporting

General

- 12.3.1 Following completion of the fieldwork and/or the assessment of the data, a draft report(s) will be submitted for approval to the Developer and/ or the Client and the Archaeological Curator(s), for comment. Once approved, a final version will be submitted.
- 12.3.2 The report(s) will be prepared in accordance with the relevant Standards and Guidance documents produced by the ClfA, and will typically include the following elements:
- a non-technical summary;
 - the aims and methods of the work;
 - the results of the work including finds and environmental remains;
 - a statement of the potential of the results;
 - proposals for further analysis and publication;



- appendices;
- illustrations and appendices to support the report; and
- references.

12.3.3 A copy of the final report(s) will be deposited with the National Record of the Historic Environment (NRHE) and/ or KHER, along with surveyed spatial digital data (.dxf or shapefile format) relating to the evaluation.

12.3.4 It is essential that information from this project be made publicly available, as this will lead to beneficial effects, and is a requirement of Historic England. The information can then support appreciation and enjoyment of the historic environment, on local, regional, and national levels, and also enable further academic research and inform marine plans. In addition, dissemination can bring about greater awareness of the historic environment, which can in turn engender local pride.

Publication

12.3.5 If no further mitigation works are undertaken, a short report on the results of the evaluation will be prepared for publication in a suitable journal, if considered appropriate and agreed with the Developer and/ or their representative and the Archaeological Curator(s).

OASIS

12.3.6 Following completion of the scheme of construction, the Developer and/ or their representative will produce an OASIS form for any completed and agreed Archaeological Reports produced as a result of this WSI and will submit a copy as a PDF file to Historic England's NRHE (oasis@english-heritage.org.uk).

13 ARCHIVE STORAGE AND CURATION

13.1 Museum

13.1.1 Every effort will be made to identify a suitable repository for the archive resulting from the investigation. If no suitable repository is identified, the Retained Archaeologist will continue to store the archive, but may institute a charge to the client for ongoing storage beyond a set period.

13.1.2 Deposition of any finds with the museum or archive will only be carried out with the full agreement of TCE or the owner (as confirmed by the Receiver of Wreck).

13.2 Transfer of title

13.2.1 On completion of the investigation (or extended fieldwork programme), every effort will be made to persuade the legal owner of any finds recovered (ie, TCE), with the exception of human remains and any objects covered by the *Treasure Act 1996 (as amended by the Coroners and Justice Act 2009)*, to transfer their ownership to the museum or archive in a written agreement.

13.3 Preparation of archive

13.3.1 The complete project archive, which may include paper records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by the suitable repository that will accept the archive, and in general following nationally recommended guidelines (Society of Museum Archives (SMA), 1995; ClfA, 2014d; Brown, 2011; ADS, 2013). The archive will



usually be deposited within one year of the completion of the project, with the agreement of the Client.

- 13.3.2 The relevant Archaeological Curator(s) and the Retained Archaeologist will agree with the receiving institution a policy for the selection, retention and disposal of recovered or excavated material, and confirm requirements in respect of the format, presentation and packaging of archive records and materials. The receiving institution will be notified in advance of any fieldwork.
- 13.3.3 All digital data will be considered part of the primary archive and will accord with the procedures recommended by TCE, Marine Environment Data and Information Network (MEDIN), Archaeological Data Service (ADS) and the accepting institution.
- 13.3.4 Data will be compiled in a format suitable for submission of Monument, Event and Source records for entry into the NRHE and/ or the KHER (terrestrial and inshore).

13.4 Selection policy

- 13.4.1 The selection policy should be based on national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum, and fully documented in the project archive. Material not selected for retention may be used for teaching or reference collections by the museum, or by the Retained Archaeologist.

13.5 Security copy

- 13.5.1 In line with current best practice (eg, Brown, 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

14 COPYRIGHT

14.1 Archive and report copyright

- 14.1.1 The full copyright of the written/ illustrative/ digital archive relating to the project will be retained by the Retained Archaeologist under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The Developer and the Client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*. In some instances, certain regional museums may require absolute transfer of copyright, rather than a licence; this should be dealt with on a case-by-case basis.
- 14.1.2 Information relating to the project will be deposited with the NRHE and/ or the KHER where it can be freely copied without reference to the Retained Archaeologist for the purposes of archaeological research, or development control within the planning process.



14.2 Third party data copyright

- 14.2.1 This document, the evaluation report and the project archive may contain material that is non-Retained Archaeologist copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which the Retained Archaeologist is able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by the Retained Archaeologist. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.



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APPENDICES

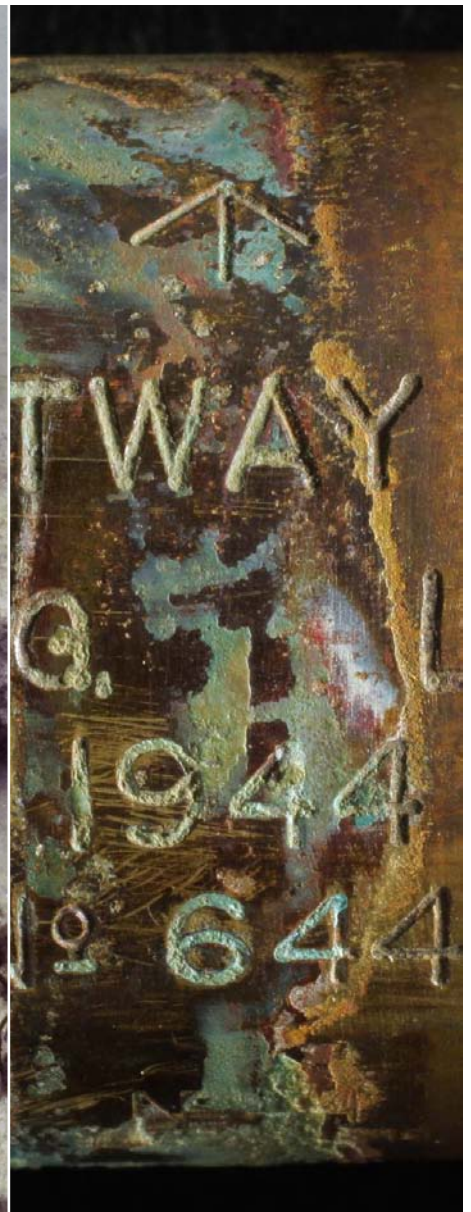
Appendix 1

Technical Report Name	Type of Assessment	Data acquired	Details	Location	Sample Type	Present location
<i>Thanet Extension Offshore Wind Farm: Marine Archaeological Desk-Based Assessment Technical Report.</i> (Wessex Archaeology 2017a)	Desk-Based Assessment	Undertaken by Wessex Archaeology	Data from: UKHO NRHE KHER Reports related to TOWF			Wessex Archaeology
<i>Thanet Extension Offshore Wind Farm: Archaeological Review of Geophysical and Geotechnical Data</i> (Wessex Archaeology 2018a)	Geophysical survey datasets	Acquired by Fugro, 29 July to 6 September 2016	SSS Magnetometer SBP MBES			Wessex Archaeology
	Geotechnical data	Acquired by Fugro, 2016 for engineering purposes	Geotechnical logs from: - 10 locations within the array; and - 1 location within the OECC. These comprise: - 11 CPTs; and - 9 vibrocores.	001	VC and CPT	Fugro Wallingford
				002	VC and CPT	
				003	VC and CPT	
				004	VC and CPT	
				005	VC and CPT	
				006	VC and CPT	
				007	VC and CPT	
				008	VC and CPT	
				009	CPT	
				011	CPT	
				013 (OECC)	VC and CPT	
<i>Project NEMO: Archaeological Report Form: Summary Record for the Discovery of MAG_11081/ Anomaly 70050: Possible aircraft wing</i> (Wessex Archaeology 2017b)	ROV data	Acquired by Nemo Link	Geophysical survey data from Gardline. UXO investigations, diver inspection and excavation – photographs and initial report		Mag_11081/ Anomaly 70050	Wessex Archaeology



Appendix 2: Offshore Renewables Protocol for Archaeological Discoveries (ORPAD)

Protocol for Archaeological Discoveries: Offshore Renewables Projects

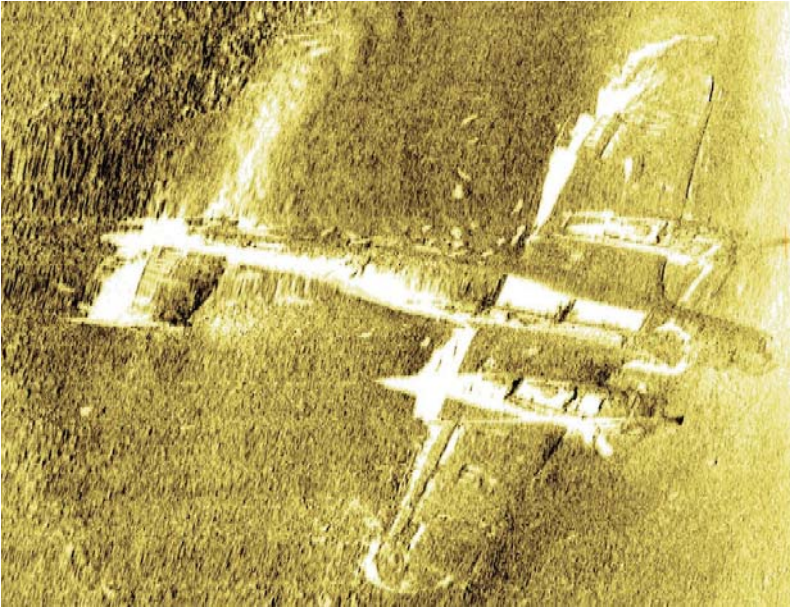


Front cover photographs

Alpha Vantus, courtesy of Areva.

Diver at the Drumbeg historic wreck site
courtesy of Wessex Archaeology.

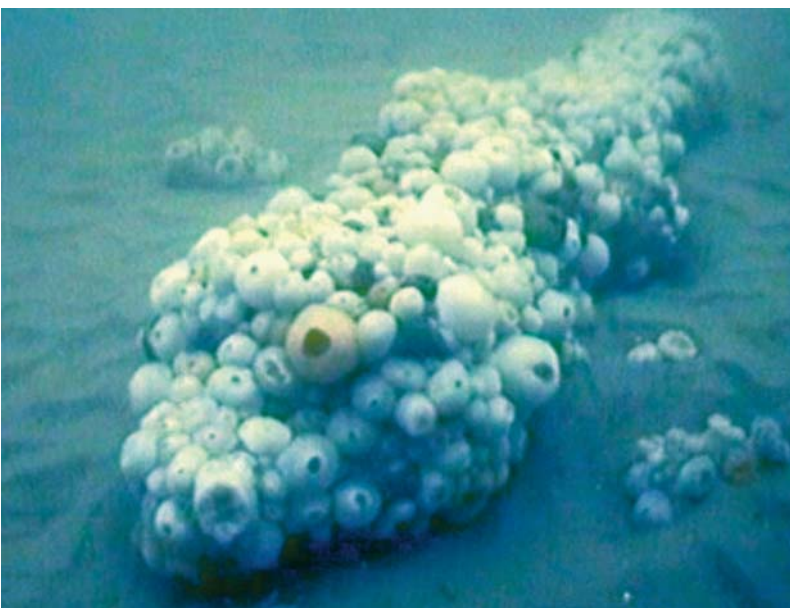
1944 British naval telescope found in the sea
courtesy of Wessex Archaeology.



A sidescan sonar image of a rare German bomber, the Dornier Do 17, which was found on the Goodwin Sands. Shot down on 26th August 1940, the Dornier's historical importance is considerable as it is the world's only surviving example of this type of German aircraft.



Detail of a fragment of Roman samian ware which was made in Gaul (modern day France) some 1700 years ago. It was found in the North Sea and retains its makers mark.



An historic cannon found during site investigation for wind farm construction. It was left *in situ* and is one of many archaeological finds successfully reported through the Protocol.

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1st issue December 2010.
2nd issue July 2014 (revised)

Acknowledgements

Wessex Archaeology was commissioned by The Crown Estate to prepare a Protocol for archaeological discoveries for offshore renewable energy projects. Wessex Archaeology would like to thank The Crown Estate for their support and all those individuals and organisations that commented on the various drafts of the document during consultation and whose input has contributed significantly to the final document. The document was compiled by Toby Gane and design and typesetting was by Kenneth Lymer. Quality assurance and editing was provided by Euan McNeill, Vic Cooper and Gemma Ingason. The current project was managed for Wessex Archaeology by Toby Gane.

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Suggested Citation

The Crown Estate, 2014, *Protocol for Archaeological Discoveries: Offshore Renewables Projects*. Published by Wessex Archaeology, Salisbury, on behalf of The Crown Estate.

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1 Introduction

1.1 Background

1.1.1 This document is a Protocol that will satisfy anticipated conditions relating to the reporting of archaeological discoveries across the offshore renewable energy industry, if followed correctly.

1.1.2 Protocols for Archaeological Discoveries (PADs) are systems of monitoring for unexpected or incidental finds relating to the historic environment, and have come into use predominantly in the marine sphere where construction tends to be a 24 hour operation, involving multiple vessels, where conventional watching briefs (routinely used in the terrestrial sector) are not cost effective. They are recommended in 'Historic Environment Guidance for the Offshore Renewable Energy Sector' (COWRIE 2007, 11.3, 45–6).

1.1.3 The character of the marine environment and lower baseline of archaeological knowledge at sea means that the level of unspecified risk of archaeological discoveries is generally higher at sea than on land, whilst the construction team's flexibility in the event that a significant site is discovered is generally less. Protocols may also prove useful on land to provide a safety-net when construction activities are diffuse or in areas of apparently low potential, especially given the legal requirements applicable to some archaeological discoveries. It is anticipated that the PAD will apply to all activities in the marine and inter-tidal zone and on land, if part of the offshore scheme.

1.1.4 This PAD is specific to archaeology, and it should be used at all stages of the development process where archaeological information may be obtained, including all pre-development surveys such as benthic sampling, obstruction surveys and other such operations.

1.1.5 The Crown Estate actively supports this Protocol and encourages Developers to utilise it to its full extent. Doing so may help meet the Developers' conditions of consent, will assist in protecting the historic environment, may help meet targets on sustainable development and will demonstrate the Developers' commitment to corporate social responsibility.

1.1.6 It should be noted that this PAD is a 'safety-net' only. Anticipated scheme impacts on the historic environment will have been taken into account prior to consent and wherever possible dealt with either in

advance or by conditions requiring the implementation of an archaeological Written Scheme of Investigation (WSI). This Protocol in no way detracts from the basic tenet; that impacts on the historic environment should be considered and addressed in the earliest stages of the development process.

1.1.7 PADs have been used very effectively in other industries – most notably Marine Aggregate Industry (MAI) Protocol used in the aggregate dredging sector. To date over 970 individual finds have been investigated as a result of over 370 reports, such as the important lithic tool assemblages found in Area 240. These discoveries are helping to directly inform the advice given to industry, by the Archaeological Curators. A number of previously unknown archaeological sites have been recognised due to assemblages and artefacts reported through the MAI Protocol. Details of the MAI Protocol and the important discoveries that have been made can be found at <http://www.wessexarch.co.uk/projects/marine/bmapa/index.html>.

1.1.8 The MAI Protocol has proved to be a cost effective mitigation measure with huge benefits for industry and the protection of our heritage. It has also contributed to continuing good relationships between archaeologists and those working offshore. A programme of awareness-raising visits, newsletters and online resources have helped those working in the aggregate dredging industry to learn how reporting finds contributes to identifying potentially significant archaeological sites and, where appropriate, protecting them for future generations.

1.1.9 This Protocol is intended to satisfy any conditions that relate to reporting protocols included on consents administered by marine licensing authorities, including the Major Applications and Plans Directorate of the Planning Inspectorate, the Marine Management Organisation (or equivalent planning authority), Marine Scotland, Natural Resources Wales Marine Licensing Team or the Department of the Environment (Northern Ireland). Where implementation of this Protocol is a condition of consent, failure to follow the Protocol may give rise to a breach of condition.

1.1.10 'Our Seas – a Shared Resource', which documents the UK's High Level Marine Objectives, envisages that: "The use of the marine environment is spatially planned where appropriate and based on

an ecosystems approach which takes account of climate change and recognises the protection and management needs of marine cultural heritage according to its significance” (DEFRA, 2009).

1.1.11 This theme is echoed and expanded in the UK-wide Marine Policy Statement (MPS) (2011). It intended to provide the high level policy context within which Marine Plans will be developed, and set the direction for marine licensing and other relevant authorisation systems. The MPS states:

The view shared by the UK Administrations is that heritage assets should be enjoyed for the quality of life they bring to this and future generations, and that they should be conserved through marine planning in a manner appropriate and proportionate to their significance. Opportunities should be taken to contribute to our knowledge and understanding of our past by capturing evidence from the historic environment and making this publicly available particularly if a heritage asset is to be lost.

1.1.12 Section 5.8 of the Overarching National Policy Statement for Energy (EN-1) (DECC 2011) sets out conditions and recommendations that are pertinent to the historic environment and in particular:

Where the IPC [Infrastructure Planning Commission] considers there to be a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the IPC should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.

This Protocol will help to satisfy that requirement when followed correctly.

1.1.13 COWRIE's *Historic Environment Guidance for the Offshore Renewable Energy Sector* (2007) document states:

The aim of protocols for unexpected discoveries is to reduce any adverse effects of the development upon the marine historic environment by enabling people working on the project to report their discoveries or recovered material rapidly in a manner that is convenient and effective. The protocol will set out the respective responsibilities of the developer, main contractors, and archaeological contractors/consultants. The protocol therefore provides a mechanism to aid compliance with the Merchant Shipping Act 1995 in respect to recovery of 'wreck', as defined by the Act and reporting of military vessel and aircraft wrecks to the Ministry of Defence.

1.1.14 This Protocol applies to things that are or may have been made, used or affected by people.

This will include, for example, fossilised remains from periods of human inhabitation, but not fossils that are exclusively pre-human in origin. It will not include finds of geological, ecological, or other non-archaeological origin, unless a link to human activity can be assumed.

1.1.15 This Protocol takes into account, and is consistent with, existing statutory and non-statutory regimes for reporting discoveries, ownership of finds and other legal regimes in each of the home countries (England; Scotland; Wales; Northern Ireland), on land, within territorial waters and outside territorial waters.

1.1.16 For some classes of find there are specific legal requirements (e.g. treasure, wreck, human remains). These legal requirements will be met by following this Protocol. In such instances, failure to follow the Protocol may also give rise to a criminal offence.

1.1.17 Where **ordnance** is concerned, specific rules are likely to have been put in place by the Developer or their contractors. These rules are required for the safe conduct of construction and installation operations, and must take precedence over this Protocol. Historic ordnance may, however, also be of archaeological interest and can be reported under this Protocol once local rules for ordnance have been satisfied.

1.1.18 This Protocol is supported by an **Implementation Service** (IS) funded by The Crown Estate which will cover the administration of the reporting of discoveries and provide advice about immediate actions (including recording, handling and storage, and introduction of measures to prevent or reduce damage if the presence of a significant archaeological site is suspected).

1.1.19 The IS can help the Developer with any subsequent actions required, but such actions are expected to be the direct responsibility of the Developer, to be agreed case-by-case with the Regulator and their archaeological advisors (curators) with the assistance of the Developer's own Retained Archaeologist, where appointed.

1.1.20 The Protocol is accompanied by an **Awareness Programme** to provide awareness-raising in the workplace, taking into account differing workplace circumstances.

1.1.21 In order for historic environment finds' protocols to be operationally effective, there must be three elements which need to be fully resourced and functioning. These are:

- The Implementation Service (IS)
- The Developer's internal reporting chain
- Awareness training to the right personnel

If just one of these elements is not in place, resourced or functioning correctly, then the Protocol will not operate and will be ineffectual for that development.

1.2 Outline

1.2.1 Archaeological finds made in the course of construction and installation activities are important because they can shed light on past human use of the landscape, sea and seabed. The information that such discoveries bring to light can help archaeologists better understand society and human endeavour in the past, and better protect significant aspects of our history on behalf of future generations.

Important: This Protocol is a supplement (rather than an alternative) to the conventional regulatory mechanisms employed in the earlier stages of the development process to consider and address impacts upon the historic environment. As a 'safety-net', the use of the Protocol should in no way be seen as a devolution of normal responsibilities toward the historic environment with respect to the planning process and the Environmental Impact Assessment (EIA) directive. It is essential that the Offshore Renewables Protocol for Archaeological Discoveries (ORPAD) is not assumed to provide a catch-all approach to dealing with marine archaeology, such that proper investigation is curtailed.

1.2.2 The Protocol is intended to apply to development, construction and installation activities where an archaeologist is not present on site and therefore not immediately available, i.e. in those instances where a traditional archaeological scheme of works is not in place (such as a watching brief, evaluation, etc.). In cases where the Developer has made provision for an archaeologist to be on site, as part of a site investigation, watching brief or specific archaeological works, then the archaeological method statement relating to this provision will take precedence. Where no specific archaeological provision has been made, then this Protocol will apply.

1.2.3 This Protocol addresses finds of archaeological interest made on the seabed, onboard vessels, in the inter-tidal zone or on land. They may be identified as a result of geophysical survey, remote operated vehicle or diver visual identification or through coming into contact with anchors, grapnels, jack-up legs or other seabed equipment. Alternatively they may be uncovered during groundworks on land or in the inter-tidal zone. These finds or anomalies may indicate that an object or structure of archaeological interest has been encountered on the seabed, the inter-tidal zone or on land.

1.2.4 The definition of an archaeological "find" in this context is of an object or site with archaeological potential or significance. It does not refer just to items brought to the surface. An archaeological "site" is a group of features or objects that make up a relatively discrete collection of associated archaeological objects. This could be a shipwreck, structure, or other archaeological assemblage.

1.2.5 An "anomaly" is distinct from a find or site, and is a signature that could be visual or digital (e.g. geophysical) that indicates a possible find or site. Further investigation may reveal that it is not of human origin, or is too modern to be of archaeological interest – but until this takes place it must be considered as a source of **possible** archaeological interest.

1.2.6 The Protocol anticipates discoveries being made by Project Staff, who report to a Site Champion on their vessel or site (usually the senior person on site), who then reports to a person (the Nominated Contact) who has been nominated by the Developer to co-ordinate implementation of the Protocol. The Nominated Contact will in turn inform the IS and the Developer's Project Manager(s). The IS will in turn liaise with the Nominated Contact, Archaeological Curators and the Developer's Project Manager(s) as necessary.

