

# APPENDIX UES18-1

## WRITTEN SCHEME OF INVESTIGATION

ABLE MARINE ENERGY PARK  
(Material Change 2 – TR030006)



ABLE MARINE ENERGY PARK AND COMPENSATION SITE

**WRITTEN SCHEME OF INVESTIGATION:  
COASTAL AND MARINE**

**FINAL**

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For:

**Able UK**

**Ref: 76490.02**

March 2012

## ABLE MARINE ENERGY PARK AND COMPENSATION SITE

## WRITTEN SCHEME OF INVESTIGATION

Ref: 76490.02

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Title:	Able Marine Energy Park and Compensation Site – Written Scheme of Investigation: Coastal and Marine
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Managed by:	Caroline Budd
Origination date:	12/05/2011
Date of last revision:	24/05/2012
Version:	76490
Wessex Archaeology QA:	Caroline Budd
Status:	<b>FINAL</b>
Summary of changes:	Updated to incorporate comments from Andy Hammon (English Heritage, Science Advisor, Yorkshire and the Humber).
Associated reports:	76490; 76491.01
Client Approval:	J Monk

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# ABLE MARINE ENERGY PARK AND COMPENSATION SITE

## WRITTEN SCHEME OF INVESTIGATION: COASTAL AND MARINE

Ref: 76490

### Contents

1	INTRODUCTION.....	4
1.1	PROJECT BACKGROUND .....	4
1.2	DEVELOPMENT PROPOSAL.....	4
2	SUMMARY OF POSSIBLE IMPACTS .....	5
2.1	INTRODUCTION .....	5
2.2	THE NEW QUAY.....	5
2.3	THE BERTHING POCKET, APPROACH CHANNEL AND TURNING AREA.....	8
2.4	COMPENSATION SITE.....	10
3	ROLES RESPONSIBILITIES AND COMMUNICATION .....	11
3.1	ROLES .....	11
3.2	RESPONSIBILITIES .....	12
3.3	COMMUNICATION.....	14
4	ARCHAEOLOGICAL RECORDING, REPORTING, DATA MANAGEMENT AND ARCHIVING .....	16
4.1	ARCHAEOLOGICAL METHOD STATEMENTS.....	16
4.2	INDEXING AND RECORDING SYSTEMS.....	17
4.3	DATA MANAGEMENT .....	18
4.4	POSITION-FIXING AND LEVELLING.....	18
4.5	REPORTS .....	18
4.6	POST-FIELDWORK ASSESSMENT.....	20
4.7	ANALYSIS AND PUBLICATION.....	21
4.8	ARCHIVING .....	21
5	INVESTIGATIONS.....	22
5.1	DESIGN PHASE INVESTIGATIONS .....	22
5.2	CONSTRUCTION PHASE INVESTIGATIONS.....	25
5.3	ARCHAEOLOGICAL MEASURES WITHIN AN ENVIRONMENTAL MONITORING PLAN .....	27
5.4	POST-INVESTIGATION ACTIVITIES.....	27
5.5	HEALTH, SAFETY AND WELFARE .....	29
6	ARRANGEMENTS FOR MONITORING AND REVIEWING THE WSI.....	30
7	REFERENCES .....	30
	APPENDIX 1: ARCHAEOLOGICAL RECORDING LEVELS .....	33
	APPENDIX 2: KNOWN ARCHAEOLOGICAL RECEPTORS.....	35
	SIGNIFICANCE GRADING .....	35
	AMEP SITE.....	35
	COMPENSATION SITE .....	38
	APPENDIX 3: INVESTIGATION METHODOLOGIES.....	50
	FINDS AND ENVIRONMENTAL SAMPLES .....	50
	ENVIRONMENTAL SAMPLING .....	50
	FINDS .....	50
	HUMAN REMAINS, ORDNANCE, MILITARY AIRCRAFT.....	51
	MATERIALS CONSERVATION AND STORAGE.....	52

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ARCHAEOLOGICAL EXCLUSION ZONES: DESIGN AND MONITORING .....	53
LOCATION AND EXTENT OF ARCHAEOLOGICAL EXCLUSION ZONES .....	53
ESTABLISHING NEW ARCHAEOLOGICAL EXCLUSION ZONES .....	53
ALTERING ARCHAEOLOGICAL EXCLUSION ZONES .....	53
MONITORING OF ARCHAEOLOGICAL EXCLUSION ZONES .....	54
MARINE GEOPHYSICAL INVESTIGATIONS .....	54
PLANNING FURTHER GEOPHYSICAL SURVEYS .....	54
UNDERTAKING FURTHER GEOPHYSICAL SURVEYS .....	54
GEOARCHAEOLOGICAL INVESTIGATIONS .....	56
PLANNING FURTHER GEOTECHNICAL SURVEYS .....	56
STAGES OF GEOARCHAEOLOGICAL INVESTIGATION .....	57
DIVER-BASED INVESTIGATIONS .....	58
REVIEW OF DATA COLLECTED BY DIVER SURVEYS .....	58
ARCHAEOLOGICAL DIVER-BASED SITE ASSESSMENT .....	58
DIVING PROCEDURES .....	59
ARCHAEOLOGICAL WATCHING BRIEFS .....	59