1.2.7 It is recognised that, for the Protocol to be effective, participants (such as Site Champions or Project Staff) should receive appropriate training. This will take place through the Awareness Programme referred to above.

1.2.8 The response to reported finds will be implemented through the measures set out in the Protocol, such as further survey or the establishment of Temporary Exclusion Zones (TEZs), which may be converted into new Archaeological Exclusion Zones (AEZs), if warranted. Any action to implement new, or to amend agreed AEZs or TEZs will only be done in agreement with the appropriate national Archaeological Curators and the Regulator responsible for consenting the development.

1.2.9 It is recognised that this Protocol refers primarily to offshore schemes of development. However, with offshore renewable schemes it is usual to have associated infrastructure (such as export cables) that impact not only the offshore historic environment, but also inshore, inter-tidal, and in fully terrestrial localities. Therefore this Protocol has been designed to operate in all of these environments, where an archaeologist is not present.

1.3 Roles and Responsibilities

1.3.1 The Site Champion is the person formally appointed by the Developer to be directly

responsible for reports arising from a particular activity location. The Site Champion could be a Vessel Master, a Construction Foreman or any other person in a position to control the immediate works.

1.3.2 The Developer's Nominated Contact is the formal point of contact for all matters relating to the PAD between the Developer, its subcontractors, the Site Champions, the IS, the Retained Archaeologist (where appointed), the Archaeological Curators and ultimately the Regulator. The Nominated Contact could be the scheme's Environmental Manager, Project Manager or any other co-ordinator that the Developer feels is appropriate and effective in acting in this role. It is critical that all parties hold the Nominated Contact's full contact details and that any changes to the Nominated Contact's details are circulated as soon as possible.

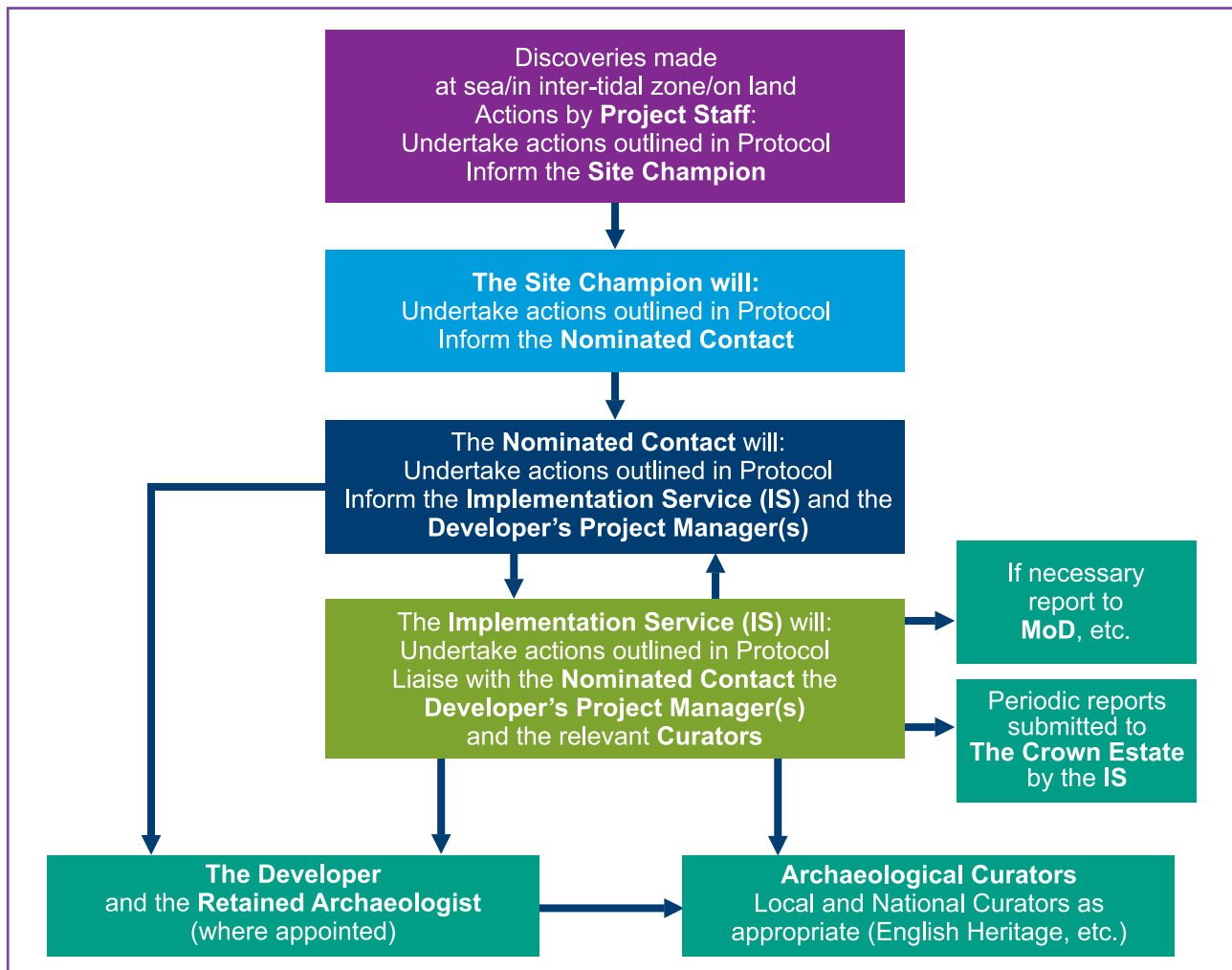
1.3.3 The IS is a service provided by an archaeological contractor appointed by The Crown Estate to manage the day to day responses to reports through the PAD. The performance of the IS will be reviewed by The Crown Estate, and the annual report of the IS will be submitted to Regulators, Archaeological Curators and Developers.

1.3.4 The Developer may have appointed a Retained Archaeologist to provide archaeological advice and/or services to the development. In this case the IS will undertake its duties in liaison with the Retained Archaeologist, as well as the Nominated Contact for the Developer. The actions of the IS will not take precedence over the Developer's Retained Archaeologist, but timely information should be provided to the IS that allows the ORPAD database to be sufficiently updated.

1.3.5 It should be noted that a detailed assessment of the potential of any discoveries may be dependent on the advice of, and information from, a range of external specialists, repositories and organisations. Therefore the IS can only provide a full response as that information becomes available.

1.3.6 Response times for Initial Responses will vary but the system is designed for information to be submitted to the IS website and a rapid response made within office hours. Alternative communication may take the form of email correspondence and/or telephone conversations (where internet access is restricted).

Basic Sequence of Reporting (when an archaeologist is not present)



2 Actions by Project Staff

2.1 In All Cases

2.1.1 If a find of archaeological interest is made, Project Staff will immediately inform the Site Champion (via their supervisor if appropriate).

2.1.2 If the discovery is ordnance, then Project Staff will abide by their operational procedures which are to take precedence; and then report via the Protocol once safe to do so.

2.1.3 Where items of archaeological interest are recovered, Project Staff (under direction of the Site Champion) will:

- Handle all material with care.
- Any rust, sediment, concretion or marine growth should not be removed and 'groups' of items or sediments should not be separated.
- If possible photograph the item in the condition in which it was recovered.
- Record the position at which the artefact/sediments were recovered.
- Label artefact appropriately and add the unique ID when provided by the Implementation Service.

If the find is from a waterlogged or underwater environment, then Project Staff (under direction of the Site Champion) will arrange for the find to be immersed in seawater in a suitable clean container, which should be covered.

2.2 Discoveries On Board

2.2.1 If a find of archaeological interest is made on board a construction vessel (for instance, caught in a grapnel/anchor or trapped in a plough), Project Staff will immediately inform the Officer on Watch. The Officer on Watch will inform the Site Champion.

2.2.2 Where it is possible to identify the seabed position from which the find originated, the Officer on Watch will temporarily cease construction activities in the vicinity of the seabed location, or move to an alternate location, until the advice of the IS has been obtained. The advice of the IS will be provided within the timescales previously advised (1.3.6).

2.3 Anomalies on the Seabed

2.3.1 Finds or sites of archaeological potential may be encountered via a number of methods including; geophysical survey, diver magnetometer, obstacle

avoidance sonar, visual survey by remote operated vehicles or divers, and interaction with ploughs, anchors, jack-up legs or seabed grapnels. Staff should be constantly aware of the possibility of archaeological discoveries.

2.3.2 If an anomaly is identified in advance of impact, such as on the forward-looking sonar of a cable plough, the route should – where possible – be deviated around the obstruction, in line with normal ploughing practice. The position of the anomaly will be reported to the Officer on Watch and thence to the Site Champion.

2.3.3 If an anomaly is identified after an impact has occurred, for example, as indicated by a change in the towing cable tensiometer, avoidance by deviation will be precluded. However, the change in tension should be immediately brought to the attention of the Officer on Watch and the Site Champion so that the anomaly can be reported, advice can be sought and any requirements for further investigation determined.

2.3.4 The Officer on Watch will arrange for the grapnel or plough to be recovered to the surface and examined as soon as possible, once recovered to surface, to see if any archaeological material is trapped within it, and will inform the Site Champion accordingly.

2.3.5 If an anomaly comes to light in the course of geophysical survey or drop-down video survey the Officer on Watch will ensure that the position of the anomaly is noted on navigational software and that the Site Champion is informed.

2.4 Discoveries on Land or in Inter-tidal Areas

2.4.1 Discoveries may be made in the course of groundworks, trenching or site investigations. They should be reported to the Site Champion and the finds handled in accordance with the general guidance above. Where archaeological investigations are already taking place, as part of a watching brief, evaluation trenching, strip map and sample or open area investigation, then the method statement for those investigations will take precedence and discoveries need not be reported under this Protocol.

2.5 Discoveries Subsequent to Work on Site

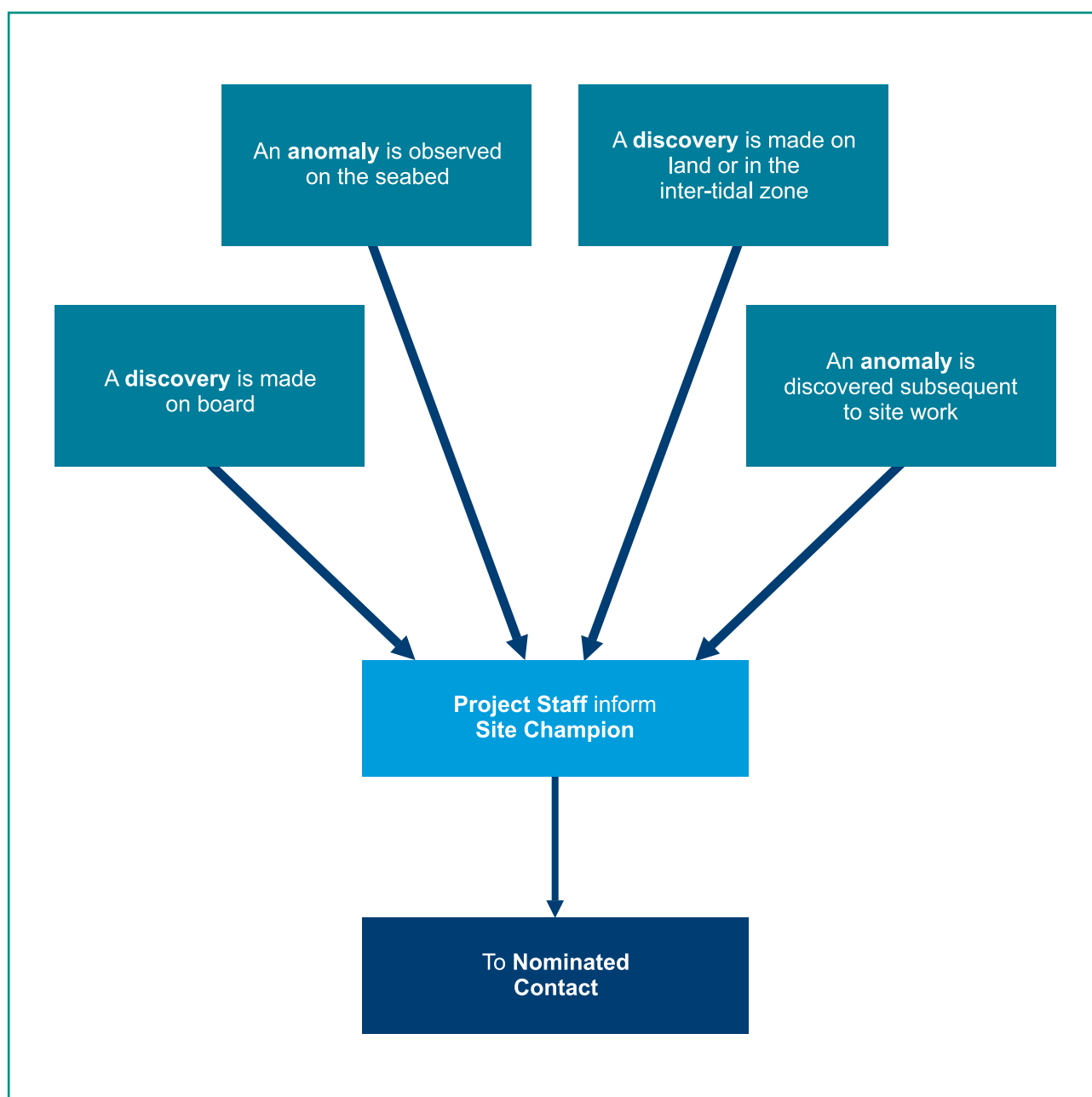
2.5.1 There are a number of circumstances in which the presence of material of archaeological interest may be identified after work on site has occurred. For example, Project Staff reviewing geophysical data or video might observe an anomaly. Similarly, Project Staff involved in processing samples in the laboratory may make archaeological discoveries in their samples.

2.5.2 Staff examining sample material (e.g. core material; benthic samples) should consider the potential for archaeological and/or

palaeoenvironmental material being recovered within their samples. Where such discoveries are made Project Staff should inform the Site Champion and pass on details of the sample number and its position.

2.5.3 If an anomaly comes to light in the course of processing or interpreting geophysical survey data, video or other photographic data, Project Staff should inform the Site Champion and pass on details of the data files and navigational information relating to the positions where the data were obtained.

Actions by Project Staff (when an archaeologist is not present)



3 Actions by Site Champion

3.1.1 Where it is possible to identify the position from which the discovery originated, the Site Champion will arrange for a TEZ in which construction activities will cease temporarily (in the vicinity of the location), or move to an alternate location, until the advice of the IS has been obtained. The advice of the IS will be provided within the timescales previously advised (1.3.6).

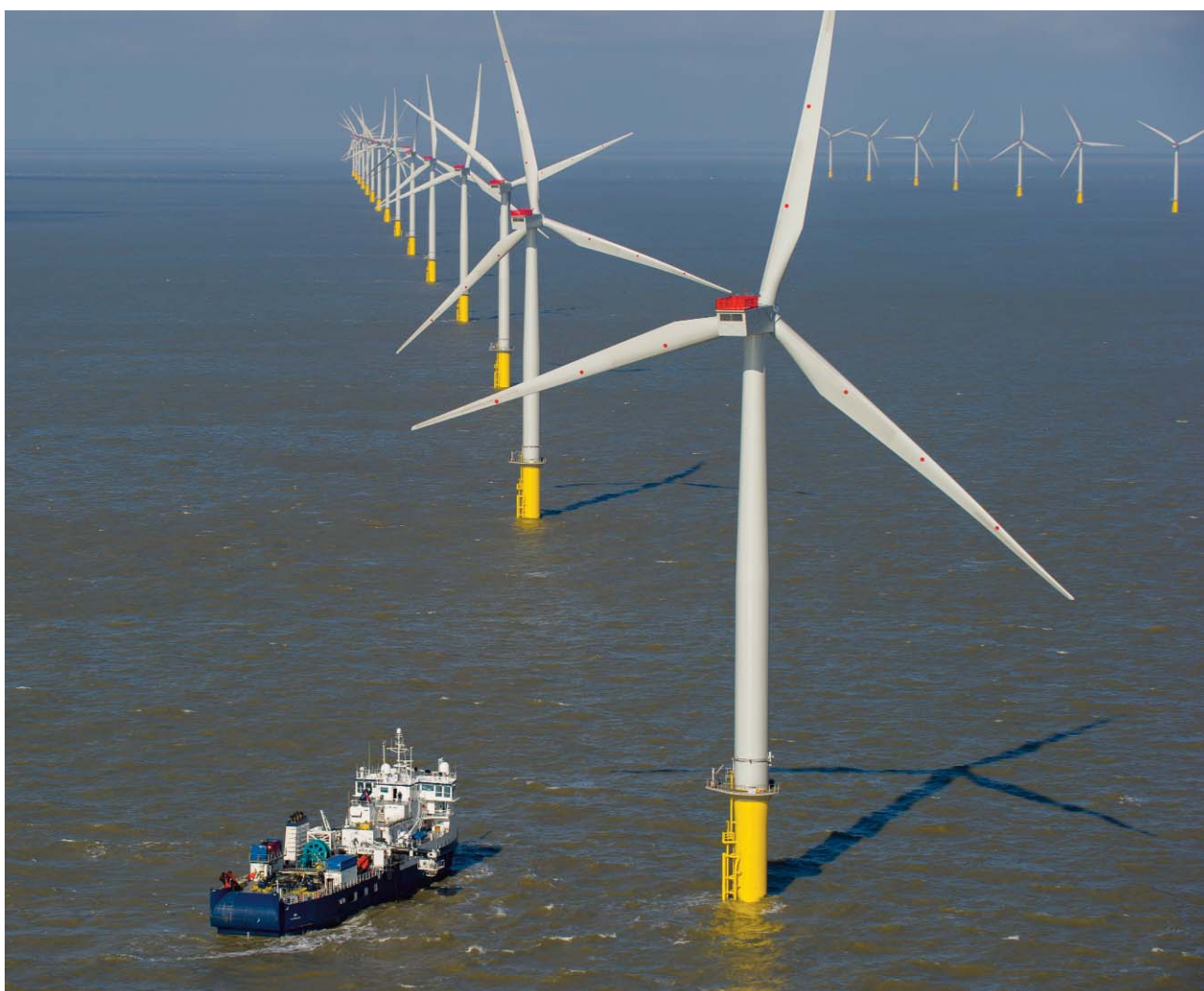
3.1.2 The Site Champion will note the occurrence as soon as possible in the site daybook or vessel log together with the time and exact position. The entry should include a close approximation of the original position of the find/anomaly. Additionally, the area should be marked on site drawings or surveys.

3.1.3 The Site Champion will compile a Preliminary Record (see Appendix II) of the occurrence. The Site Champion will inform the Developer's Nominated

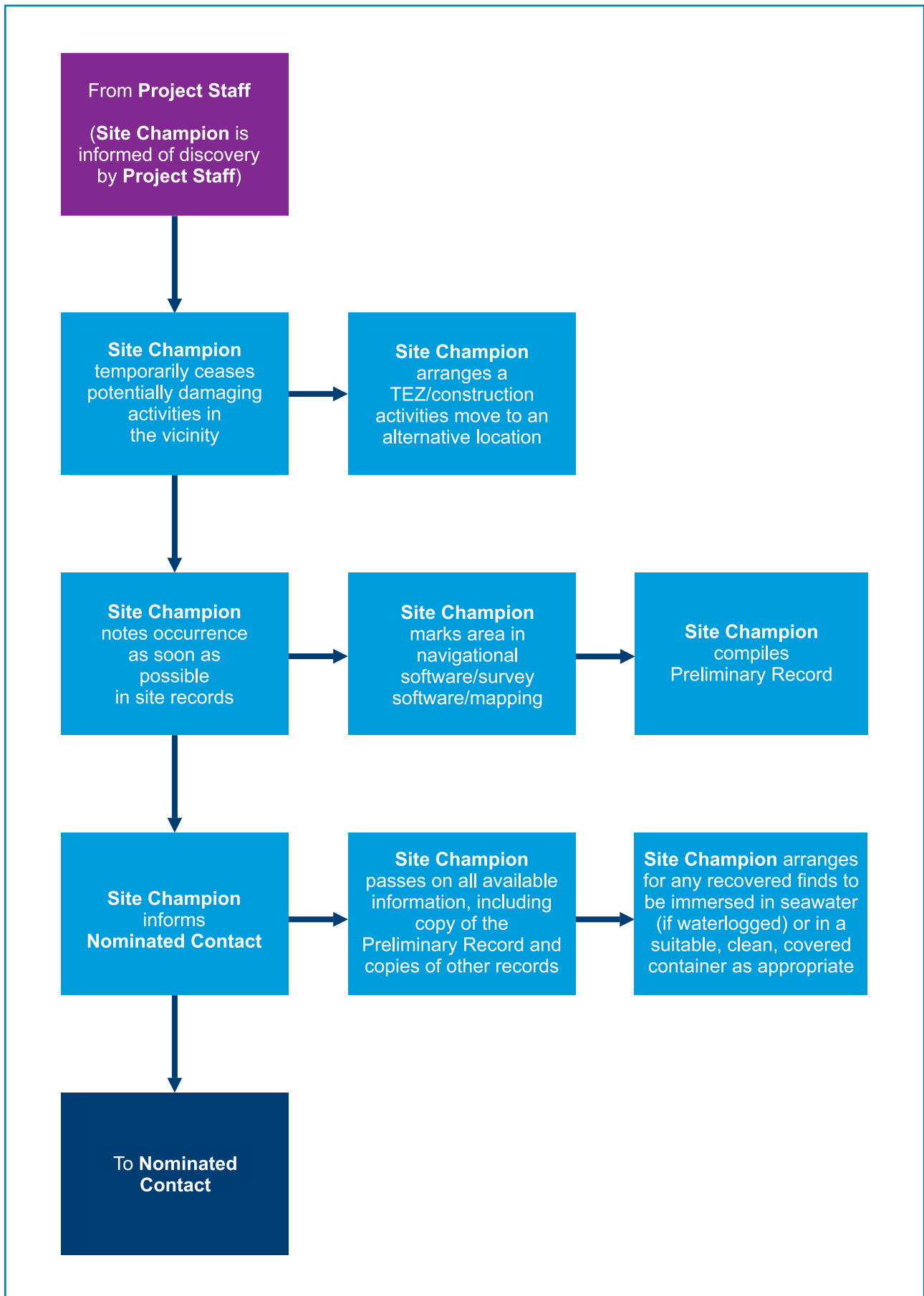
Contact of the occurrence as soon as possible and pass on all available information, including a copy of the Preliminary Record and copies of any photographs, drawings or other records that have been made.