# ABLE HUMBER MARINE ENERGY PARK AND COMPENSATION SITE

## WRITTEN SCHEME OF INVESTIGATION: COASTAL AND MARINE

Ref: 76490

### 1 INTRODUCTION

#### 1.1 PROJECT BACKGROUND

- 1.1.1 Wessex Archaeology has been commissioned by Able UK to prepare an archaeological Written Scheme of Investigation (WSI) to accompany the coastal and marine aspects of the Able Marine Energy Park (AMEP) and Compensation Site. The AMEP development area lies on the south bank of the Humber River at Killingholme marshes. The Compensation Site lies on the north bank of the Humber, almost directly opposite the AMEP, at Cherry Cobb Sands.
- 1.1.2 Curatorial comment on the archaeological implications of the development has been provided by English Heritage (EH), North Lincolnshire Council and Humber Archaeology Partnership.
- 1.1.3 This WSI addresses coastal and marine aspects of the development, including land immediately on the coast, intertidal areas and fully sub-tidal areas. Land-based aspects of the development are addressed in a WSI prepared by AC Archaeology.
- 1.1.4 This WSI draws upon the Crown Estate document *Model Clauses for Archaeological Written Schemes of Investigation* and provides a framework and methodologies for additional archaeological work to be undertaken during the design, construction and post-construction phases of the AMEP and Compensation Site.
- 1.1.5 Appendices 1, 2 and 3 and Figure 1 are included at the end of this document.

#### 1.2 DEVELOPMENT PROPOSAL

- 1.2.1 Able UK is proposing to construct a Marine Energy Park which comprises new manufacturing facilities, storage and a new deep water quay at Killingholme marshes (Figure 1). The new deep water quay will enable transportation of wind turbine parts from the manufacturing site to the windfarm on vessels up to 40,000 T with an operational draft of 10 m. In order to accommodate these vessels, the existing approach channel will be deepened, an area for manoeuvring and turning these vessels will be developed, and a new quay with turbine manufacturing and storage facilities will be constructed
- 1.2.2 The relevant marine and coastal works of this project are:
- Removal of compressible silt in the footprint of the new quay by trailing suction hopper dredger (c. 250 000m<sup>3</sup>);
  - Sheet and tubular pile quay wall;
  - Backfilling quay wall with dredged material;
  - Dredging of a berthing pocket (c. 827 000m<sup>3</sup>);
  - Dredging of a turning area (c. 132 000m<sup>3</sup>); and
  - Dredging of an approach channel (c. 682 000m<sup>3</sup>).

- 1.2.3 To compensate for the loss of a significant area of inter-tidal mudflats and sub-tidal habitat a Compensation Site will be developed across the river from the AMEP at Cherry Cobb Sands (Figure 1). This site will provide an equivalent area of new intertidal habitat for protected species in the area.
- 1.2.4 The relevant marine and coastal works of this project are:
- Demolition of a section of seawall at Cherry Cobb Sands;
  - Excavation of surface sediments behind seawall and in front of seawall breach at Cherry Cobb Sands.
- 1.2.5 Selected arisings from the dredging will be disposed of in a Disposal Site to be confirmed.

## **2 SUMMARY OF POSSIBLE IMPACTS**

### **2.1 INTRODUCTION**

- 2.1.1 The area of the AMEP is considered to be an area of archaeological potential. The development of the new quay and the berthing pocket, turning area and approach channel may result in a series of possible impacts on historic environment receptors.
- 2.1.2 The Compensation site will affect land that has been reclaimed from the seas within the past few hundred years and which comprises a thick alluvial deposit. The new works are expected to be too shallow to impact deposits underlying this alluvium and impacts are thus restricted to receptors within the alluvium.
- 2.1.3 These receptors can be broadly divided into palaeo-landsurfaces, maritime archaeology and aviation archaeology, and encompass receptors that are known to be present, and receptors that are as yet unknown but have the potential to be present.

### **2.2 THE NEW QUAY**

- 2.2.1 The new quay frontage will be 1279m in length and located close to the western edge of the existing dredged channel. Direct impacts from construction of the new quay on archaeological sites will arise from the following activities:
- Dredging of alluvium from the reclamation area (c. 294 500m<sup>3</sup>);
  - Excavation of flap anchor trench;
  - Installation of tubular and sheet piles for 1200m of front wall (combi-pile);
  - Rainbowing of fill over flap anchors;
  - Hydraulic fill of reclamation area;
  - Installation of piles to support relieving slab, including jetty;
  - Installation of rock revetment;
  - Relocation of existing outfall to north; and
  - Works associated with existing seawall to north west and south east of new quay.

- 2.2.2 Where horizons with potential to contain archaeological material are to be entirely removed, subsequent activities (e.g. piling; rainbowing of fill; hydraulic fill) in these areas will have no additional direct impact.
- 2.2.3 Adverse direct impacts on the archaeological heritage may arise from intrusive works associated with the activities above, including dredging, piling and excavation. Such works can damage and remove material of archaeological interest and expose it to subsequent processes that will cause decay. Adverse direct impacts may also arise where the import of new materials such as fill or rock for revetment cause compaction to underlying features of archaeological interest and the deposits which currently protect them.
- 2.2.4 Adverse secondary impacts may arise from construction equipment that affects the seabed, notably the spuds/feet of jack-up vessels such as backhoe dredgers and piling rigs.
- 2.2.5 Construction of the new quay is not expected to have any adverse indirect impacts on marine heritage assets through changes in hydrology and sedimentation/ erosion regimes. The Review of the Geomorphological Dynamics of the Humber Estuary (Environmental Statement (ES) Annex 8.2) has concluded that the impact of the proposed quay on local sedimentation is likely to be one of enhanced deposition around the immediate structure, and that away from the proposed quay the combined impact of the development on intertidal and sub-tidal areas will be negligible in comparison with natural variation.
- 2.2.6 Where fill is to be imported, it will be obtained from existing marine aggregate licence areas. Other than these existing licensed areas, no additional extraction is proposed outside the footprint of the Project.
- 2.2.7 Vibrocores VC20 and VC21 within the area of the new quay contain organic material indicative of the presence of prehistoric land surfaces and deposits (Wessex Archaeology, 2011). In addition, recording and sub-sampling has been carried out on 6 core samples from 3 boreholes by WA and the logs of 77 boreholes reviewed (Wessex Archaeology, 2012). This indicated that Pleistocene and Holocene sediments including glacial, alluvial, peat and estuarine alluvial sediments of prehistoric archaeological and palaeoenvironmental interest exist in the area of the Deepwater Frontage of the AMEP.
- 2.2.8 There are two unidentified magnetometer anomalies (sites 28 and 29) and records of three named but as yet unlocated shipwrecks (sites 22, 23 and 24) within the quay area, though as the named shipwrecks are documentary references only, their remains may lie elsewhere (Appendix 2, Figure 1).
- 2.2.9 In the intertidal area adjacent to the existing seawall to the north west of the new quay are four undated alignments of wooden posts (sites 124-127), a brick and tile yard with a jetty first shown on the OS map of 1887 (site 18) and the remains of a jetty (site 19) which may be the remains of the jetty of site 18 (Figure 1).
- 2.2.10 In the intertidal area adjacent to the existing seawall to the south east of the new quay are the jetty (site 16) shown near Killingholme High Lighthouse on C19th OS maps and a post (site 17) which may be the remains of site 16, plus jetties associated with a brick and tile yard / fish processing site shown on earlier OS maps (site 20) and the extant remains of a jetty which may be associated (site 19).
- 2.2.11 There are no known aviation wrecks within the area of the new quay.