3.1.4 The Site Champion will arrange for any finds (of archaeological material) to be carefully contained and protected;

- if waterlogged: immersed, bagged and placed in a protective container, or placed in seawater in a suitable clean container, which should be covered and stored in a cool, dark place;
- if dry: placed in a suitable container and stored in a cool, dark place;
- any dirt, rust, concretion or marine growth should not be removed.



Actions by Site Champion



4 Actions by the Nominated Contact

4.1.1 The Nominated Contact will confirm with the Site Champion that all the details set out in the Preliminary Record are comprehensive and correct.

4.1.2 Contact will be made with the Implementation Service (IS) at the earliest opportunity, preferably using the IS web service. The IS will provide advice on the appropriate immediate actions in addition to the recording, handling and storage of any items recovered. The advice of the IS will be provided within the timescales previously advised (1.3.6).

4.1.3 The Nominated Contact shall pass on to the IS all available information relating to the circumstances of the occurrence, including a copy of the Preliminary Record and copies of any other records that have been made.

4.1.4 In addition any finds should be made available to the IS if required.

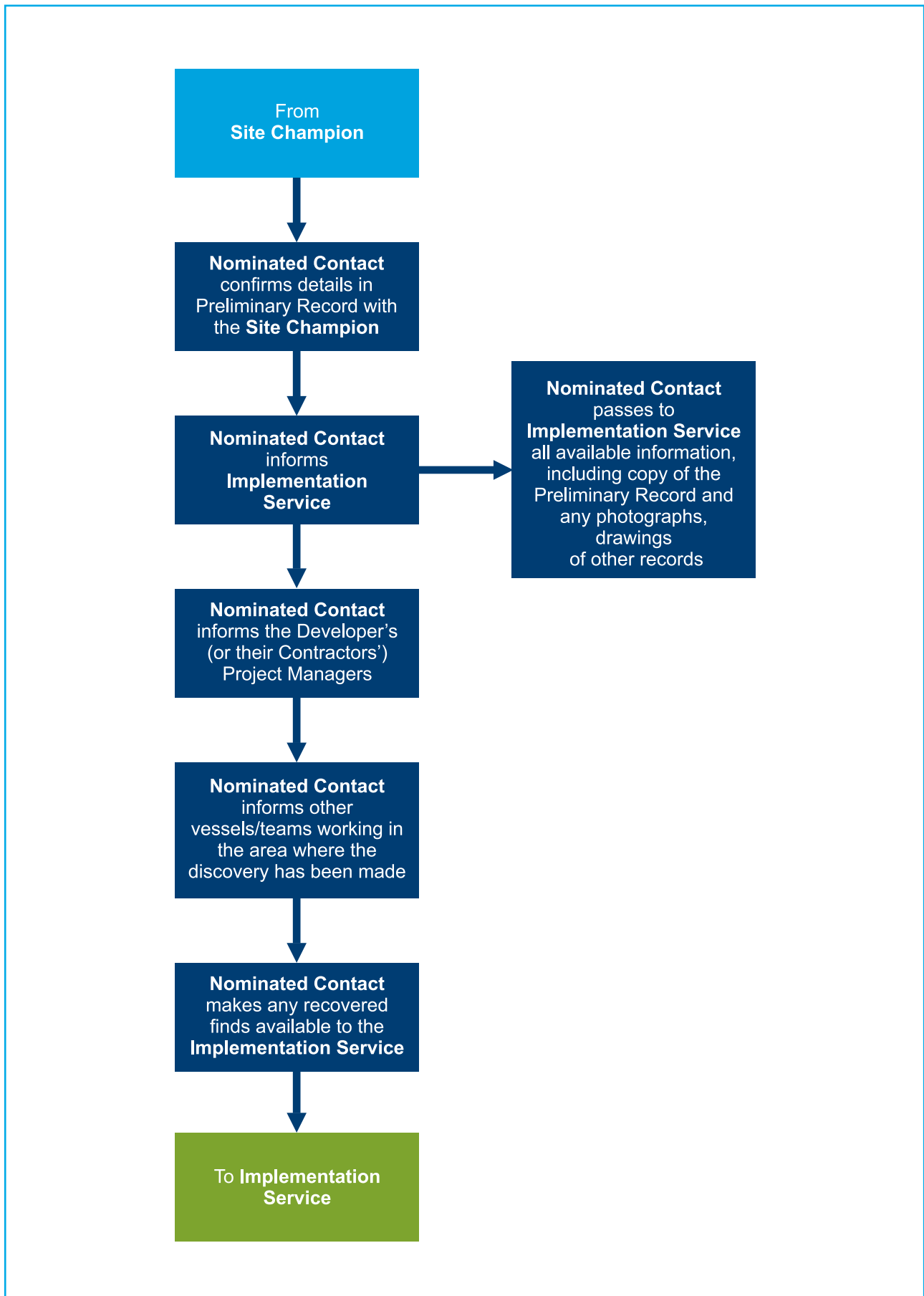
4.1.5 Once informed of a find by a Site Champion, the Nominated Contact will inform the Developer's (or their Contractors') Project Managers (as appropriate), in addition to the IS.

4.1.6 The Nominated Contact should inform other teams engaged in potentially damaging activities in the same area, to ensure that they are aware of the position of the discovery so that further possible damage to the historic environment can be avoided.

4.1.7 Should it be required by The Crown Estate or the Developer, IS archaeologists will travel to the site to inspect any finds or data made available.



Actions by Nominated Contact



5 Actions by the Implementation Service

5.1 Initial Response

5.1.1 The Implementation Service (IS) will review the information about the discovery in conjunction with geophysical and/or desk-based information, where available. This review will normally be based on information uploaded to the IS website. Additional communication may take the form of email correspondence and/or telephone conversations (where internet access is restricted).

5.1.2 The IS will send an Initial Response to the Nominated Contact to acknowledge the report.

5.2 Urgent Reports

5.2.1 Where the report is urgent, the Initial Response will include an assessment of archaeological potential and a decision on the continuation or removal of the TEZ.

5.3 Assessment of Archaeological Potential

5.3.1 The assessment of archaeological potential will be based on the following guidance:

5.3.2 The following types of discovery are likely to be of **low** potential:

- reports of single, apparently isolated, finds that are not datable or are of modern (post-1800) or later date;
- peat deposits.

5.3.3 The following types of discovery are likely to be of **high** potential:

- reports of single finds that are of post-medieval or earlier date;
- reports of single finds that relate to military aircraft;
- reports of multiple finds from the same area;
- reports indicating the presence of a wreck or other structural remains;
- reports of peat or other fine-grained sediments that contain worked flint, charcoal or bone.

5.3.4 In the case of a discovery of **high** potential, construction will not recommence in the TEZ without the approval of the Archaeological Curators. The IS will confirm the extent of the area of the TEZ. The IS

will notify the Archaeological Curators that a discovery of high potential has been reported, and will provide details of the further actions (see below) that have been advised.

5.3.5 In the case of discoveries of **low** potential, the IS will advise the Nominated Contact that the TEZ may be lifted and that construction activities in the vicinity of the discovery may recommence.

5.4 Summary Record

5.4.1 The IS will send a Summary Record of the report to the Nominated Contact and to other relevant parties. The Summary Record will include:

- advice on the identification of finds and the character of their seabed locations;
- an assessment of the archaeological potential of the report, including the rationale for the conclusion reached;
- advice on actions to be taken in respect of the discovery, including any recovered finds.

5.5 Subsequent Actions

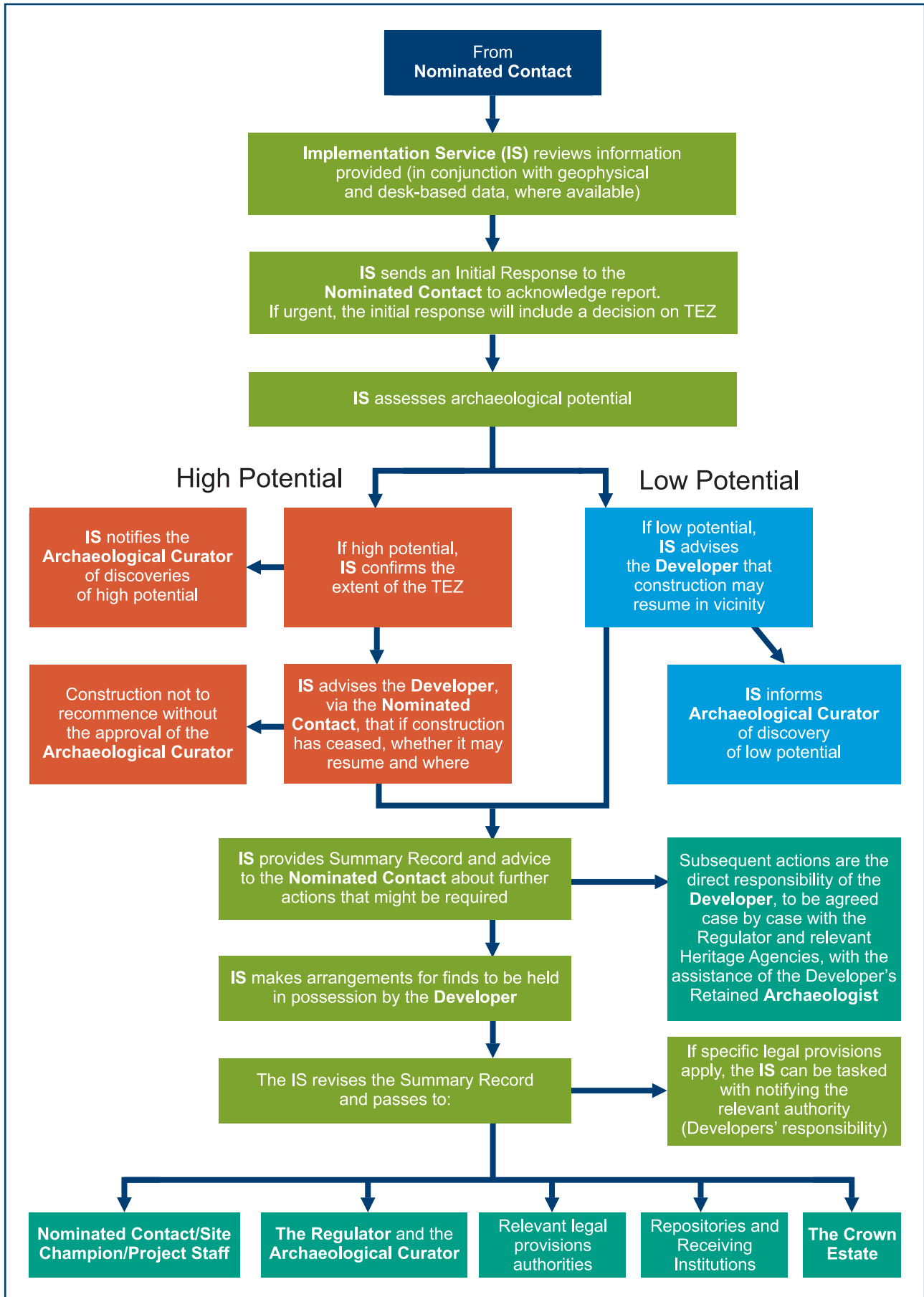
5.5.1 The IS will advise the Nominated Contact of the implications of the discovery and of further actions that might be required. Further actions may include call-out investigations, the conversion of a TEZ to an AEZ, and/or the institution of a watching brief. The rationale for conclusions reached will be provided to the Nominated Contact.

5.5.2 Any subsequent actions are expected to be the direct responsibility of the Developer, to be agreed case-by-case with the Regulator and relevant Heritage Agencies with the assistance of the Developer's own Retained Archaeologist, where appointed.

5.6 Further Requirements

5.6.1 If the discovery is something to which specific legal provisions apply (treasure, human remains, wreck etc.), it will remain the responsibility of the Developer to undertake such statutory reporting as is required. The Developer may, however, task the Implementation Service with making statutory reports alongside reporting under this Protocol if they so wish.

Actions by Implementation Service flow chart



5.7 Finds

5.7.1 The IS will make arrangements for the Developer to hold in possession any recovered finds, subject – in the case of wreck – to agreement with the Receiver of Wreck. The subsequent handling, retention or disposal of finds will be subject to applicable law and to arrangements between the Developer and the institution receiving the archaeological archive arising from the scheme.

5.8 Revised Summary Record

5.8.1 The Summary Record will be revised to take account of further information or actions that have taken place or are planned. The IS will pass on a copy of the revised Summary Record to the Nominated Contact for circulation to the Site Champion and relevant Project Staff.

5.9 MIDAS Report

5.9.1 A report conforming to MIDAS Heritage (the UK's historic environment data standard) will be prepared and submitted to:

- The relevant Regulator and Archaeological Curator(s).
 - In England this is English Heritage and the Local Government Archaeological Curator. The Implementation Service will send a copy of the MIDAS Report to the National Record of the Historic Environment (NRHE) for incorporation into their records.

- In the Scottish Offshore Region this is Historic Scotland and the Local Government Archaeological Curator. The Implementation Service will send a copy of the MIDAS Report to the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) for incorporation into their records.
- In the Welsh Offshore Region this is Cadw and the Local Government Archaeological Curator. The Implementation Service will send a copy of the MIDAS Report to the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) for incorporation into their records.
- In Northern Ireland this is the Northern Ireland Environment Agency (Built Heritage) and the Local Government Archaeological Curator. The Implementation Service will send a copy of the MIDAS Report to the Northern Ireland Sites and Monuments Record (NISMR).
- The relevant authority, where specific legal provisions apply (e.g. Ministry of Justice, Ministry of Defence etc.).
- The relevant archaeological records repository, including the relevant NRHE, Historic Environment Record, Portable Antiquities Scheme Officer etc.
- The Crown Estate.
- The Receiver of Wreck has a standard reporting form for all items deemed to be wreck and where applicable material will be reported to them using this form.



Activities such as pre-lay grapnel runs have a high chance of encountering archaeological materials.



Worked flint, such as this example, attests to the use of the seabed environment by humans prior to its submergence.



Archaeologists examine evidence for past environments by looking at organic materials found during wind farm construction activities.

6 Appendix I: Legal Terms and Responsibilities

6.1 Legal Terms & Responsibilities*

6.1.1 Protection of Wrecks Act 1973. Under the 1973 Act, shipwrecks and wreckage of historical, archaeological or artistic importance within UK territorial waters can be protected by way of designation. Once a wreck has been designated it is an offence to carry out certain activities on or around the site without a licence.

6.1.2 Administration of the Act and associated licences is the responsibility of English Heritage in England, Historic Scotland in Scotland, Cadw in Wales and the Northern Ireland Environment Agency (Built Heritage) in Northern Ireland.

6.1.3 Currently, designated wrecks in UK waters range in date from the middle Bronze Age to the 20th century. Where a wreck is located that it is considered warrants designation, the relevant Secretary of State is required to consult appropriate advisors prior to designation. However, Developers should be aware that it is also possible for a wreck or wreck material to be designated in an emergency.

6.1.4 Merchant Shipping Act 1995. This Act is not a form of designation, but will affect offshore renewable energy schemes if, in the course of site investigations or construction, any material is recovered which falls within the definition of 'wreck'. All wreck has an owner, and the Merchant Shipping Act sets out the procedure for returning recovered wreck to the owner or their successor. The Receiver of Wreck has to be notified of all recovered wreck landed in the UK, and will seek to identify the original owner so that it can be claimed. Ownership of unclaimed wreck from within territorial waters vests in the Crown or in a person to whom rights of wreck have been granted. Unclaimed wreck from beyond territorial waters is returned to the finder.

6.1.5 The Receiver of Wreck has a duty to ensure that finders who report wreck receive an appropriate salvage payment. In the case of material considered to be of historic or archaeological importance, a suitable museum will be asked to purchase the material at the current market valuation. The finder will receive the net proceeds of the sale as a salvage payment. If the right to, or the amount of,

salvage cannot be agreed, either between the owner and finder or between competing salvors, the Receiver of Wreck will hold the wreck until the matter is settled, either through amicable agreement or by court judgement.

6.1.6 Protection of Military Remains Act 1986.

The primary purpose of The Protection of Military Remains Act is to protect the resting places of military personnel from unauthorised disturbance. It allows the Ministry of Defence (MoD) to protect vessels and aircraft that were in military service when they were lost or wrecked. The MoD can designate any such named vessel lost after 4 August 1914 as a 'protected place' even if the position of the wreck is not known. In addition the MoD can designate a 'controlled site' as any such wreck whose position is known.

6.1.7 Access is not prohibited at a 'protected place', but it is an offence to tamper with, damage, move or remove items from such a wreck without a licence. However, access, salvage and excavation are all prohibited on 'controlled sites', except where a licence for restricted activities has been obtained from the MoD.

6.1.8 The remains of all aircraft that have been lost in military service are automatically classified as 'protected places' by the Act.

6.1.9 Marine (Scotland) Act 2010. This Act enables Scottish Ministers to designate Historic Marine Protected Areas (MPAs). This is restricted to Scottish Territorial Waters.

6.1.10 Human Remains. Human remains in archaeology may be considered in relation to the Burial Act 1857, where they are not interred on sites for which specific burial ground legislation applies. The Act requires a licence to be granted prior to the removal of human remains from deliberately deposited contexts, on land and up to the 12 nautical mile limit of territorial waters. Remains encountered offshore however may not be deliberately deposited (i.e. buried) and licences cannot be granted retrospectively. It will be rare for the Burial Act 1857, or other burial legislation, to apply to human remains found in the marine

* Adapted from 'Historic Environment Guidance for the Offshore Renewable Energy Sector', COWRIE, 2007

environment. Where human remains are associated with vessels and aircraft that were in military service when they were lost or wrecked, the provisions of the Protection of Military Remains Act 1986 would apply.

6.1.11 For sites in Scotland, the guidance offered in 'Historic Scotland Operational Policy Paper 5: The Treatment of Human Remains in Archaeology' should be adhered to.

6.1.12 Treasure: The Treasure Act 1996. The Act has effect in England, Wales and Northern Ireland and is supplemented by the Treasure (Designation) Order 2002. Finders of gold and silver objects (over 300 years old) and some base metal assemblages (prehistoric) as defined in the Act are required to report such finds by contacting the Coroner and delivering the items for hand over as per the Coroners' instructions.

6.1.13 The Act and the Order apply to objects found anywhere in England, Wales and Northern Ireland, including in or on land, in buildings (whether currently occupied or ruined), in rivers and lakes and on the foreshore (that is the area between mean high water and mean low water on beaches and tidal river banks), provided that the object does not come from a wreck.

6.1.14 In Scotland, the Scots common law right relating to found archaeological and historic items in Scotland (and dealt with through the system of Treasure Trove) does not extend to the marine environment except to the foreshore.

6.1.15 *Bona Vacantia* (Scotland). The term *bona vacantia* means "ownerless goods". In Scotland,

bona vacantia refers only to the assets of dissolved companies and lost property, which is administered under the Civic Government (Scotland) Act 1982. In Scottish law, ownerless goods fall to the Crown and the realised value of such assets are paid into the Scottish Consolidated Fund for use of the Scottish Government on behalf of the people of Scotland.

6.1.16 Ancient Monuments and Archaeological Areas Act 1979. Monuments that are of national importance within UK territorial waters can be protected by being added to the schedule of monuments protected under this Act. It is an offence to damage, or carry out a range of specified activities on such a 'scheduled monument', unless a licence for these activities has been obtained from the relevant authority, in the form of 'scheduled monument consent'.

6.1.17 Monument can mean, among other things, the site of any vehicle, vessel, aircraft or other structure. It also refers to many types of archaeological site in the traditional sense.

6.1.18 In Scotland, the Act is devolved to Scottish Ministers and the Historic Environment (Amendment) (Scotland) Bill was introduced to the Scottish Parliament in 2010.

6.1.19 The Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995. The Ancient Monuments Act 1979 does not apply in Northern Ireland. The relevant legislation is the Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995. It provides for the designation of scheduled monuments and the statutory reporting of archaeological objects found.



This anchor was recovered during cable installation for a wind farm. It is probably a Rodgers' Small-palm anchor, named after Lieutenant (later Commander) Rodgers and was patented in 1832. The anchor was carefully recovered to the vessel, recorded and reported, and returned to the seabed away from development impacts.

7 Appendix II: Guidelines for Identifying Finds of Archaeological Interest and Handling Artefacts

7.1 Materials Guidelines

7.1.1 Rubber, Plastic etc. In most cases, rubber, plastic, bakelite and similar modern materials are not of archaeological interest and can be disregarded. One exception is where such materials are found in the same area as aluminium objects and structures, which may indicate aircraft wreckage from World War Two. Such material should be reported.

7.1.2 Iron and Steel. The potential range and date of iron and steel objects is so wide that it is difficult to provide general guidance. In broad terms, iron and steel objects which are covered by a thick amorphous concrete-like coating ('concretion') are likely to be of archaeological interest and should be reported. Pieces of metal sheet and structure may indicate a wreck and should be reported. Specific operational measures are likely to apply in respect of ordnance (cannonballs, bullets, shells) which should take precedence over archaeological requirements. However, discoveries of ordnance may be of archaeological interest, and they should be reported.

7.1.3 Other Metals. Items made of thin, tinned or painted metal sheet are unlikely to be of archaeological interest. Aluminium objects may indicate aircraft wreckage from World War Two, especially if two or more pieces of aluminium are fixed together by rivets. All occurrences should be reported. Copper and copper alloy (bronze, brass) objects might indicate a wreck, or they may be very old. All occurrences should be reported. Precious metal objects and coins are definitely of archaeological interest because they are relatively easy to date. All occurrences should be reported.

7.1.4 Bone. Discoveries of animal bone, teeth and tusks are of archaeological interest because they may date to periods when the seabed formed dry land, and should be reported. Such bones, teeth, tusks etc. may have signs of damage, breaking or cutting that can be directly attributed to human activity. Large quantities of animal bone may indicate a wreck (the remains of cargo or provisions) and should be reported. Human bone is definitely of archaeological interest, and may, if buried and found within territorial waters, be subject to the provisions of the Burial Act 1857. Alternatively, it may be

subject to the Protection of Military Remains Act 1986. Any suspected human bone should be reported, and treated with discretion and respect. Objects made out of bone – such as combs, harpoon points or decorative items – can be very old and are definitely of archaeological interest. All occurrences should be reported.

7.1.5 Wood. Light coloured wood, or wood that floats easily, is probably modern and is unlikely to be of archaeological interest. 'Roundwood' with bark – such as branches – is unlikely to be of archaeological interest, although it may provide paleo-environmental evidence. However, roundwood that has clearly been shaped or made into a point should be reported. Pieces of wood that have been shaped or jointed may be of archaeological interest, especially if fixed with wooden pegs, bolts or nails – all occurrences should be reported. Objects made out of dark, waterlogged wood – such as bowls, handles, shafts and so on – can be very old and are definitely of archaeological interest. All occurrences should be reported.

7.1.6 Stone. Small to medium size stones that are shaped, polished and/or pierced may be prehistoric axes. All occurrences should be reported. Objects such as axe heads or knife blades made from flint are likely to be of prehistoric date and should be reported. Large blocks of stone that have been pierced or shaped may have been used as anchors or weights for fishing nets. All occurrences should be reported. The recovery of numerous stones may indicate the ballast mound of a wreck, or a navigational cairn. All occurrences should be reported.

7.1.7 Pottery. Any fragment of pottery is potentially of interest, especially if it is a large fragment. Items which look like modern crockery can be discarded, but if the item has an unusual shape, glaze or fabric it should be reported.

7.1.8 Brick. Bricks with modern proportions and v-shaped hollows ('frogs') are of no archaeological interest. Unfrogged, 'small', 'thin' or otherwise unusual bricks may date back to Medieval or even Roman times and should be reported.

7.1.9 Peat and Clay. Peat is black or brown fibrous soil that formed when sea level was so low that the seabed formed marshy land, for example on the banks of a river or estuary. Peat is made up of plant remains, and also contains microscopic remains that can provide information about the environment at the time it was formed. This information helps us to understand the kind of landscape that our predecessors inhabited, and about how their landscape changed. It can also provide information about rising sea-level and coastline change, which are important to understanding processes that are affecting us today. Prehistoric structures (such as wooden trackways) and artefacts are often found within or near peat, because our predecessors used the many resources that these marshy areas contained. As these areas were waterlogged, and have continued to be waterlogged because the sea has risen, 'organic' artefacts made of wood, leather, textile and so on often survive together with the stone and pottery which are found on 'dry' sites.

7.1.10 Fine-grained sediments such as silts and clays are often found at the same places as peat. These fine-grained sediments also contain the microscopic remains that can provide information about past environments and sea level change. Any discoveries of such material would be of archaeological interest, and their occurrence should be reported.

7.2 Artefact Storage Advice

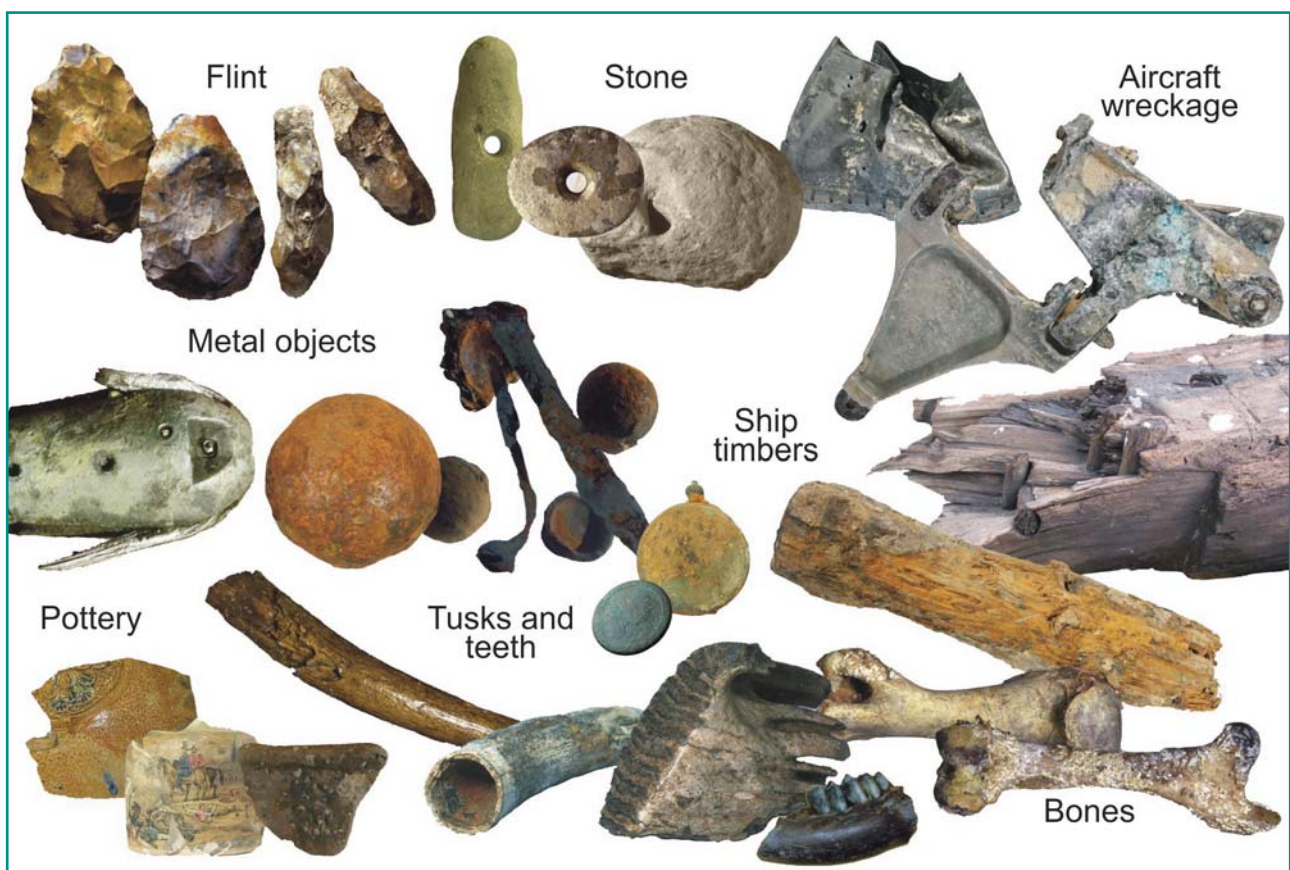
7.2.1 It should be noted that 'time is of the essence' in terms of the recovery of waterlogged archaeological material. If waterlogged organic items are allowed to dry out this can cause irreparable damage. Care in handling items is paramount.

7.2.2 In the event of artefact recovery, the finds should be stored in the following manner:

- If dry, finds should be placed in sealable bags and/or stored in a suitable protective container in a cool, dark area if possible.
- If waterlogged, any artefacts should be kept damp, or preferably totally submerged (in sea water), in sealable bags which are then stored in rigid plastic boxes to prevent damage. Items should be kept wet, covered, and stored in a cool, dark area if possible.
- Any sediments of interest will be collected and double bagged in sealable bags.

7.2.3 If particularly delicate or significant items are recovered the Implementation Service should be contacted for further advice.

7.2.4 The Developer will supply suitable storage materials to its construction operations. The IS can advise on suitable materials for this purpose.




Protocol for Archaeological Discoveries: Offshore Renewables Projects

Preliminary Record Form Page 1 of 2

Preliminary Record Form: Discoveries on the Seabed/ on board / in the inter-tidal zone / on land

Company Name:
Vessel/Team Name:
Site/sea area Name:
Date:
Time of compiling information:
Name of compiler (Site Champion):
Name of finder (if different to above):

Time at which discovery was encountered:
Vessel position at time when anomaly was encountered:
a) Latitude
b) Longitude
c) Datum (if different from WGS84)
Original position of the anomaly on the seabed, if known:
Notes on likely accuracy of original position stated above:
a) How accurate is the position?
b) Is the position the original position or has the material been moved by operations?
c) Details of circumstances and activity that lead to the discovery

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Protocol for Archaeological Discoveries: Offshore Renewables Projects

Preliminary Record Form Page 2 of 2

Preliminary Record Form: Discoveries on the Seabed/ on board / in the inter-tidal zone / on land

Description of the find/anomaly:
Apparent size/extent of the anomaly:
Details of any find(s) recovered:
Details of photographs, drawings or other records made of the find(s) (e.g. location figure):
Details of treatment or storage of find(s):
Date and time Nominated Contact informed:
General notes:
If discovered on the seabed:
a) Derived from: e.g. Obstacle Avoidance Sonar, Cable Tensiometer?
b) Apparent size/extent of anomaly (length, width, height above seabed)
c) Extent of deviation/route development
Signed: _____ Date: _____

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8 Appendix III: Glossary

AEZ

Archaeological Exclusion Zone

COWRIE

Collaborative Offshore Wind Research into the Environment

DECC

Department of Energy and Climate Change

DEFRA

Department for Environment, Food and Rural Affairs

EH

English Heritage

EIA

Environmental Impact Assessment

HER

Historic Environment Record

HS

Historic Scotland

IPC

Infrastructure Planning Commission

IS

Implementation Service

MAI

Marine Aggregates Industry

MoD

Ministry of Defence

MoJ

Ministry of Justice

MPA

Marine Protected Areas

MPS

Marine Policy Statement

NISMR

Northern Ireland Sites and Monuments Record

NRHE

National Record of the Historic Environment

ORPAD

Offshore Renewables Protocol for Archaeological Discoveries

PAD

Protocol for Archaeological Discoveries

PAS

Portable Antiquities Scheme

RoW

Receiver of Wreck

TEZ

Temporary Exclusion Zone

WSI

Written Scheme of Investigation

9 Appendix IV: List of Consultees

List of Consultees for The Crown Estate, Offshore Renewable Energy and the Historic Environment Consultation

Advisory Committee for Historic Wreck Sites	Institute for Archaeologists
Association of Local Government Archaeological Officers: Maritime Committee	Joint Nautical Archaeology Policy Committee
Association of Local Government Archaeological Officers: Planning & Legislation Committee	Manx National Heritage
Cadw	Marine Management Organisation
Centrica	Marine Scotland
Council for British Archaeology	Ministry of Defence
Department for Culture, Media and Sport	Ministry of Justice
Department for Environment, Food and Rural Affairs	Nautical Archaeology Society
Department of Energy and Climate Change	Northern Ireland Environment Agency
Department of Enterprise Trade and Investment	Portable Antiquities Scheme
Department of the Environment, Northern Ireland	Receiver of Wreck (MCA)
DONG Wind (UK) Ltd	Renewable UK
East Anglia Offshore Wind (SP Renewables)	RES
English Heritage: Marine Team	Royal Commission on the Ancient and Historical Monuments of Scotland
E.ON	Royal Commission on the Ancient and Historical Monuments of Wales
Fluor	Scottish Government
Forewind	Sea Energy Renewables
Historic Scotland	UHI Millenium Institute
Infrastructure Planning Commission	Welsh Assembly Government: Energy Team
	Welsh Assembly Government: Marine Policy Team

10 Appendix V: References

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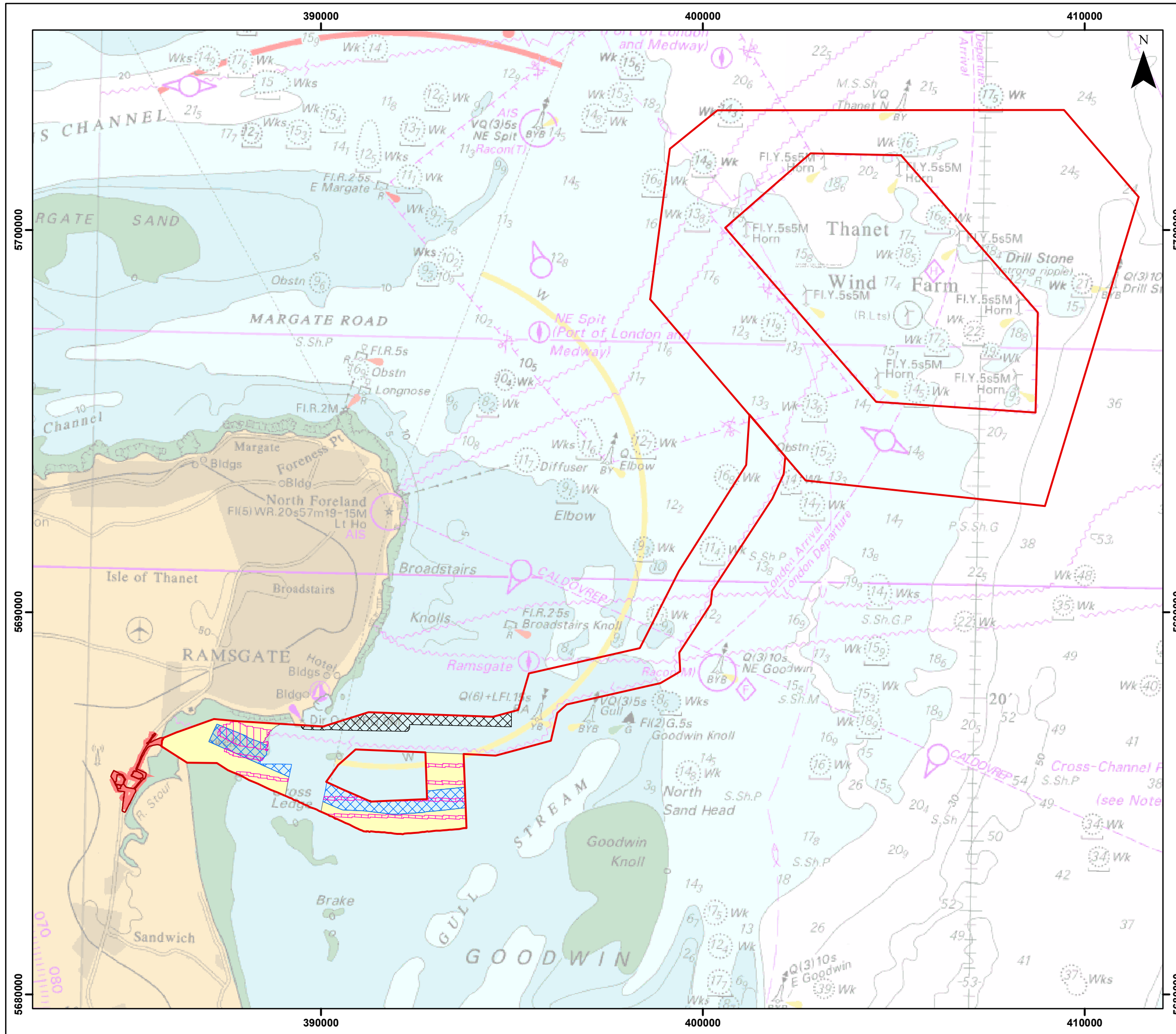
Printed by BML Printers Ltd on FSC® certified paper.

Paper: Evolution Silk 100% recycled.

Carbon emissions generated during the manufacture and delivery of this product have been measured and reduced to net zero through a verified carbon offsetting project via The CarbonNeutral Company. This is in accordance with The CarbonNeutral Protocol, the global leading standard for carbon neutrality.

If you have finished reading this document and no longer wish to retain it, please pass it on to other interested readers, return to The Crown Estate, or dispose of it in your recycled paper waste. Thank you.



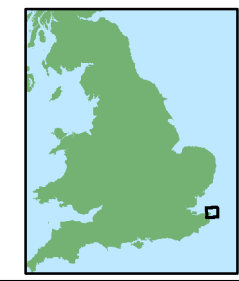


THANET EXTENSION OFFSHORE WIND FARM

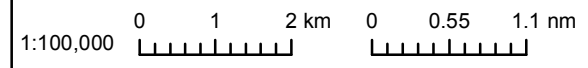
Figure 1
 Thanet Extension location, offshore site boundary, cable route offshore and coverage of Nemo Link data

- Legend
- Offshore Red Line Boundary
 - Onshore Red Line Boundary
 - Cable Exclusion Area
 - Covered by 2005 Thanet data
 - Covered by 73390 NEMO data
 - No 2016 Coverage

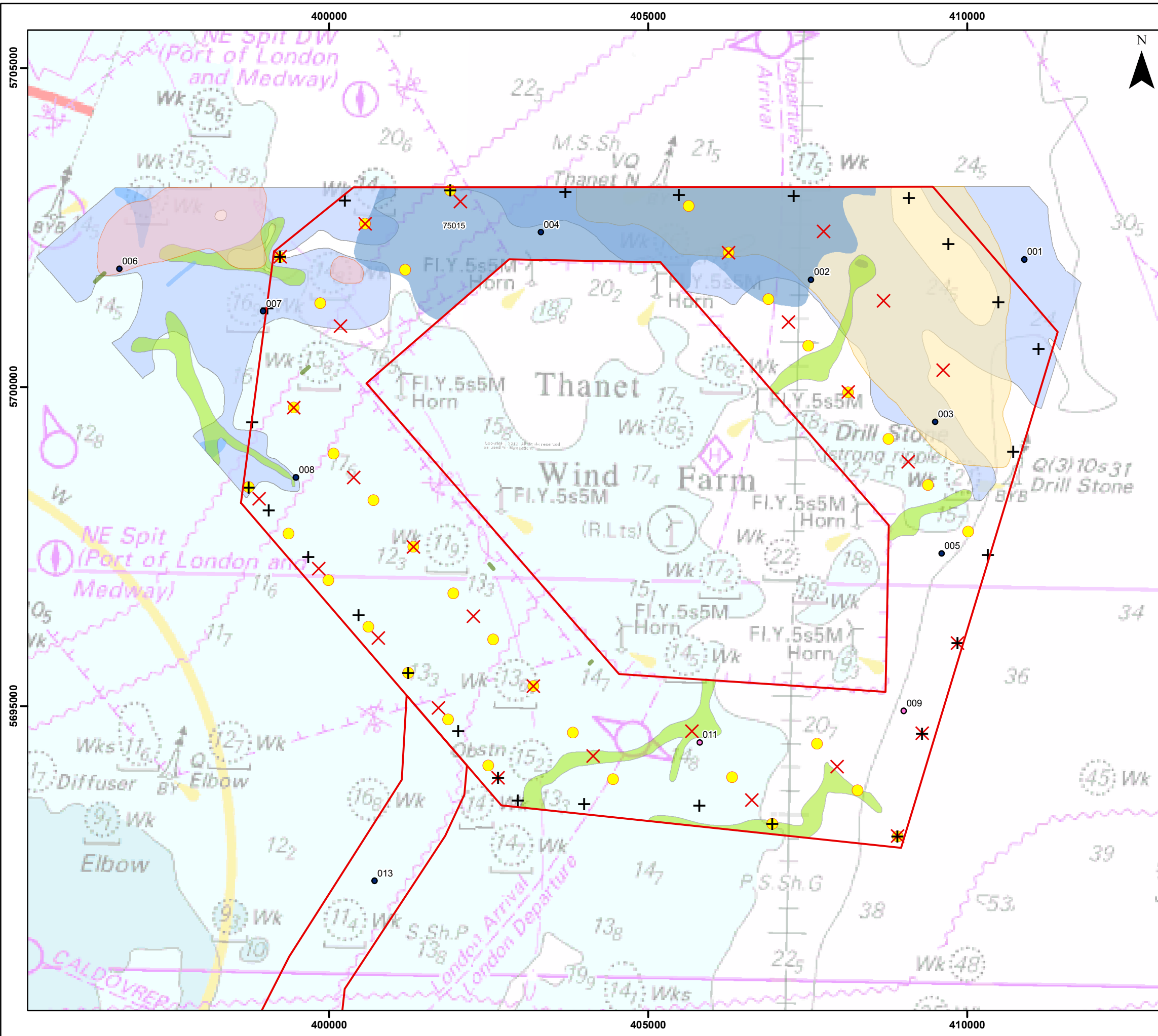
Datum: ETRS 1989
 Projection: UTM31N



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Date	08/05/2018		
Layout	N/A		



THANET EXTENSION OFFSHORE WIND FARM

Figure 2

Palaeogeographic features of archaeological potential

Legend

- Offshore Red Line Boundary
- + Indicative 28 WTG layout (perimeter)
- × Indicative 28 WTG layout (space)
- Indicative 34 WTG layout

Phase 1 Channels

- Acoustic Blanking
- Channel
- Acoustic Blanking

Phase 2 Channels

- Channel

Phase 3 Channels

- Simple Cut and Fill
- Acoustic Blanking
- Channel

Phase 4 Erosion Surfaces

- Erosion Surface

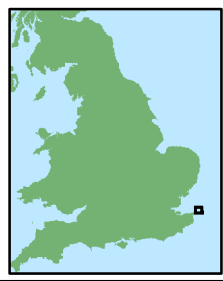
Phase 5 Channel Complex

- Channel Complex

Geotechnical sample locations (Fugro 2016)