2.2.12 In addition to the features that are known from coring, desk-based study and intertidal walkover, there is potential for as yet unknown features and sites to be present in the area of the new quay. These sites range from prehistoric land surfaces, and associated sites, to the remains of boats and ships, from the prehistoric to modern periods, and aircraft crash sites. The anchorage of Whitebooth Roads, off Killingholme, in particular is believed to have been heavily used and a focus for shipping in this stretch of the river.

2.2.13 These sites, if present, could range from low to high sensitivity and, in the case of aviation remains, be subject to automatic legal protection.

2.2.14 The following table summarises impacts on buried landscapes, maritime archaeological sites and aviation archaeology:

Impact from:	Palaeo-land surfaces	Maritime Archaeology	Aviation Archaeology
Dredging of alluvium from intertidal area and excavation of flap anchor trench	<p>Removal and/or exposure of former land surfaces indicated by vibrocores; removal of associated archaeological material.</p> <p>Secondary impacts from dredging equipment, such as jack-up legs of backhoe dredgers.</p>	<p>Removal and/or exposure of boat and shipwrecks possibly indicated by magnetic anomalies.</p> <p>Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts, including remains of documented shipping casualties.</p> <p>Secondary impacts from dredging equipment.</p>	<p>Removal and/or exposure of aircraft wrecks possibly indicated by magnetic anomalies.</p> <p>Removal and/or exposure of as yet unknown aircraft wrecks, wreckage, small features and artefacts.</p> <p>Secondary impacts from dredging equipment.</p>
<p>Installation of tubular piles and sheet piles for new quay and piling to support relieving slab and jetty</p> <p>NB: No further impact from piling if all deposits of archaeological interest removed by dredging / excavation.</p>	<p>Direct damage to former land surfaces and associated archaeological material.</p> <p>Secondary impacts from installation equipment, such as jack-up spuds for piling rigs.</p>	<p>Direct damage to as yet unknown boat and shipwrecks and wreckage.</p> <p>Secondary impacts from installation equipment.</p>	<p>Direct damage to as yet unknown aircraft remains.</p> <p>Secondary impacts from installation equipment.</p>
<p>Rainbowing and hydraulic fill of reclamation area; installation of rock revetment</p> <p>NB: No further impact from fill if all deposits of archaeological interest removed by dredging / excavation.</p>	<p>Compaction of underlying former land surfaces and associated archaeological material.</p>	<p>Compaction of as yet unknown boat and shipwrecks.</p>	<p>Compaction of as yet unknown aircraft remains.</p>

Impact from:	Palaeo-land surfaces		Maritime Archaeology		Aviation Archaeology	
Relocation of outfall and works associated with existing seawall	Removal and/or exposure of former land surfaces indicated by vibrocores; removal of associated archaeological material.		Removal and/or exposure of features indicated by post alignments and former jetties.  Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts, including remains of documented shipping casualties.		Removal and/or exposure of as yet unknown aircraft wrecks, wreckage, small features and artefacts.	
Sensitivity of receptor (if present)	<i>In-situ</i> Prehistoric sites	High	As yet unknown boat and shipwrecks	Low to High	As yet unknown aircraft wrecks (civil)	Low to High
	Submerged landscape features (without associated archaeological material)	Medium	Features indicated by post alignments and former jetties	Low to High	As yet unknown aircraft wrecks (military)	High
	Isolated Prehistoric finds	Medium	Isolated Maritime finds	Medium	Isolated Aviation finds	Medium
	Isolated examples of Palaeo-environmental evidence	Low				
Overall significance	Minor to High Significance		Minor to High Significance		Minor to High Significance	

## 2.3 THE BERTHING POCKET, APPROACH CHANNEL AND TURNING AREA

### 2.3.1 Dredging activities will comprise:

- Capital dredging of berthing pocket in front of quay to the top of natural bedrock. Maximum capital dredge of 9m ;
- Capital dredging to maintained depth of -9m CD in the approach channel. Removal of a maximum of 5.5 m at the northern end of the quay and around 2.5m at southern end.
- Capital dredging to maintained depth of -9m CD in the turning area. Maximum capital dredge of 1.5m.

2.3.2 Adverse direct impacts on the archaeological heritage may arise from dredging, which can damage and remove material of archaeological interest and expose it to subsequent processes that cause decay.