- CPT
- CPT and Vibrocore

Datum: ETRS 1989
Projection: UTM31N



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1:60,000

0 0.65 1.3 km 0 0.35 0.7 nm

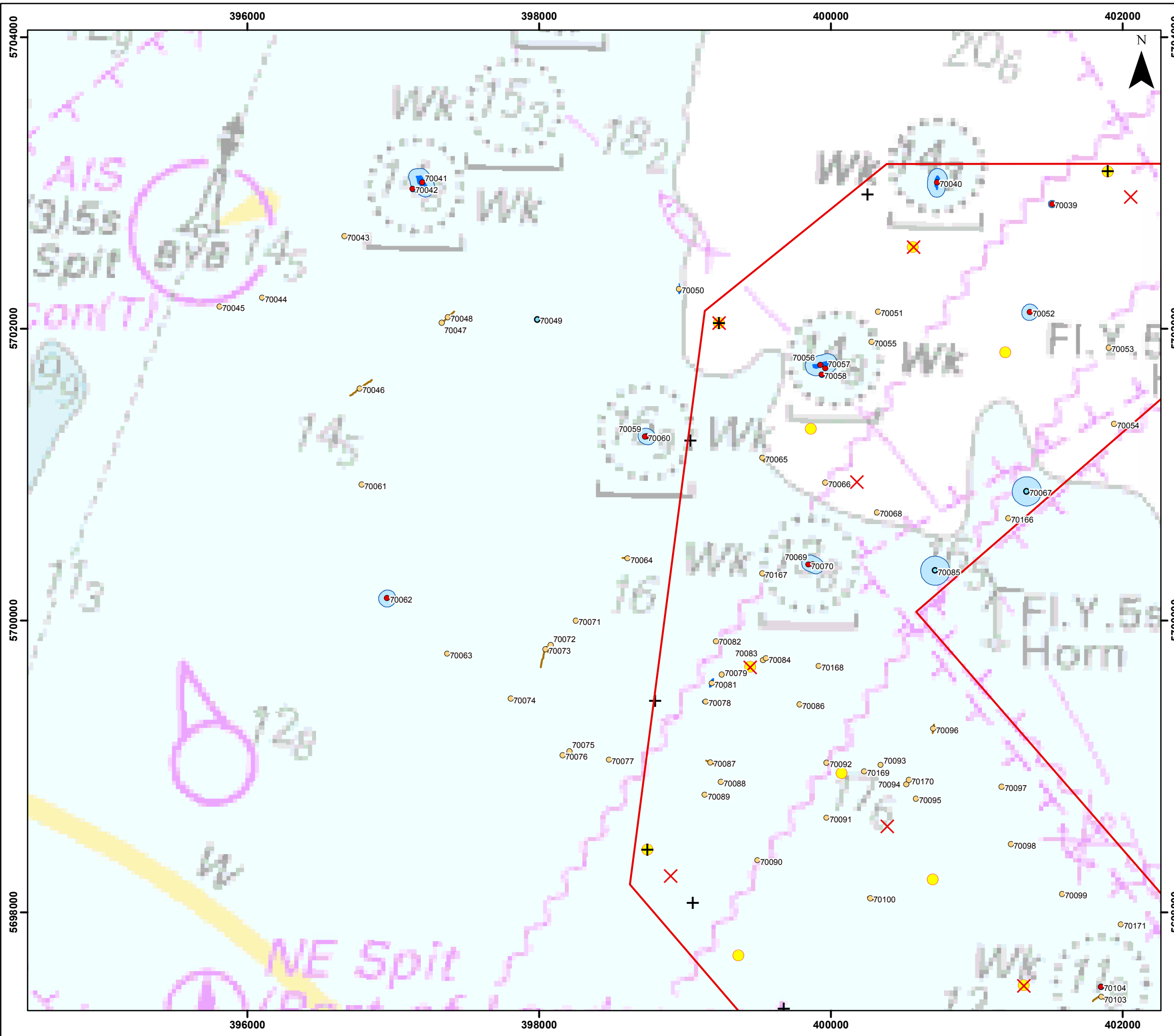
Drg No	Fig_2			Figure 2
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	

THANET EXTENSION OFFSHORE WIND FARM

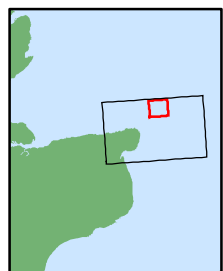
Figure 3
Seabed features of archaeological potential in Thanet Extension Site Area

Legend

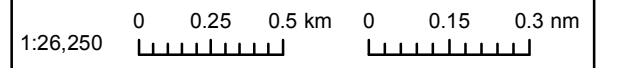
- Offshore Red Line Boundary
- + Indicative 28 WTG layout (perimeter)
- X Indicative 28 WTG layout (space)
- Indicative 34 WTG layout
- A1 – Anthropogenic origin of archaeological interest
- A2 – Uncertain origin of possible archaeological interest
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- Linear features
- Site extents
- Recommended AEZs



Datum: ETRS 1989
Projection: UTM31N



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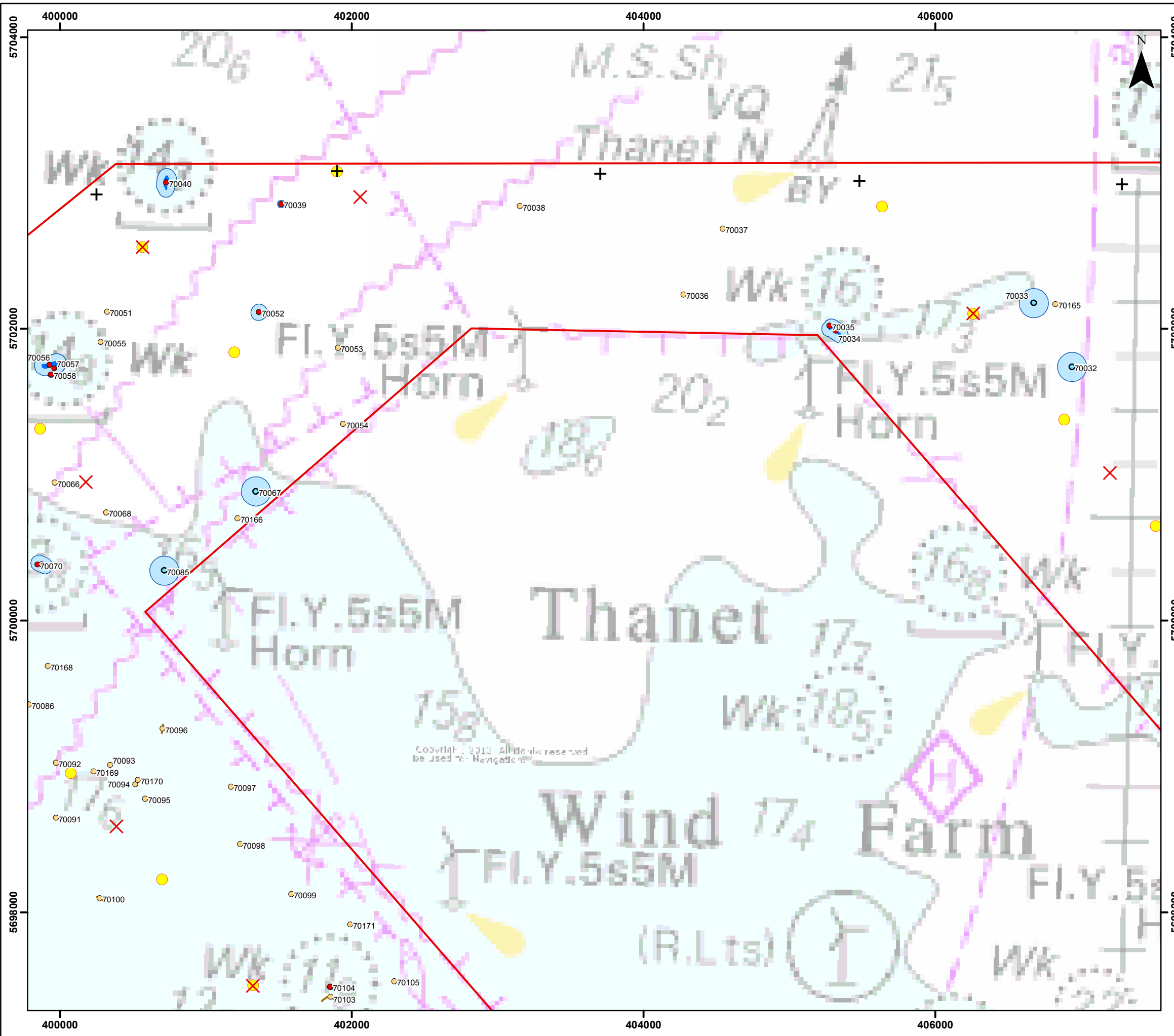
Drg No	Fig_3-7			Figure 3
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	

THANET EXTENSION OFFSHORE WIND FARM

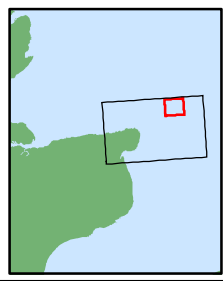
Figure 4
Seabed features of archaeological potential in Thanet Extension Site Area

Legend

- Offshore Red Line Boundary
- + Indicative 28 WTG layout (perimeter)
- × Indicative 28 WTG layout (space)
- Indicative 34 WTG layout
- 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
- Linear features
- Site extents
- Recommended AEZs



Datum: ETRS 1989
Projection: UTM31N



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1:26,250

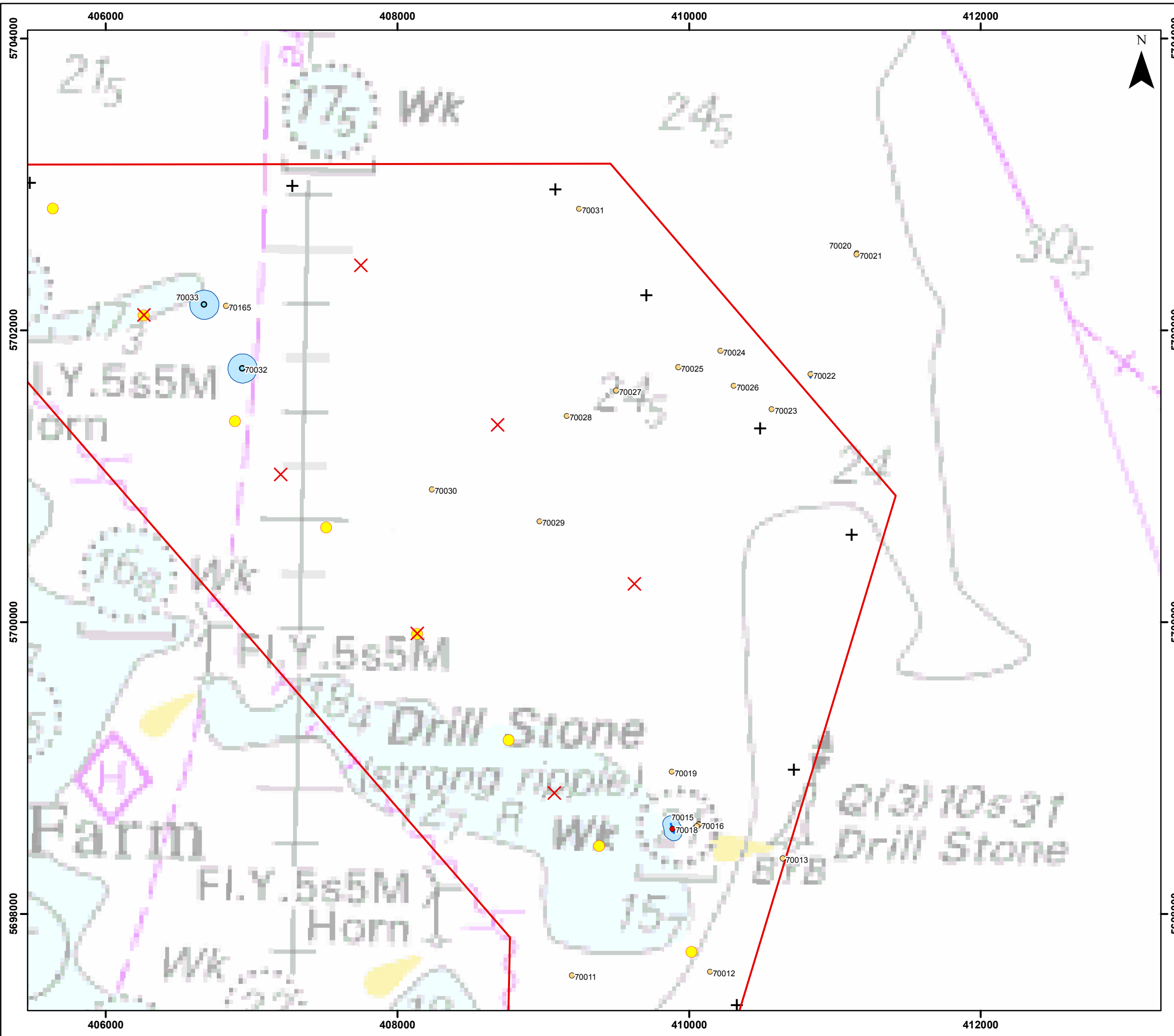
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Drg No	Fig_3-7			Figure 4
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	

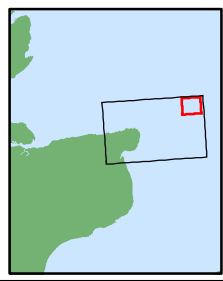
THANET EXTENSION OFFSHORE WIND FARM

Figure 5
Seabed features of archaeological potential in Thanet Extension Site Area

- Legend
- Offshore Red Line Boundary
 - + Indicative 28 WTG layout (perimeter)
 - × Indicative 28 WTG layout (space)
 - Indicative 34 WTG layout
 - 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
 - Linear features
 - Site extents
 - Recommended AEZs



Datum: ETRS 1989
Projection: UTM31N

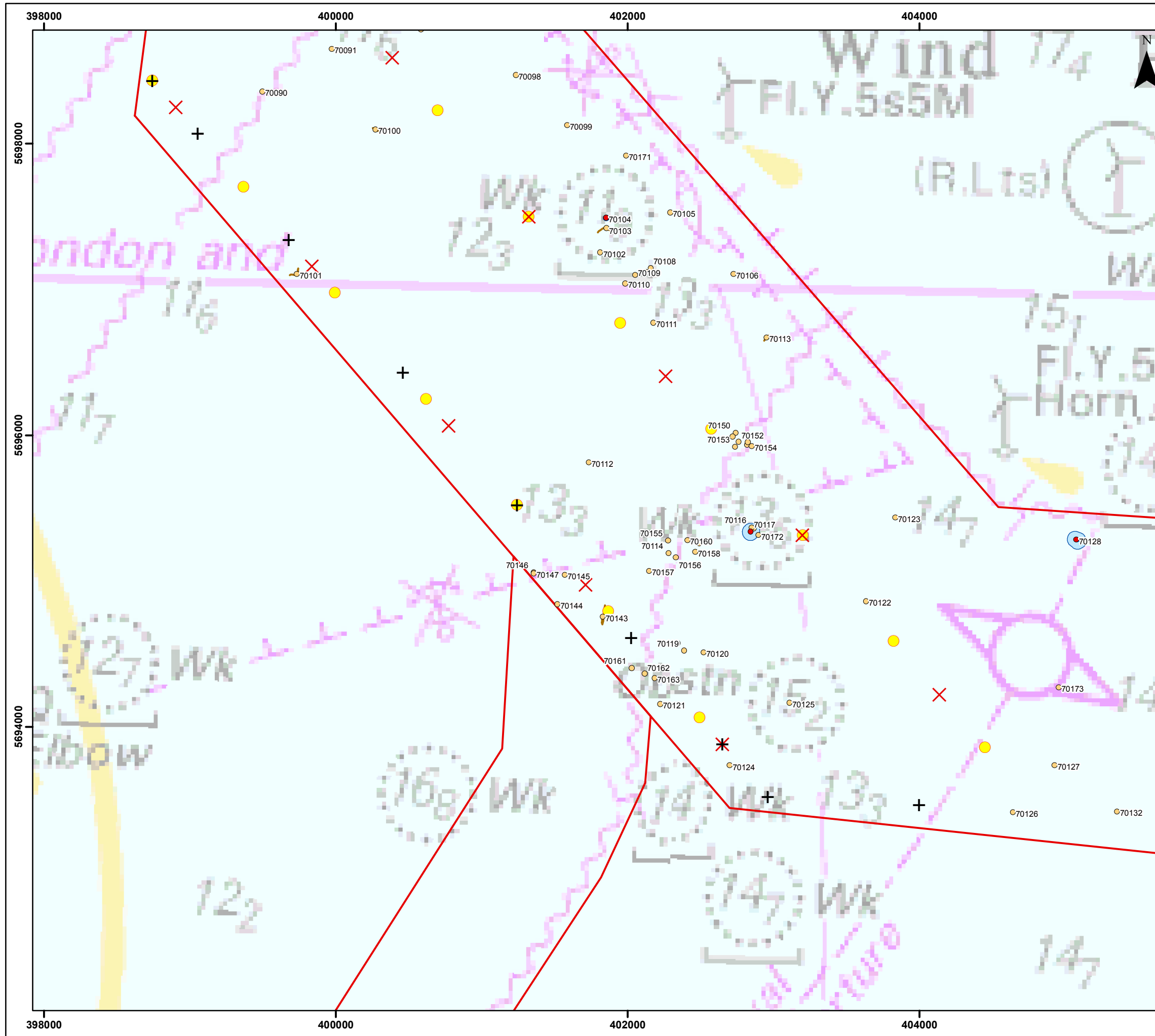


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1:26,250

0 0.25 0.5 km 0 0.15 0.3 nm

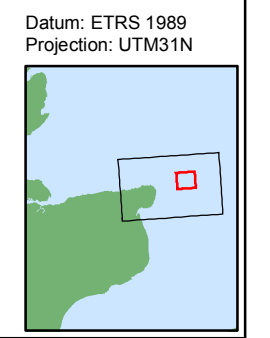
Drg No	Fig_3-7			Figure 5
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	



THANET EXTENSION OFFSHORE WIND FARM

Figure 6
Seabed features of archaeological potential in Thanet Extension Site Area

- Legend
- Offshore Red Line Boundary
 - + Indicative 28 WTG layout (perimeter)
 - x Indicative 28 WTG layout (space)
 - Indicative 34 WTG layout
 - A1 – Anthropogenic origin of archaeological interest
 - A2 – Uncertain origin of possible archaeological interest
 - Linear features
 - Site extents
 - Recommended AEZs

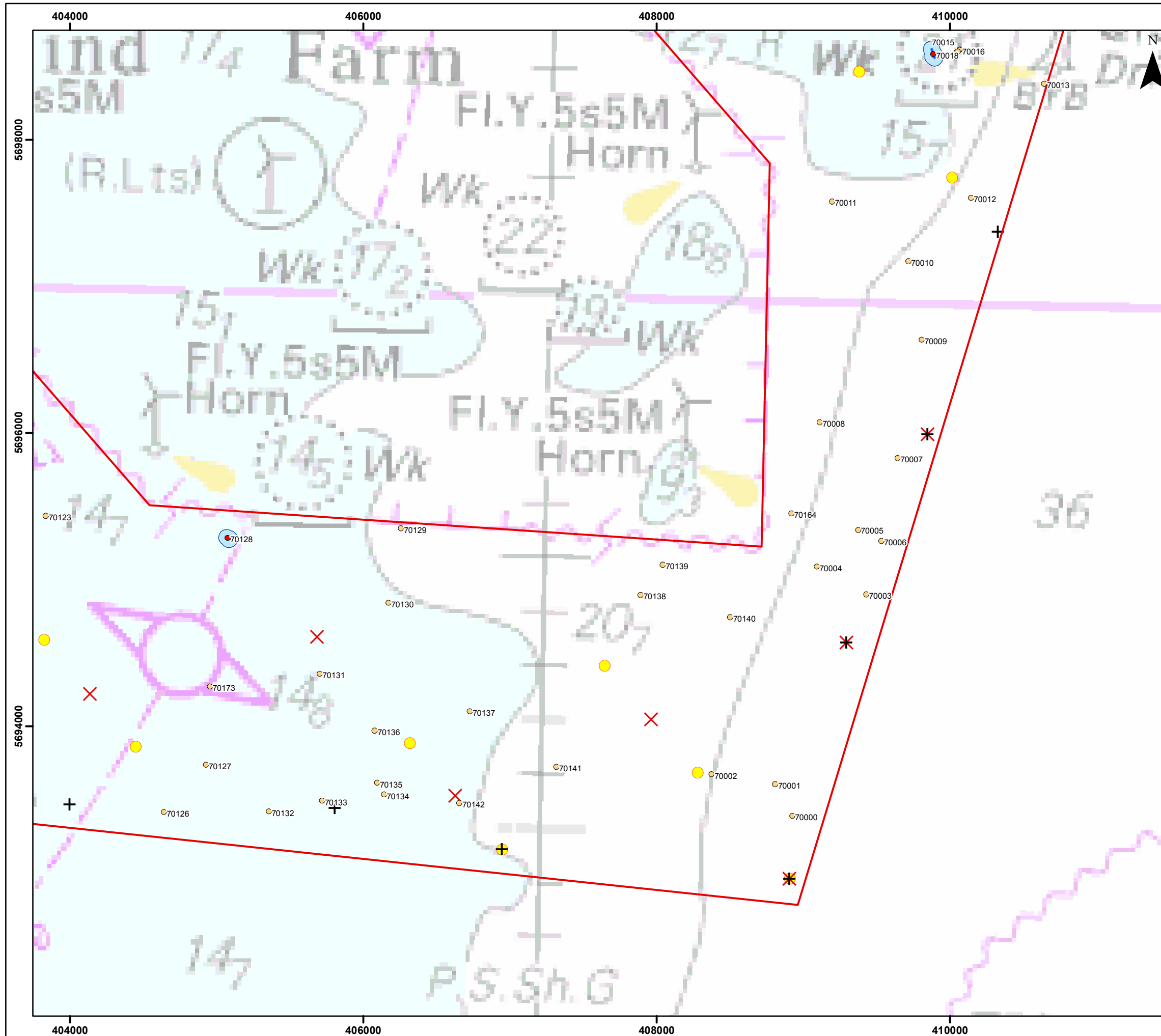


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1:26,250

0 0.25 0.5 km 0 0.15 0.3 nm

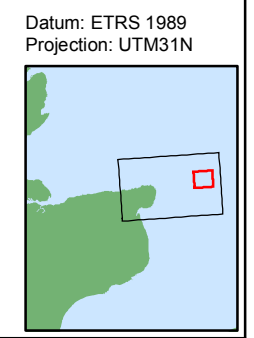
Drg No	Fig_3-7			Figure 6
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	



THANET EXTENSION OFFSHORE WIND FARM

Figure 7
Seabed features of archaeological potential in Thanet Extension Site Area

- Legend
- Offshore Red Line Boundary
 - + Indicative 28 WTG layout (perimeter)
 - × Indicative 28 WTG layout (space)
 - Indicative 34 WTG layout
 - A1 – Anthropogenic origin of archaeological interest
 - A2 – Uncertain origin of possible archaeological interest
 - Site extents
 - Recommended AEZs