2.3.3 Adverse secondary impacts may arise from construction equipment that affects the seabed, notably the spuds/feet of jack-up vessels such as backhoe dredgers.

- 2.3.4 Dredging is not expected to have any adverse indirect impacts on marine heritage assets through changes in hydrology and sedimentation/ erosion regimes. The Review of the Geomorphological Dynamics of the Humber Estuary (ES Annex 8.2) has concluded that the combined impact of the development on intertidal and sub-tidal areas will be negligible in comparison with natural variation.
- 2.3.5 The arisings from dredging will either be used in the Project or disposed of at existing licensed disposal areas. Other than these existing licensed areas, no additional disposal is proposed outside the footprint of the Project.
- 2.3.6 Vibrocores VC07, VC09 and VC13 within the dredging area, and VC05, VC06, and VC08 adjacent, all contain organic material indicative of the presence of prehistoric land surfaces and deposits.
- 2.3.7 There are three unidentified magnetometer anomalies (sites 27, 30 and 167) in the dredging area.
- 2.3.8 There are no known aviation sites within the dredging area.
- 2.3.9 In addition to the features that are known from coring and desk-based study, there is potential for as yet unknown features and sites to be present in the area of the new quay, ranging from prehistoric land surfaces and associated sites, to hitherto unknown wrecks of boats and ships from the prehistoric to modern periods, to aviation remains. These sites, if present, could range from low to high sensitivity and, in the case of aviation remains, be subject to automatic legal protection.
- 2.3.10 The following table summarises impacts on buried landscapes, maritime archaeological sites and aviation archaeology.

Impact from:	Palaeo-land surfaces		Maritime Archaeology		Aviation Archaeology	
Dredging operations	Removal and/or exposure of former land surfaces indicated by vibrocores; removal of associated archaeological material.  Secondary impacts from dredging equipment, such as jack-up legs of backhoe dredgers.		Removal and/or exposure of boat and shipwrecks possibly indicated by magnetic anomalies.  Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts, including remains of documented shipping casualties.  Secondary impacts from dredging equipment.		Removal and/or exposure of aircraft wrecks possibly indicated by magnetic anomalies.  Removal and/or exposure of as yet unknown aircraft wrecks, wreckage, small features and artefacts.  Secondary impacts from dredging equipment	
Construction of Reinforcement of berthing pocket	None identified		None identified		None identified	
Sensitivity of receptor (if present)	<i>In-situ</i> Prehistoric sites	High	As yet unknown boat and shipwrecks	Low to High	As yet unknown aircraft wrecks (civil)	Low to High

Impact from:	Palaeo-land surfaces		Maritime Archaeology		Aviation Archaeology	
	Submerged landscape features (without associated archaeological material)	Medium	Features indicated by post alignments and former jetties	Low to High	As yet unknown aircraft wrecks (military)	High
	Isolated Prehistoric finds	Medium	Isolated Maritime finds	Medium	Isolated Aviation finds	Medium
	Isolated examples of Palaeo-environmental evidence	Low				
Overall predicted effects	Minor to High Significance		Minor to High Significance		Minor to High Significance	

## 2.4 COMPENSATION SITE

- 2.4.1 Direct impacts on marine archaeological sites from the development of the Compensation Site include the demolition of sections of the existing sea wall, excavation of surface sediments seaward of the seawall and around the seawall breach, and possible damage by construction/ demolition plant accessing the foreshore.
- 2.4.2 Indirect impacts seaward of the seawall may arise as a consequence of erosion of the foreshore arising from the development of drainage channels between the breach and low water.
- 2.4.3 The only apparent features of archaeological interest on the foreshore in the vicinity of the seawall breach are an area of posts (631) and a groyne (507) associated with construction of the seawall. Other posts, groynes and dumped stone may be implicated if demolition / construction activity on the foreshore (e.g. access/tracking) is more extensive.
- 2.4.4 There are no known ship or boat wrecks, palaeo-land surfaces or aviation wrecks seaward of the seawall. There is, however, potential for as yet unknown features and sites to be present ranging from prehistoric land surfaces and associated sites, to hitherto unknown wrecks of boats and ships from the prehistoric to modern periods, to aviation remains. These sites, if present, could range from low to high sensitivity and, in the case of aviation remains, be subject to automatic legal protection.
- 2.4.5 As Cherry Cobb Sands has been reclaimed from the sea in the relatively recent past, it should be noted that excavation of sediments landward of the seawall has the potential to impact as yet unknown archaeological material typically regarded as 'marine' but now beneath dry land. Specifically, direct impacts may occur to the remains of boats, ships and associated maritime infrastructure within the reclaimed land. There are numerous examples of previously unknown but very important boat and ship sites coming to light in the course of excavation of reclaimed land, including sites such as the Bronze Age Brigg 'Raft' and Iron Age Hasholme Logboat in reclaimed land around the Humber.

2.4.6 The following table summarises impacts on palaeo-land surfaces, maritime archaeological sites and aviation archaeology:

Impact from:	Palaeo-land surfaces	Marine Archaeology		Aviation Archaeology	
Demolition of the existing sea wall	None	None		None	
Excavation of sediments seaward of seawall	None	Removal of linear stone dump features seaward of the current seawall. Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts.		Removal and/or exposure of as yet unknown aircraft wrecks, wreckage, small features and artefacts.	
Damage by construction/demolition plant accessing the breach area	None	Potential for direct physical damage of the groynes by construction/demolition plant. Damage to as yet unknown boat and shipwrecks, wreckage, small features and artefacts.		None	
Excavation of sediments landward of seawall	None	Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts.		None	
Erosion of the foreshore arising from the development of drainage channels	None	Removal and/or exposure of as yet unknown boat and shipwrecks, wreckage, small features and artefacts.		Removal and/or exposure of as yet unknown aircraft wrecks, wreckage, small features and artefacts.	
	None	As yet unknown boat and shipwrecks	Low to High	As yet unknown aircraft wrecks (civil)	Low to High
		Features indicated by post alignments and former jetties	Low to High	As yet unknown aircraft wrecks (military)	High
		Isolated Maritime finds	Medium	Isolated Aviation finds	Medium
Overall significance	None	Minor to High Significance		None to High Significance	

### 3 ROLES RESPONSIBILITIES AND COMMUNICATION

#### 3.1 ROLES

3.1.1 For the purposes of the WSI, the following definitions apply:

The Company	Able UK
Agents and Contractors	Organisations and individuals contracted or otherwise instructed by the Company in respect of the design and construction of the AMEP and Compensation Site.
Archaeological Curator	English Heritage, in consultation with the Archaeological Officers of North Lincolnshire Council and Humber Archaeology Partnership.

Retained Archaeologist	The suitably qualified and experienced archaeologist or archaeological organisation employed and retained by the Company as required by the Scheme to supervise the implementation of the Scheme.
Archaeological Contractor(s)	An archaeologist or archaeological organisation employed by the Company to carry out specific archaeological work packages, subject to Method Statements submitted and agreed in accordance with this WSI. There may be more than one Archaeological Contractor.

### **3.2 RESPONSIBILITIES**

#### **The Company**

- 3.2.1 The Company is responsible for implementing this WSI in order to meet its obligations under legal mechanisms attached to consent.
- 3.2.2 The Company will ensure that its Agents and Contractors are aware of this WSI and the requirements and responsibilities it places upon them.
- 3.2.3 The Company will ensure that its Agents and Contractors are contractually bound to implement such elements of the WSI as apply to them.
- 3.2.4 The Company will obtain agreement on archaeological issues from the Archaeological Curator.
- 3.2.5 The Company will afford access to relevant works by the Archaeological Curator, subject to the requirements of health, safety, welfare and environmental protection.
- 3.2.6 The Company will submit archaeological documentation (revisions to this WSI; Method Statements; Archaeological Reports; etc.) to the Archaeological Curator at least four weeks (or as agreed with the Archaeological Curator) in advance of the commencement of actions consequent on the documentation being agreed.
- 3.2.7 The Company will submit archaeological documentation by email to the addresses specified by the Archaeological Curator. The date of submission by the Company will be regarded as the date of receipt by the Archaeological Curator.
- 3.2.8 The Company will retain the services of a suitably qualified and experienced archaeologist or archaeological organisations (the Retained Archaeologist) to ensure the effective implementation of the WSI and any other commitments in relation to archaeology.
- 3.2.9 The Company will contract one or more suitably competent and experienced archaeologists or archaeological organisations (Archaeological Contractor(s)) to undertake archaeological works.

#### **The Company's Agents and Contractors**

- 3.2.10 Agents and contractors under contract for the delivery of the Marine Energy Park and Compensation Site will ensure that project personnel are aware of this WSI and of the requirements and responsibilities it places upon them, including:
- Obeying legal obligations in respect of 'wreck' and 'treasure' under the Merchant Shipping Act (1995) and the Treasure Act (1996) respectively;
  - Respecting constraint maps and any Archaeological Exclusion Zones that are established;

- Assisting and affording access to the Archaeological Curator, the Retained Archaeologist and/or Archaeological Contractors, subject to the requirements of health, safety, welfare and environmental protection;
- Informing the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to archaeologists' activities;
- Implementing the Dredge Reporting Protocol and ensuring that lines of communication are maintained.

### **Archaeological Curator**

- 3.2.11 The Archaeological Curator will carry out their activities in accordance with the Codes, Standards and Guidance of the Institute for Archaeologists;
- 3.2.12 The Archaeological Curator will respond to all documentation within four weeks of receipt, or as agreed with the Company.
- 3.2.13 The Archaeological Curator will attend regular meetings and site visits at appropriate intervals to monitor progress of all aspects of the relevant works which arise from the implementation of this WSI.
- 3.2.14 On completion of works, all documentation must be approved by the Archaeological Curator who will also be responsible for confirming that all conditions have been fulfilled.

### **The Retained Archaeologist**

- 3.2.15 The responsibilities of the Retained Archaeologist will include:
- Ensuring that any archaeological activities implemented by the Retained Archaeologist on instruction from the Company are in accordance with the Codes, Standards and Guidance of the Institute for Archaeologists;
  - Maintaining, reviewing and updating this WSI as required by the Company in agreement with the Archaeological Curator;
  - Advising the Company's Agents and Contractors on the implementation of this WSI;
  - Advising the Company's Agents and Contractors on relevant works that warrant archaeological involvement;
  - Advising the Company's Agents and Contractors on specifications for site investigations and surveys that might be capable of generating data of archaeological relevance;
  - Advising the Company on the necessary interaction with third parties with archaeological interests, including the Archaeological Curator;
  - Advising the Company on material that relates or refers to archaeology for public dissemination;
  - Advising the Company on the implementation of generic archaeological requirements applicable to all construction activities;
  - Advising the Company on Method Statements for archaeological works;
  - Ensuring that the Company copies Method Statements to the Archaeological Curator;



- Reviewing works carried out by Archaeological Contractor(s) and advising the Company on the results;
- Monitoring the preparation and submission of Archaeological Reports and ensuring that they are copied to the Archaeological Curator for agreement prior to completion;
- Implementing and monitoring the Dredge Reporting Protocol;
- Advising the Company, its Agents and Contractors on the implementation and reporting of the Monitoring Scheme;
- Instituting regular meetings with the Company, Archaeological Curator and Archaeological Contractor(s) to enable monitoring of the implementation of this WSI;
- Advising the Company on any additional work required to stabilise, conserve or record recovered finds;
- Advising the Company and liaising with the Archaeological Curator on the implementation of procedures for resolving ownership and for disposing of any finds;
- Preparing provisions for the management of the project archive in consultation with the appropriate Museum.