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1:26,250

0 0.25 0.5 km 0 0.15 0.3 nm

Drg No	Fig_3-7			Figure 7
Rev	3	Date	08/05/2018	
By	KL	Layout	N/A	

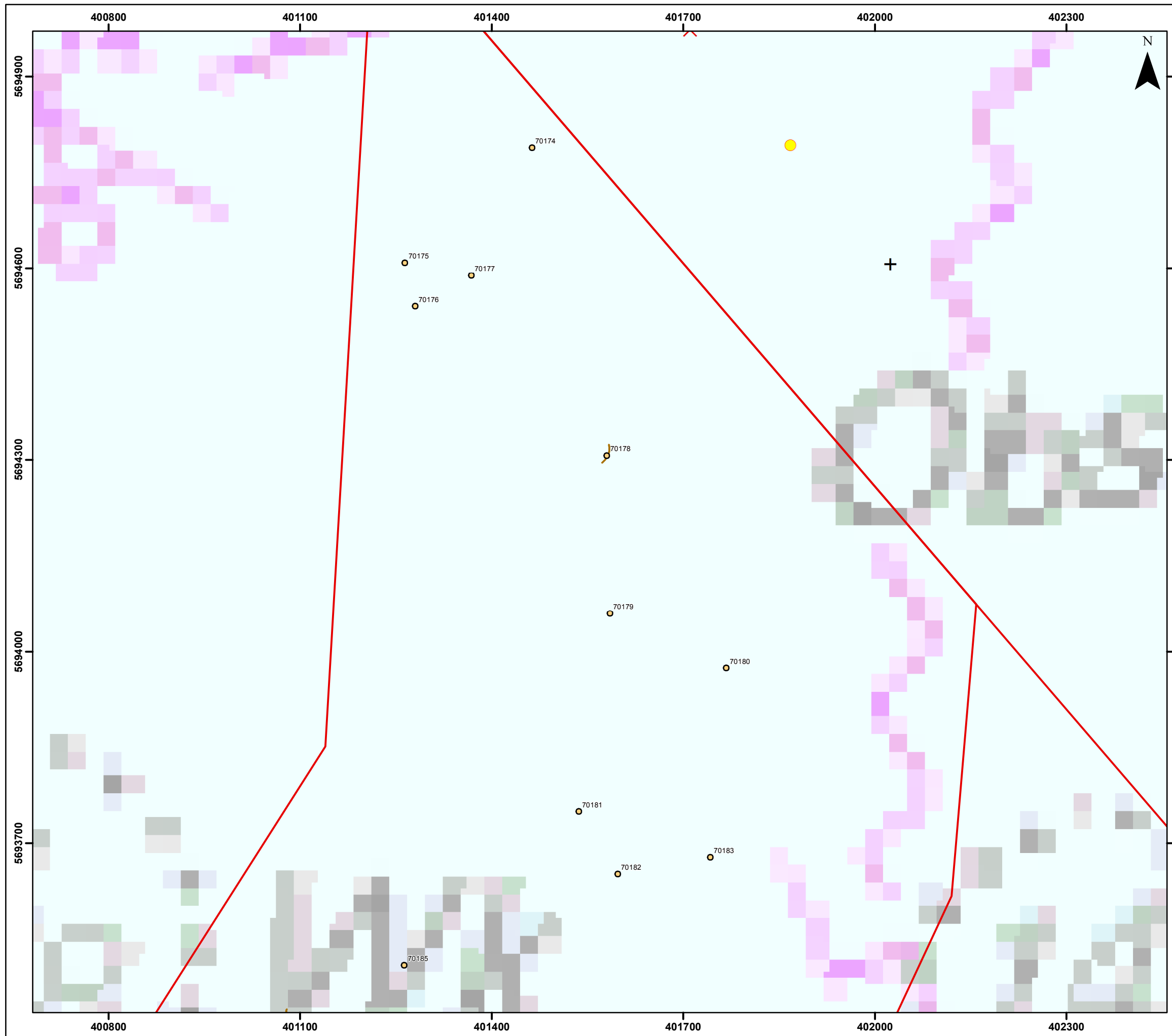
THANET EXTENSION OFFSHORE WIND FARM

Figure 8

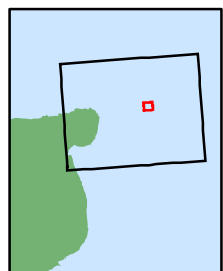
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

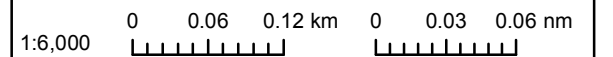
- Offshore Red Line Boundary
- + Indicative 28 WTG layout (perimeter)
- × Indicative 28 WTG layout (space)
- Indicative 34 WTG layout
- A2 – Uncertain origin of possible archaeological interest
- Linear features



Datum: OSGB 1936
Projection: UTM31N



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Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

THANET EXTENSION OFFSHORE WIND FARM




Figure 9

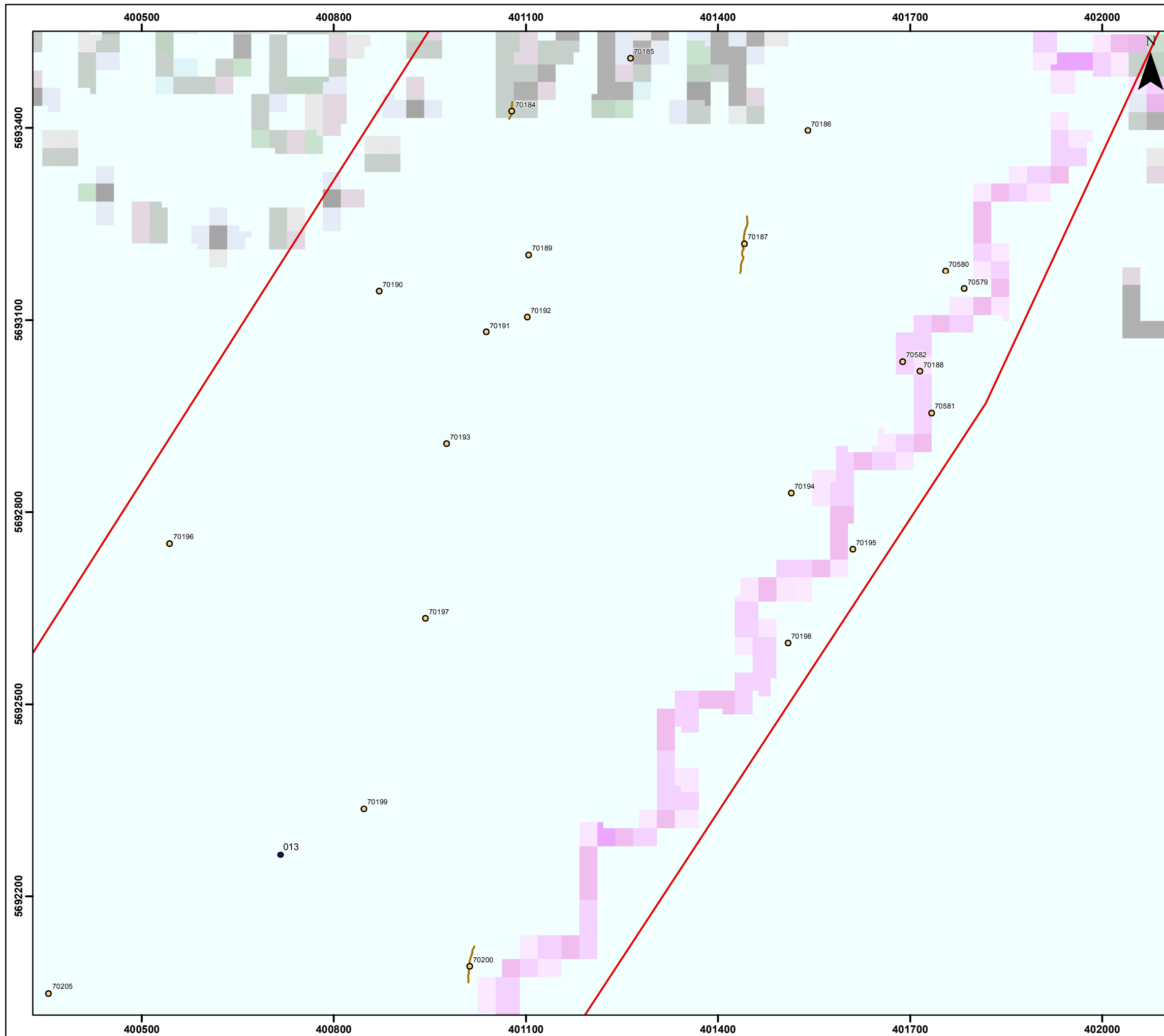
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

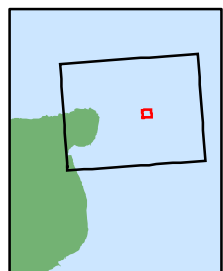
 Offshore Red Line Boundary

Geotechnical sample locations (Fugro 2016)

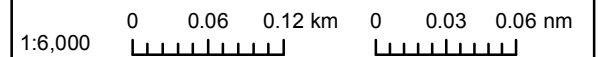
-  CPT and Vibrocore
-  A2 – Uncertain origin of possible archaeological interest
-  Linear features



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Projection: UTM31N



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Rev	4	Date	04/12/2018
By	KL	Layout	N/A

Figure 9

THANET EXTENSION OFFSHORE WIND FARM

Figure 10

Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

Offshore Red Line Boundary

Geotechnical sample locations (Fugro 2016)

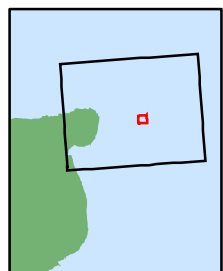
- CPT and Vibrocore
- A1 – Anthropogenic origin of archaeological interest
- A2 – Uncertain origin of possible archaeological interest
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly

Linear features

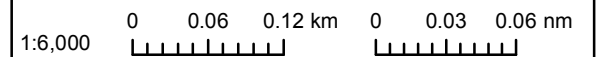
Site extents

Recommended AEZs

Datum: OSGB 1936
Projection: UTM31N

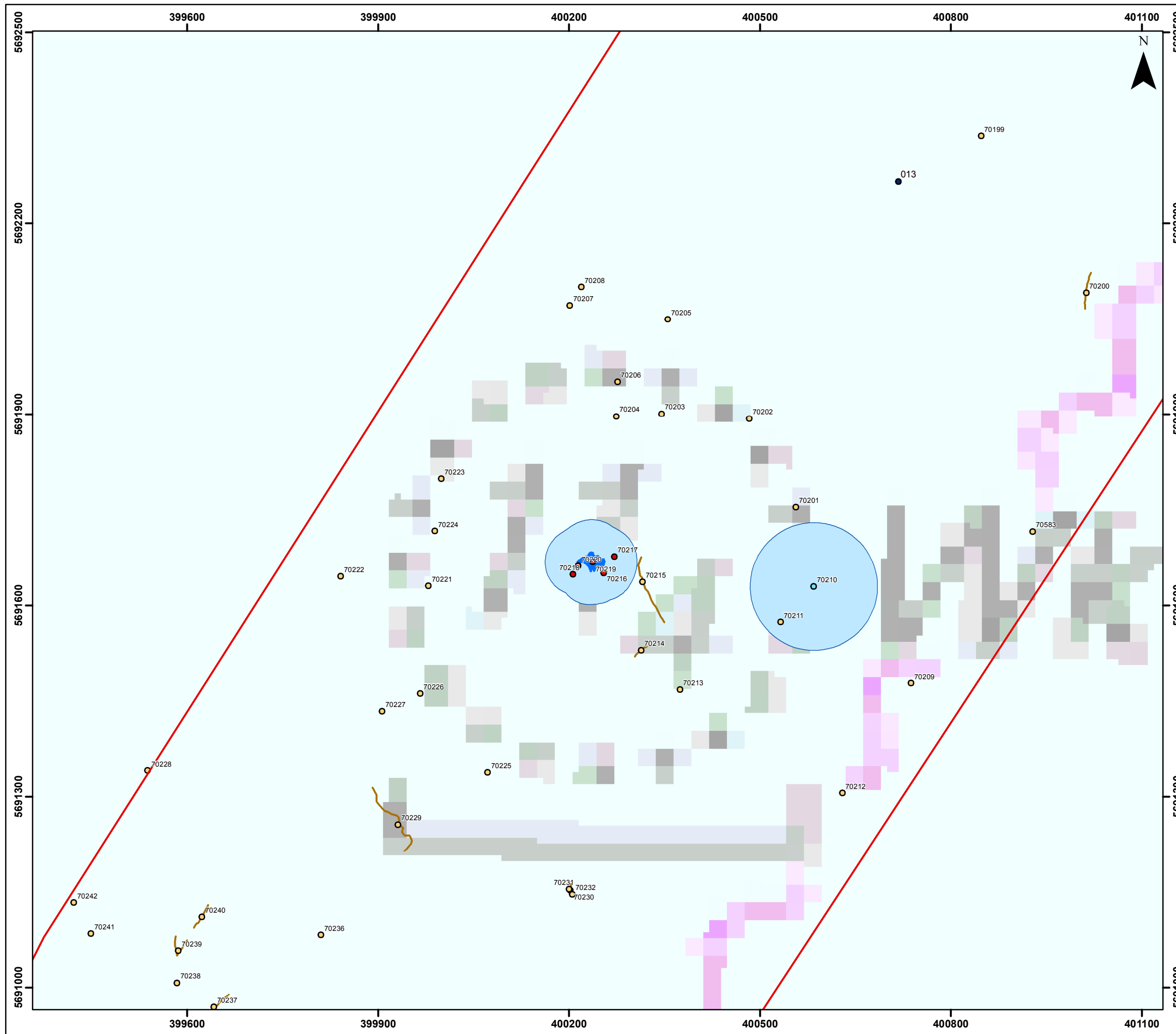


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Drg No	Fig_8-26		
Rev	4	Date	04/12/2018
By	KL	Layout	N/A

Figure 10



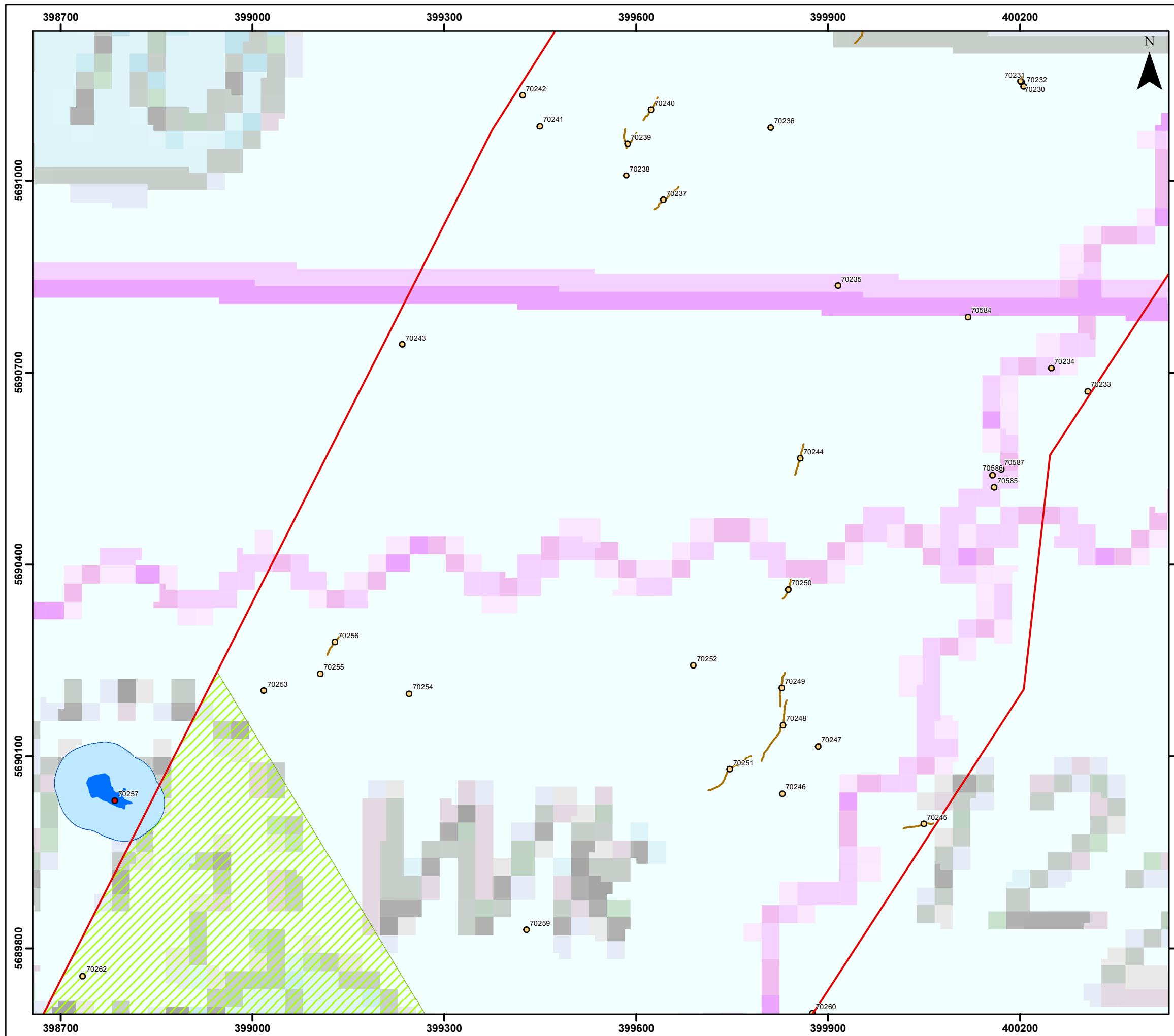
THANET EXTENSION OFFSHORE WIND FARM

Figure 11

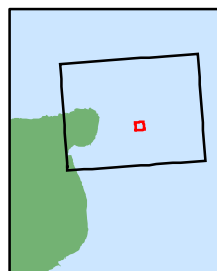
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

- Offshore Red Line Boundary
- A1 – Anthropogenic origin of archaeological interest
- A2 – Uncertain origin of possible archaeological interest
- Linear features
- Site extents
- Recommended AEZs
- Area of Archaeological Potential – Goodwin Sands



Datum: OSGB 1936
Projection: UTM31N



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1:6,000 0 0.06 0.12 km 0 0.03 0.06 nm

Drg No	Fig_8-26
Rev	4
Date	04/12/2018
By	KL
Layout	N/A

Figure 11

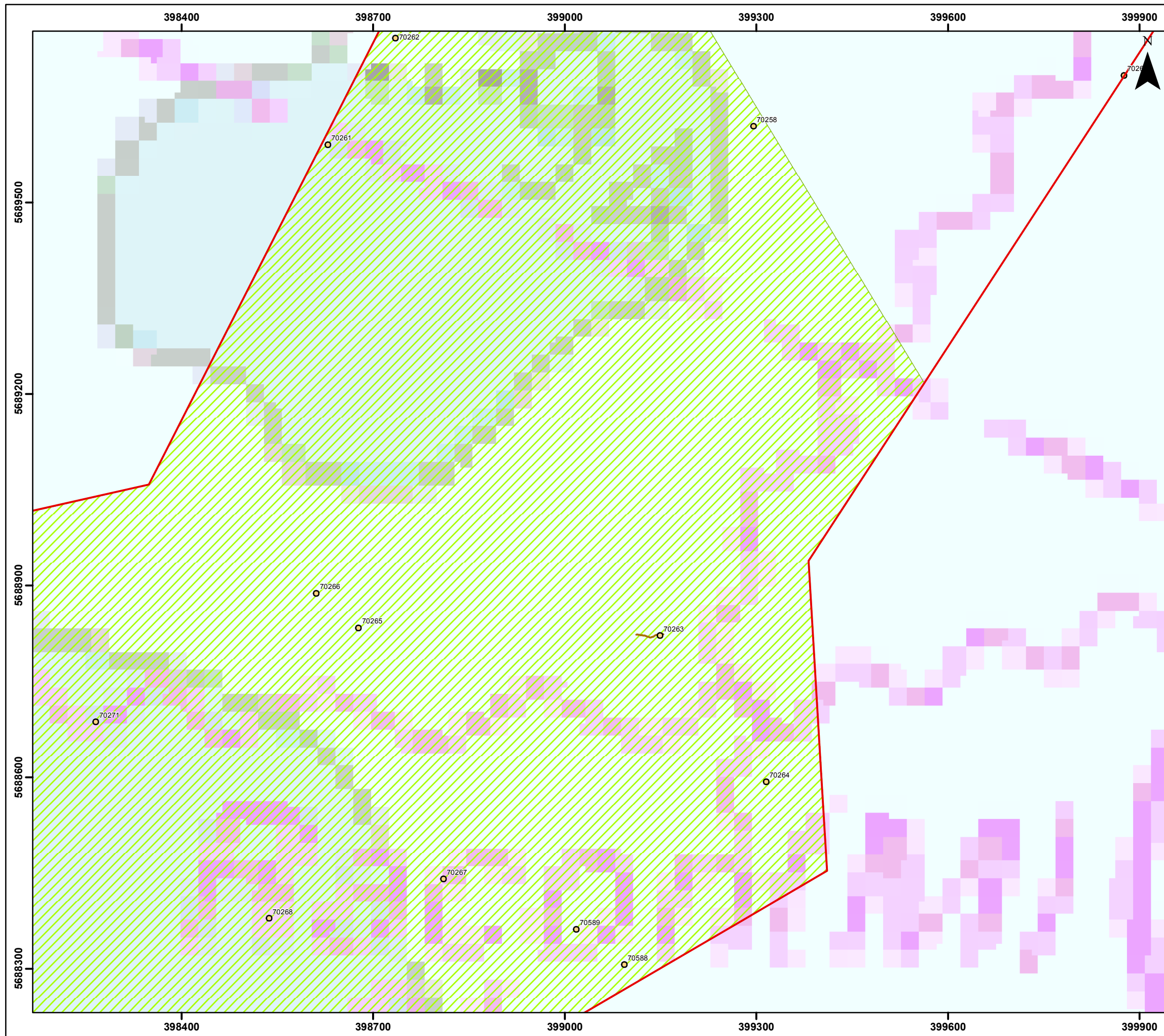
THANET EXTENSION OFFSHORE WIND FARM

Figure 12

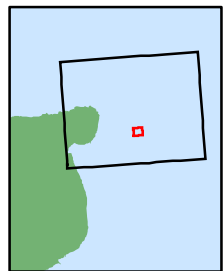
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

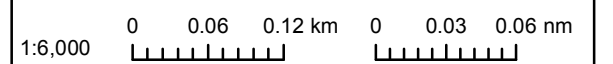
- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest
- Linear features
- Area of Archaeological Potential – Goodwin Sands



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Drg No	Fig_8-26			Figure 12
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