### **Archaeological Contractor(s)**

3.2.16 The responsibilities of Archaeological Contractor(s) will include:

- Carrying out archaeological activities contracted by the Company in accordance with the Codes, Standards and Guidance of the Institute for Archaeologists;
- Conducting archaeological activities in accordance with the relevant Method Statement and the provisions of this WSI;
- Facilitating access to archaeological investigations – both in the field and elsewhere – by the Company, the Retained Archaeologist, the Archaeological Curator, and other Archaeological Contractors, subject to the requirements of health, safety, welfare and environmental protection;
- As directed by the Retained Archaeologist, attending meetings with the Company, the Retained Archaeologist, the Archaeological Curator, and/or other Archaeological Contractors;
- Immediately informing the Retained Archaeologist of the discovery of any sensitive material, including previously unknown sites, human remains and ordnance;
- Immediately informing the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to their activities;
- Acknowledging and responding to any environmental constraint or matter relating to health, safety and welfare of which they are informed by the Company, its agents or contractors, or the Retained Archaeologist.

## **3.3 COMMUNICATION**

3.3.1 This section outlines the mechanisms for communication between the Company, the Archaeological Curator and the Retained Archaeologist. Their principal contacts are as follows:



The Company	Able UK	Jonathan Monk
Archaeological Curator	English Heritage	Ian Smith, English Heritage Yorkshire and the Humber
		Andy Hammon, English Heritage Yorkshire and the Humber
		Chris Pater, English Heritage Maritime Team
	North Lincolnshire Council	Alison Williams
	Humber Archaeology Partnership	David Evans
Retained Archaeologist	TBC	TBC

- 3.3.2 Interaction with the construction team (or any other party contracted for the delivery of the development) will be administered by the Company, advised by the Retained Archaeologist.
- 3.3.3 Interaction with the Archaeological Curator will be administered by the Company, advised by the Retained Archaeologist.
- 3.3.4 On instruction from the Company, the Retained Archaeologist may liaise directly with the Archaeological Curator, subject to the Company being informed of all such direct liaison.
- 3.3.5 Unless otherwise agreed, the Company will notify the Archaeological Curator four weeks in advance of:
- work timetables;
  - the commencement of works that may impact the historic environment;
  - the completion of works that may impact the historic environment; and
  - changes to work timetables and the commencement and completion of works.
- 3.3.6 Unless otherwise stated in this WSI, or agreed between the Company and the Archaeological Curator, the Company and the Archaeological Curator will have four weeks within which to agree documentation or actions as provided for by this WSI. Where no further communication has been received within four weeks, agreement will be considered to have been reached.
- 3.3.7 The Company and the Archaeological Curator may agree a shorter or longer period within which a specific item or type of documentation or action is to be agreed, or be considered to have been agreed.
- 3.3.8 Where commencement of a relevant work under the consent is subject to the Company securing implementation of a programme of archaeological works, the Archaeological Curator will confirm in writing that such implementation has been secured, on submission by the Company of appropriate evidence.

#### **Meetings between Company and Archaeological Curator**

- 3.3.9 Regular meetings will be held between the Company and the Archaeological Curator to enable monitoring of the implementation of this WSI.

- 3.3.10 Meetings will be attended by the Retained Archaeologist and – as relevant – by Archaeological Contractor(s).
- 3.3.11 By agreement in advance, the Company and the Archaeological Curator may arrange for the attendance at meetings of other parties.
- 3.3.12 The schedule (frequency / timescale) of meetings will be agreed between the Company and the Archaeological Curator.
- 3.3.13 The Company will provide for the circulation in advance of an agenda for each meeting, and for the preparation and circulation of meeting notes.

## **4 ARCHAEOLOGICAL RECORDING, REPORTING, DATA MANAGEMENT AND ARCHIVING**

### **4.1 ARCHAEOLOGICAL METHOD STATEMENTS**

- 4.1.1 Each package of archaeological works will be subject to a Method Statement that is consistent with this WSI. Method Statements will be prepared for the Company either by the Retained Archaeologist or by Archaeological Contractors monitored by the Retained Archaeologist on behalf of the Company.
- 4.1.2 The Company will submit each Method Statement (including generic and specific Method Statements, and varied and updated Method Statements) to the Archaeological Curator at least four weeks in advance of the archaeological works commencing, or as agreed between the Company and the Archaeological Curator.
- 4.1.3 The Archaeological Curator will confirm that they have agreed each Method Statement within four weeks of receipt.
- 4.1.4 Archaeological works will not commence unless the Archaeological Curator has confirmed their agreement of the Method Statement, or a period of four weeks has elapsed since submission.
- 4.1.5 Method Statements will include provision for the Archaeological Curator to monitor the conduct of the archaeological work as appropriate, including site visits, interim statements and/or meetings with the Company, the Retained Archaeologist and the Archaeological Contractor.
- 4.1.6 Unless otherwise agreed by the Company and the Archaeological Curator, Method Statements will address the following matters:
- form of commission and contractual relationship with the Company;
  - context in terms of relevant construction works;
  - summary results of previous archaeological investigations in the vicinity;
  - archaeological potential;
  - specific objectives of archaeological works;
  - extent of investigation;
  - investigation methodology, to cover:
    - intrusive methods;
    - recording system;
    - finds, including provision for immediate conservation and storage; and

- environmental sampling strategy.
  - anticipated post-investigation actions, including processing, assessment and analysis of finds and samples;
  - reporting, including Intellectual Property Rights in the report and associated data, confidentiality and timescale for deposition of the report in a publicly accessible archive;
  - timetable, to include investigation and post-investigation actions;
  - monitoring arrangements, including monitoring by Archaeological Curators;
  - health, safety and welfare and;
  - arrangements for adhering to any Environmental Management Plan.
- 4.1.7 All Method Statements will adhere to, and reference, EH best practice guidance such as:
- England's coastal heritage: A statement on the management of coastal archaeology (1996);
  - Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (2002)
  - Military Aircraft Crash Sites – Archaeological guidance on their significance and future management (2002);
  - MoRPHE Project Planning Note 1: Marine Archaeological Geophysical Survey (2006)
  - Geoarchaeology: using earth sciences to understand the archaeological record (2007)
  - Conservation Principles: policies and guidance (2008)
- 4.1.8 A list of available guidance can be found on the *Historic Environment Local Management* website at [REDACTED]

## 4.2 INDEXING AND RECORDING SYSTEMS

- 4.2.1 All archaeological recording will be based on a series of unique site identifiers that are cross-referenced to the identifiers used in pre-consent investigations (e.g. within the PEIR and ES).
- 4.2.2 All archaeological finds and deposits will be recorded using a pro forma recording system, based on a running matrix of assigned contexts for each site. Numbers will be allocated in blocks that are unique to that site. A number log will be maintained.
- 4.2.3 All archaeological finds and deposits will be added, as appropriate, to a Geographic Information System (GIS) maintained by the Retained Archaeologist. Summary details and archaeological constraints (including Archaeological Exclusion Zones (AEZs)) will also be added to the scheme GIS maintained by the Company.
- 4.2.4 A full photographic record will be maintained using digital, video and stills photography as appropriate. Recovered material will be subject to photographic recording by digital stills, monochrome prints and colour transparencies as

appropriate. Additional illustrative photographs will be taken as appropriate and a register of the photographic record will be maintained.

#### **4.3 DATA MANAGEMENT**

- 4.3.1 All data in digital formats will be considered part of the primary archive and will be prepared in accordance with the guidance in *Digital Archives from Excavation and Fieldwork: Guide to Good Practice* (Richards and Robinson, 2000).
- 4.3.2 All data will be stored on a suitable safe medium and protected from accidental or deliberate harm.
- 4.3.3 Provisions for digital data will accord with procedures recommended by the relevant Archaeological Curators. Digital material will be subject to managed quality control and curation processes which will embed appropriate metadata within the material and ensure its long term accessibility.
- 4.3.4 Summary data will be compiled in a format suitable for submission of Monument, Event and Source records to the relevant National Monument Record and Local Historic Environment Record (HER).
- 4.3.5 Survey data relating to wrecks should be submitted to UKHO using form H525.
- 4.3.6 On completion of scheme construction, an OASIS form will be produced for the whole scheme, and copies of all archaeological reports will be attached as data files. Notification of the completion of the OASIS form will be sent to relevant local HERs, and the English Heritage Marine Planning Unit to enable compliance with any relevant consent.

#### **4.4 POSITION-FIXING AND LEVELLING**

- 4.4.1 The spot height of all principal features and levels will be calculated in metres relative to Ordnance Datum, correct to two decimal places. Plans, sections and elevations will be annotated with spot heights as appropriate.
- 4.4.2 Levels of principal features and of the seabed/land surface will be converted to metres relative to Chart Datum.
- 4.4.3 Position-fixing will be related to British National Grid.
- 4.4.4 Position-fixing will be by GPS, either by hand-held unit (on land; intertidal areas); by reference to vessel navigation systems; or by dedicated survey equipment.
- 4.4.5 On land and in intertidal areas, levels will be obtained by Total Station or by RTK (Real Time Kinematic) GPS.
- 4.4.6 Position-fixing during diver-based investigations will be determined by acoustic tracking system linked to GPS.
- 4.4.7 The methods and likely accuracy of position-fixing and levelling will be stated in Archaeological Reports.

#### **4.5 REPORTS**

- 4.5.1 Each package of work will give rise to one or more Archaeological Reports, as set out in the Method Statement relating to the work and in accordance with the WSI.

- 4.5.2 Each Archaeological Report will satisfy the Method Statement for the investigation and will present the project information in sufficient detail to allow interpretation without recourse to the project archive.
- 4.5.3 Archaeological reports will be prepared in accordance with the guidance given in the relevant IfA's Standards and Guidance documents. Reports will typically include:
- 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; and
  - illustrations and appendices to support the report.
- 4.5.4 Illustrations will include a plan of the area subject to investigation in relation to the development scheme.
- 4.5.5 Each Archaeological Report will be submitted in draft to the Retained Archaeologist for submission to the Developer. If the report is prepared by the Retained Archaeologist it will be submitted directly to the Developer. The Retained Archaeologist will forward draft reports to the Archaeological Curator.
- 4.5.6 The Archaeological Curator will make any comments about draft Archaeological Reports to the Retained Archaeologist within four weeks of receiving the Archaeological Report. Where comments are received or a period of four weeks (or as otherwise agreed) has elapsed since submission, the draft will be amended to form a final Archaeological Report. Copies of the final Archaeological Report will be sent to the Archaeological Curator.
- 4.5.7 Archaeological works will not be regarded as complete until a final Archaeological Report has been sent to the Archaeological Curator.
- 4.5.8 On completion of archaeological works relating to construction of the scheme and to a timetable agreed with the Developer and Archaeological Curators, an overarching report on the archaeology of the scheme will be prepared in draft and final copies in accordance with the methods set out above. The overarching report need not repeat the details contained in each preceding report, but should serve as an index to, and summary of, the archaeological investigations as a whole and a synthesis of the results.
- 4.5.9 Draft and final Archaeological Reports may be submitted in pdf format. Final Archaeological Reports must also be submitted in hard copy: one copy for the Retained Archaeologist; two copies for the Company; and a further three copies for forwarding to Archaeological Curators.
- 4.5.10 Full copyright of each report shall be retained by the originator under the Copyright, Designs and Patents Act 1988 with all rights reserved, excepting that:
- the Developer will be licensed to use each report in all matters directly relating to the scheme;
  - the Developer will be licensed to make each report available for public dissemination as part of the dissemination measures; and