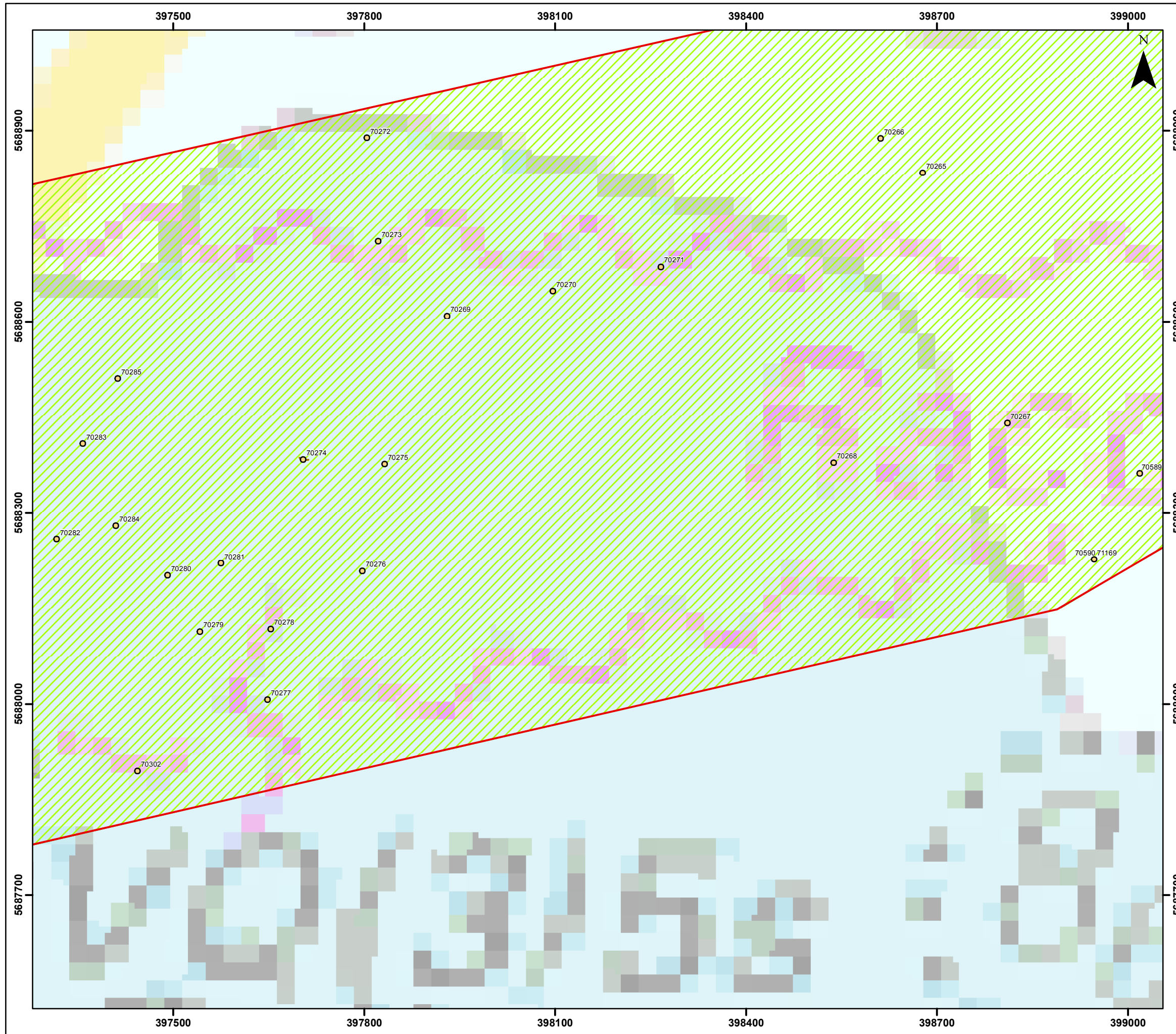
THANET EXTENSION OFFSHORE WIND FARM

Figure 13

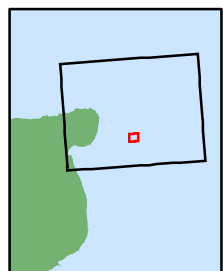
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

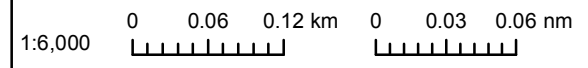
- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest
- Linear features
- Area of Archaeological Potential – Goodwin Sands



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Drg No	Fig_8-26			Figure 13
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

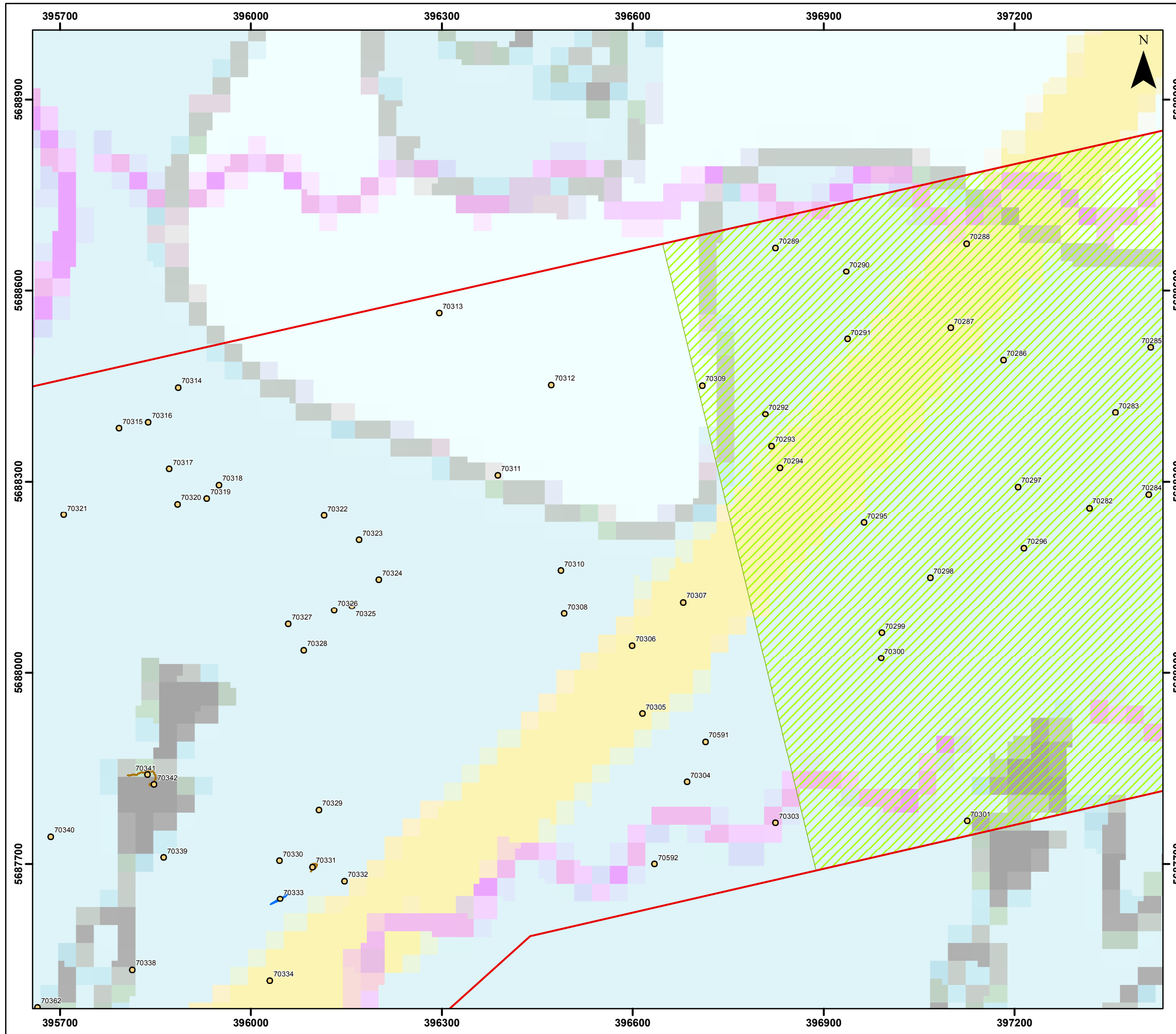
THANET EXTENSION OFFSHORE WIND FARM

Figure 14

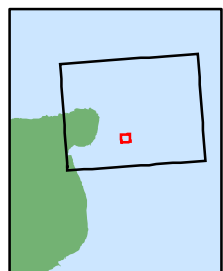
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

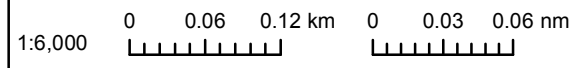
- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest
- Linear features
- Site extents
- Area of Archaeological Potential – Goodwin Sands



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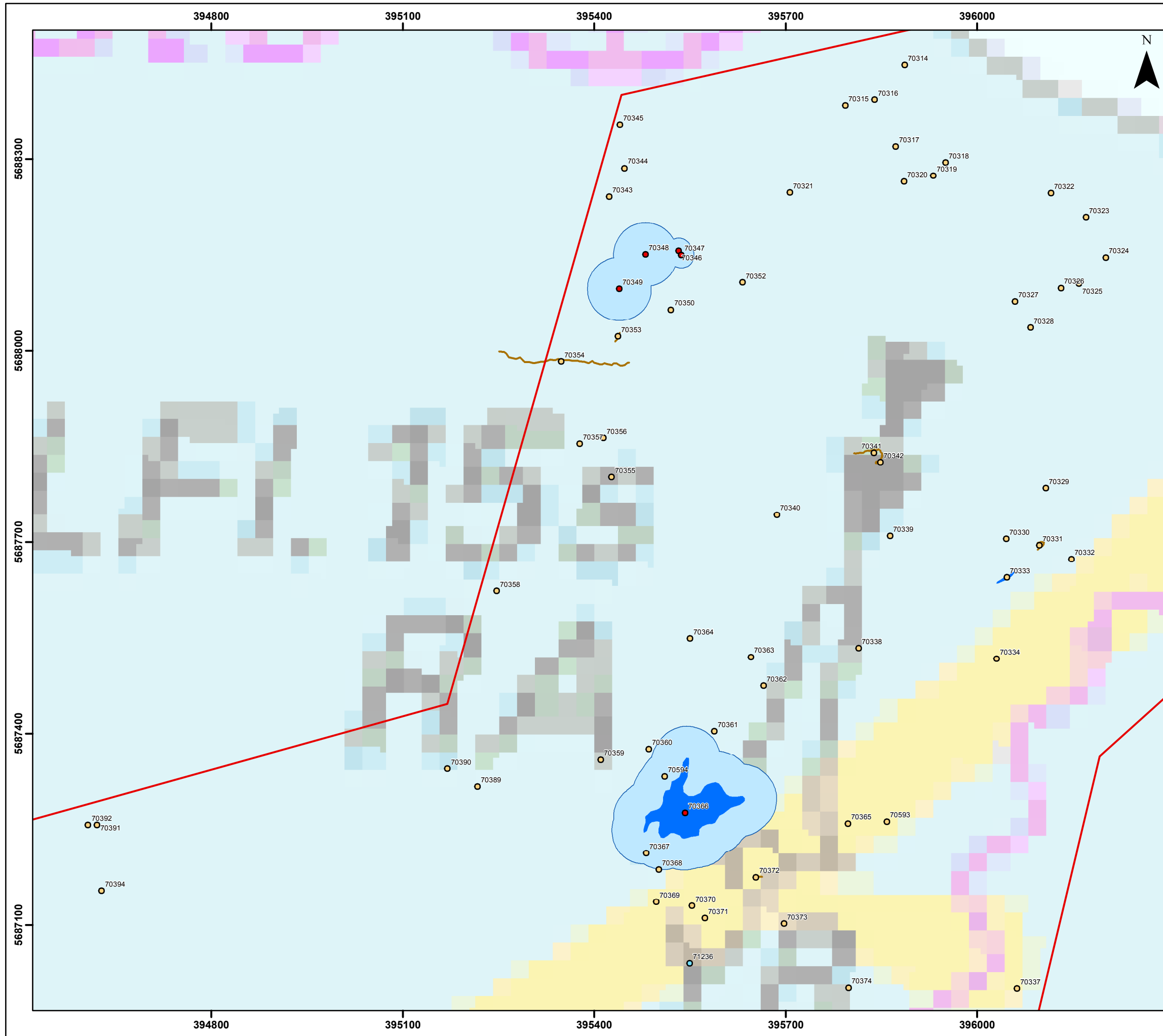


Drg No	Fig_8-26			Figure 14
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

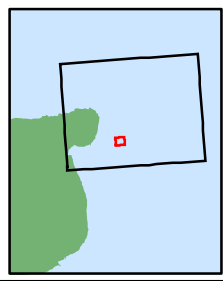
THANET EXTENSION OFFSHORE WIND FARM

Figure 15
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

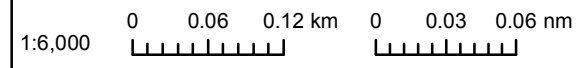
- Legend**
- Offshore Red Line Boundary
 - A1 – Anthropogenic origin of archaeological interest
 - A2 – Uncertain origin of possible archaeological interest
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
 - Linear features
 - Site extents
 - Recommended AEZs



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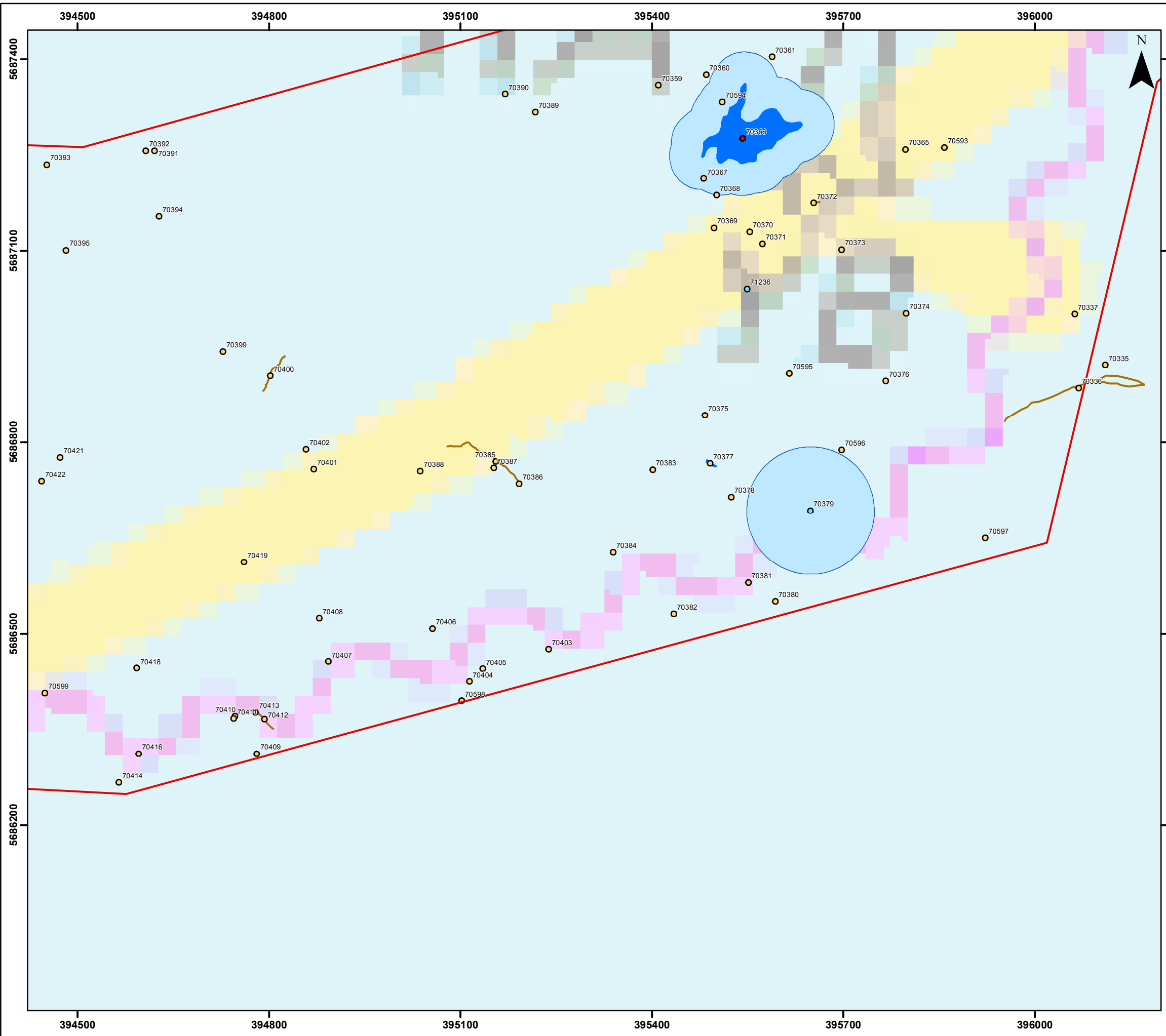


Drg No	Fig_8-26			Figure 15
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

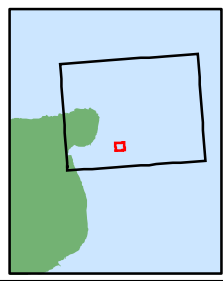
THANET EXTENSION OFFSHORE WIND FARM

Figure 16
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

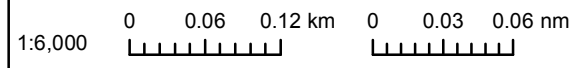
- Legend**
- Offshore Red Line Boundary
 - A1 – Anthropogenic origin of archaeological interest
 - A2 – Uncertain origin of possible archaeological interest
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
 - Linear features
 - Site extents
 - Recommended AEZs



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Drg No	Fig_8-26			Figure 16
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

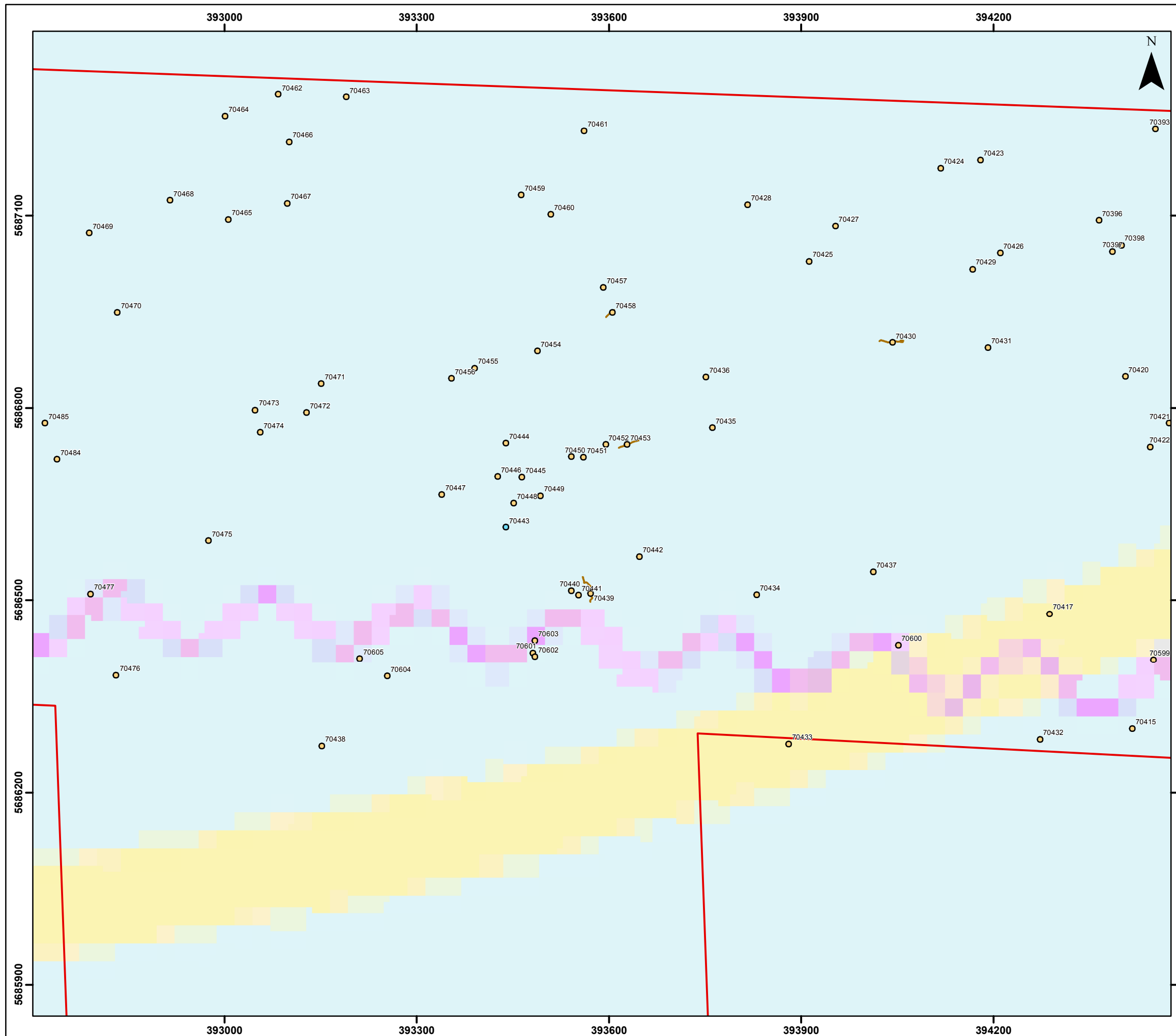
THANET EXTENSION OFFSHORE WIND FARM

Figure 17

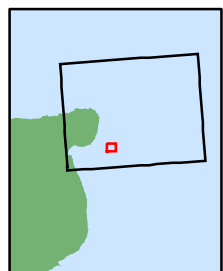
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

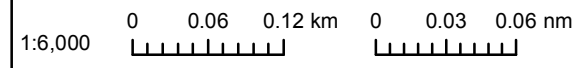
- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- Linear features



Datum: OSGB 1936
Projection: UTM31N



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Drg No	Fig_8-26			Figure 17
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

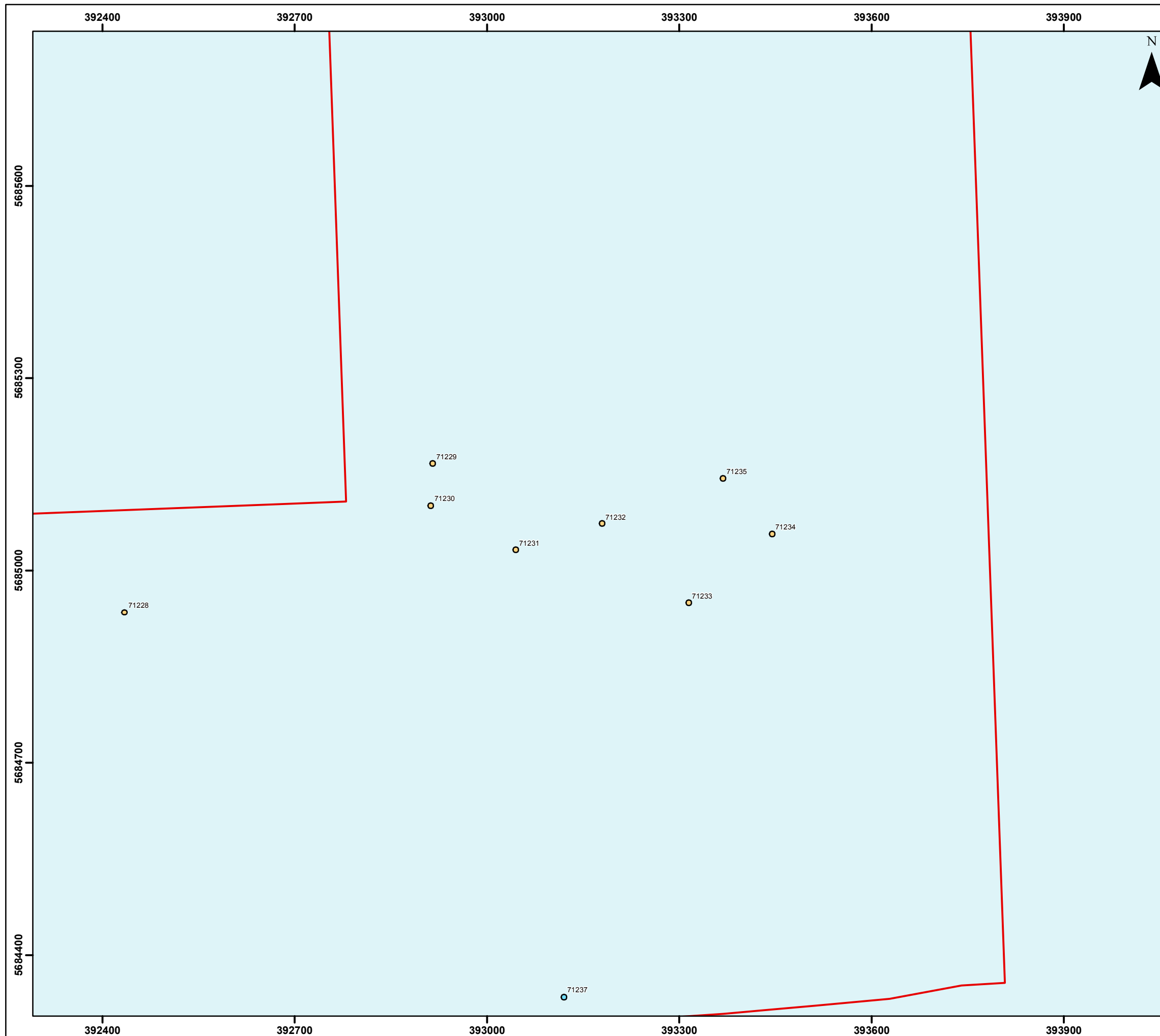
THANET EXTENSION OFFSHORE WIND FARM

Figure 18

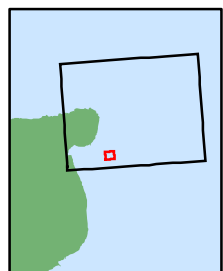
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

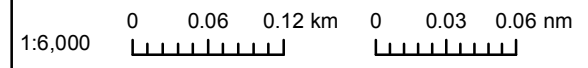
- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly



Datum: OSGB 1936
Projection: UTM31N



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Drg No	Fig_8-26			Figure 18
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

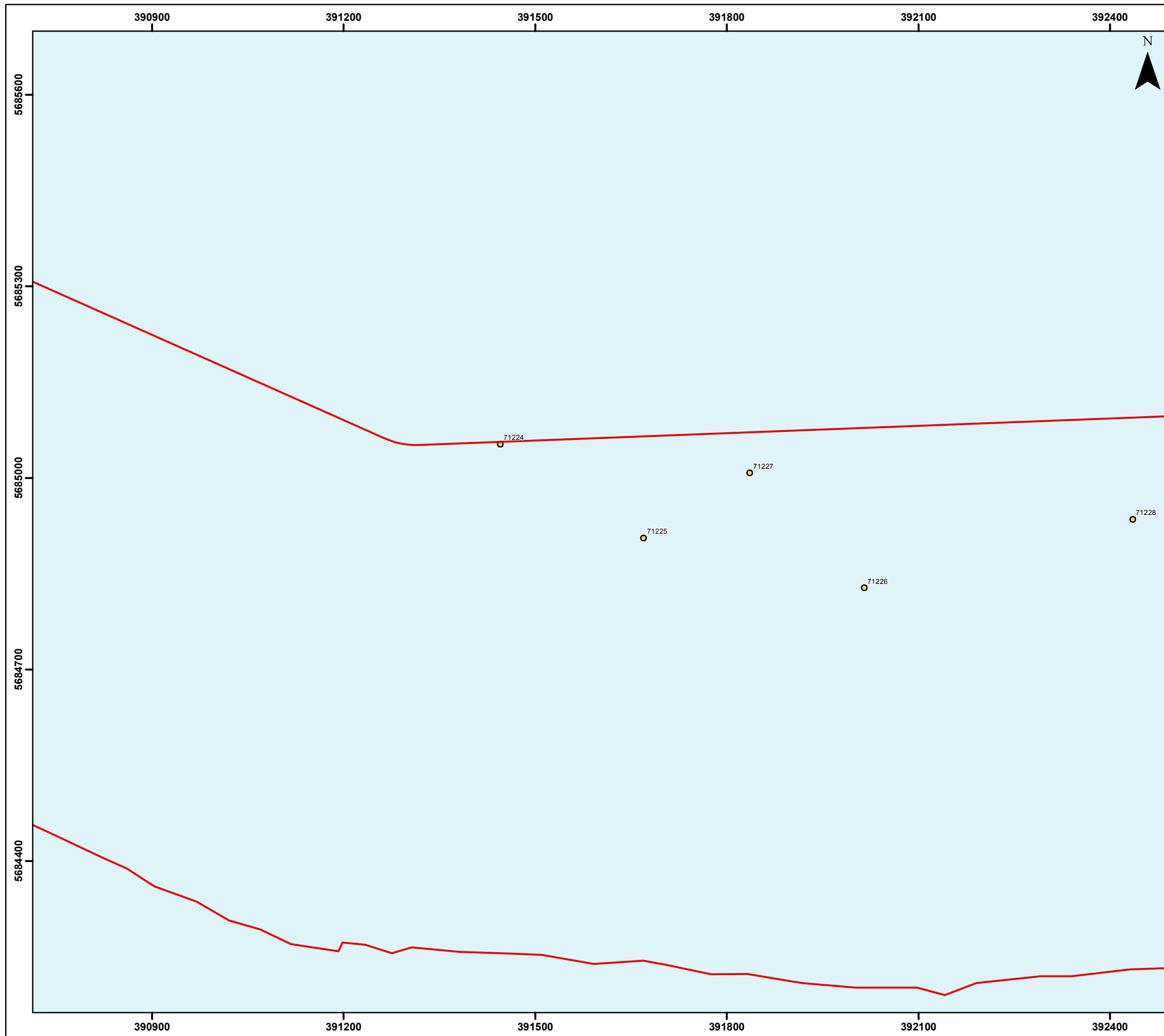
THANET EXTENSION OFFSHORE WIND FARM

Figure 19

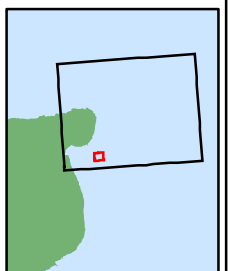
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

- Offshore Red Line Boundary
- A2 – Uncertain origin of possible archaeological interest



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1:6,000 0 0.06 0.12 km 0 0.03 0.06 nm

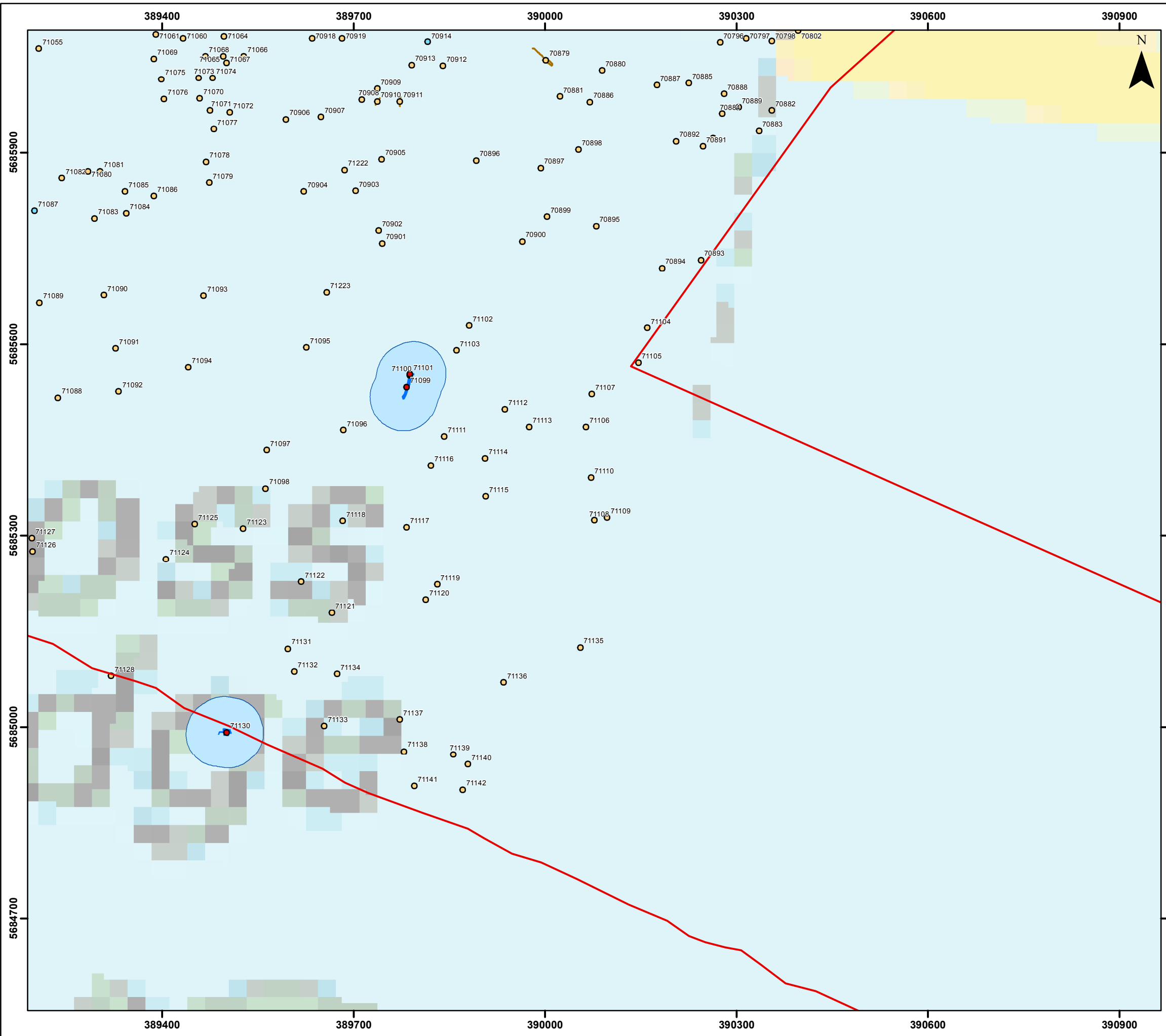
Drg No	Fig_8-26		
Rev	4	Date	04/12/2018
By	KL	Layout	N/A

Figure 19

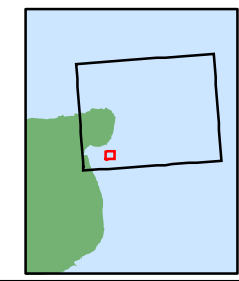
THANET EXTENSION OFFSHORE WIND FARM

Figure 20
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

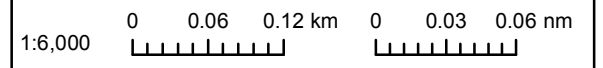
- Legend**
- Offshore Red Line Boundary
 - A1 – Anthropogenic origin of archaeological interest
 - A2 – Uncertain origin of possible archaeological interest
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
 - Linear features
 - Site extents
 - Recommended AEZs



Datum: OSGB 1936
Projection: UTM31N



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Drg No	Fig_8-26			Figure 20
Rev	4	Date	04/12/2018	
By	KL	Layout	N/A	

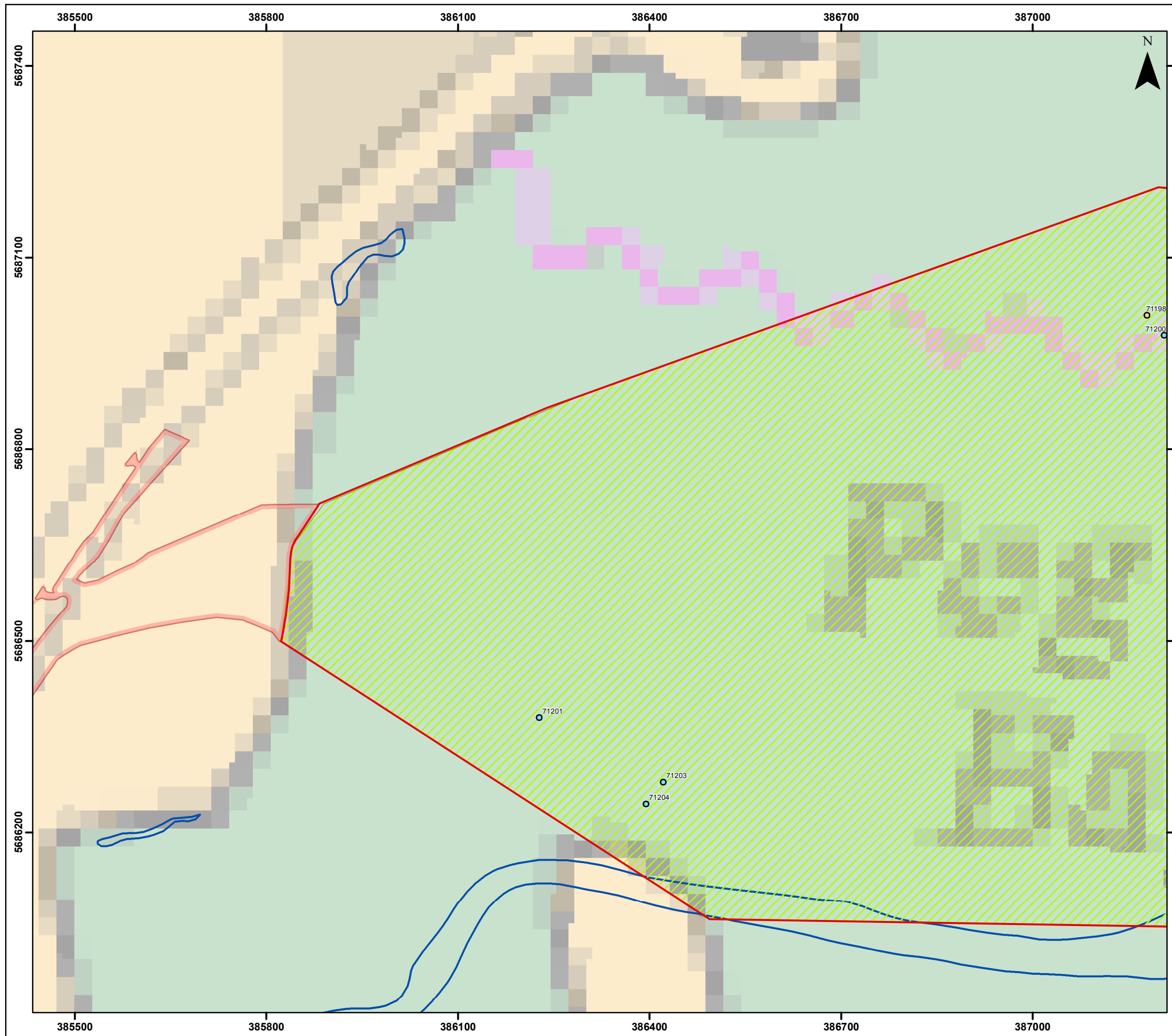
THANET EXTENSION OFFSHORE WIND FARM

Figure 25

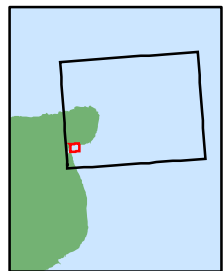
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

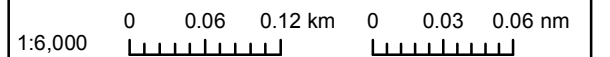
-  Offshore Red Line Boundary
-  Onshore Red Line Boundary
-  A2 – Uncertain origin of possible archaeological interest
-  A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
-  Mean Low Water Mark (MLWM)
-  Area of Archaeological Potential – Pegwell Bay



Datum: OSGB 1936
Projection: UTM31N



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Rev	4	Date	04/12/2018
By	KL	Layout	N/A

Figure 25

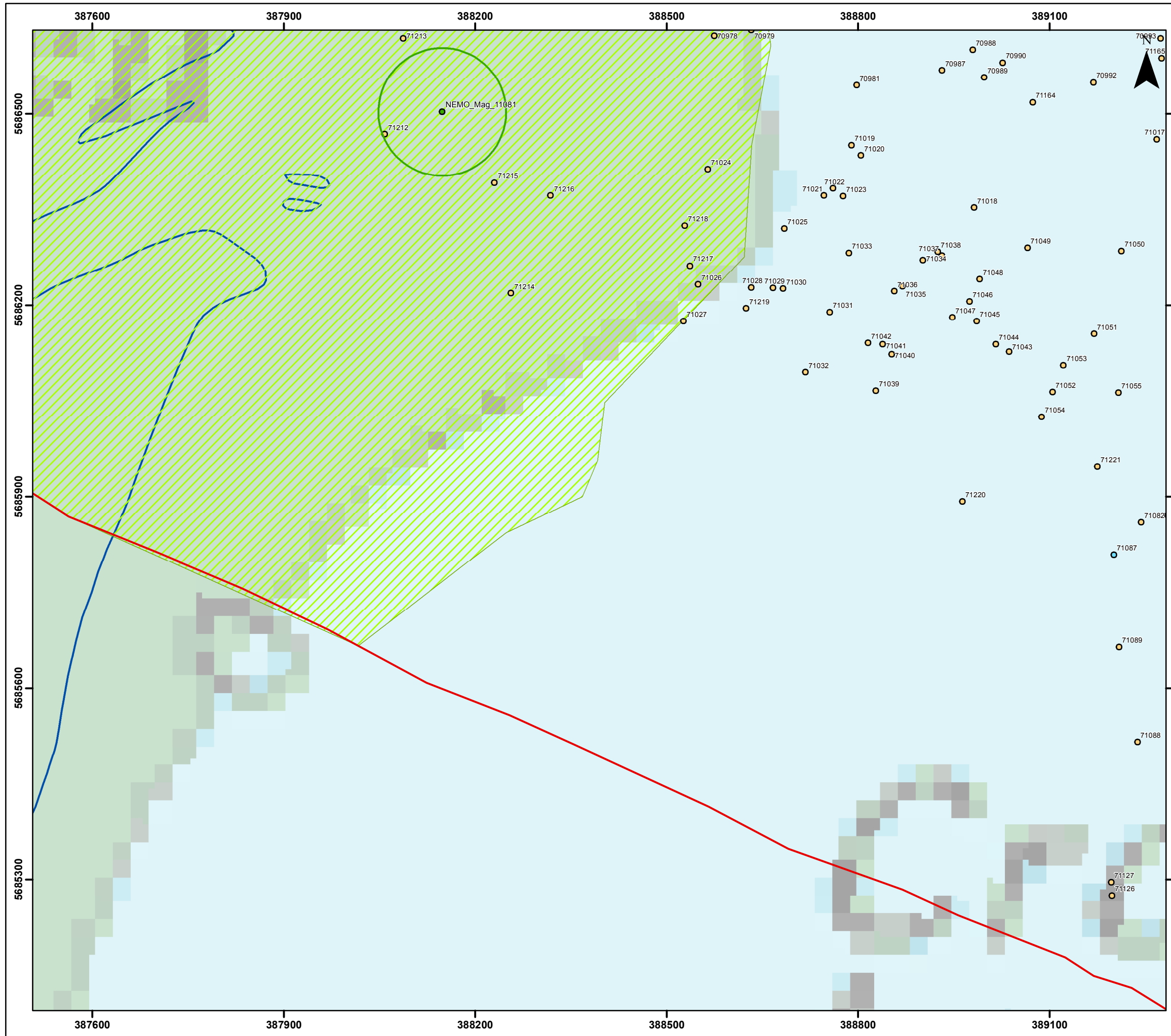
THANET EXTENSION OFFSHORE WIND FARM

Figure 26

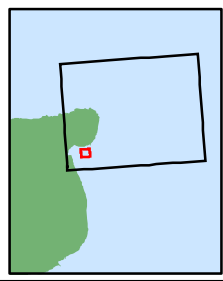
Seabed Features of Archaeological Potential in Data Examples of Seabed Anomalies in TEOWF Cable Corridor

Legend

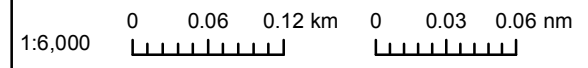
- Offshore Red Line Boundary
- Aircraft material identified during NEMO UXO survey
- 100 m buffer for NEMO_Mag_11081
- A2 – Uncertain origin of possible archaeological interest
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- Site extents
- Mean Low Water Mark (MLWM)
- Area of Archaeological Potential – Pegwell Bay



Datum: OSGB 1936
Projection: UTM31N



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Drg No	Fig_8-26			Figure 26
Rev	4	Date	04/12/2018	
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FS 606559