- at an appropriate time, the Developer will submit the reports to the appropriate National repositories with full usage rights to make accessioned material publicly available as part of their normal functions.
- 4.5.11 Except where further analysis and publication are to take place (see below), a note based on the overarching report should be published in at least one appropriate peer-reviewed local, national, thematic or period-based journal. The note will signpost the availability of further details of the investigations, including reports, records and archives.

#### **4.6 POST-FIELDWORK ASSESSMENT**

- 4.6.1 Post-fieldwork assessment will address, where possible, the character and extent, date, integrity, state of preservation and relative quality of the archaeological features or remains of the recorded archaeology, and provide a costing for any further research, analysis, publication and archiving (including the costs of depositing the archive).
- 4.6.2 Decisions regarding the scope of post-fieldwork assessment will be made by agreement between the Company and Archaeological Curators following submission of Archaeological Reports, based on the possible importance of the results in terms of their contribution to archaeological knowledge, understanding or methodological development.
- 4.6.3 As a minimum, a single post-fieldwork assessment may be carried out in respect of the investigations associated with the scheme as a whole. Such an assessment may be carried out by expanding the overarching archaeological report to include proposals in respect of analysis, publication and archiving.
- 4.6.4 An assessment of the potential of the archive for further analysis will be undertaken. The assessment phase may include (but is not limited to) the following elements:
- the conservation of appropriate materials, including the X-raying of metalwork;
  - the spot-dating of all pottery from any investigation. This will be corroborated by the scanning of other categories of material;
  - the preparation of Site matrices with supporting lists of contexts by type, by spot-dated phase and by structural grouping supported by appropriate scaled plans;
  - an assessment statement will be prepared for each category of material, including reference to quantity, provenance, range and variety, condition and existence of other primary sources;
  - a statement of potential for each material category and for the data set as a whole will be prepared, including specific questions that can be answered and the potential value of the data to local, regional and national investigation priorities.
- 4.6.5 Where warranted by – for example – the investigation of an important site, a discrete post-fieldwork assessment may be undertaken of the specific sites or investigations in advance of assessment of the investigations associated with the scheme as a whole. A discrete post-excavation assessment may also be undertaken where there is a need to inform excavation and sampling strategies.
- 4.6.6 Post-fieldwork assessment reports will be prepared in a manner consistent with that outlined above.



#### 4.7 ANALYSIS AND PUBLICATION

- 4.7.1 On the basis of post-fieldwork assessment, and as agreed by the relevant local or national Archaeological Curators, mitigation requirements will be satisfied by carrying out analysis of the post-fieldwork assessment to include publication of important results in a recognised peer-reviewed journal or as a monograph.
- 4.7.2 Other forms of publication (e.g. 'popular publication', internet publishing, and publication of photographs, videos etc. on digital media or online) may be employed where appropriate. The scope of any such publication will be informed by the post-fieldwork assessment and subject to agreement between the Developer and the relevant Archaeological Curators.

#### 4.8 ARCHIVING

- 4.8.1 It is accepted practice to keep project archives, including written, drawn, photographic and artefactual elements (together with a summary of the contents of the archive) together wherever possible and to deposit them in appropriate receiving institutions once their contents are in the public domain.
- 4.8.2 Data obtained from the terrestrial, inter-tidal and sub-tidal areas will be compiled in a format suitable for submission of Monument, Event and Source records to the following records, as relevant:
- the National Record of the Historic Environment (NRHE formerly NMR) maintained by English Heritage;
  - the HER maintained by North Lincolnshire Council;
  - the Historic Environment Record (HER) maintained by Humber Archaeology Partnership.
- 4.8.3 The receiving institutions will be notified of any archaeological investigation in advance of fieldwork. Any specific requirements relating to the preparation and deposition of project archives raised by archaeological contractors will be accommodated as appropriate. The Archaeological Contractor, through the Company, will inform the Archaeological Curators of arrangements for archiving.
- 4.8.4 Event records for HER's for archaeological works will be created using OASIS (Online AccesS to the Index of archaeological investigationS) records for each discrete package of archaeological works (normally corresponding to a Method Statement).
- 4.8.5 Best practice should be adhered to in line with Archaeology Archives Forum, Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation (Brown, 2007) and IfA, Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives (2009).
- 4.8.6 Where appropriate, reference should also be made to: *Museums and Galleries Commission, Standards in the Museum Care of Archaeological Collections* (1992); Society of Museum Archaeologists, *Retention and Dispersal of Archaeological Collections; Guidelines for use in England, Wales and Northern Ireland* (1993); Institute for Conservation (ICON), *Conservation Guidelines No. 3: environmental standards for the permanent storage of excavated material from archaeological sites* (1993) and; Walker, K., *Guidelines for the preparation of excavation archives for long-term storage* (1990).

- 4.8.7 In the course of developing Method Statements for archaeological investigations that are likely to result in artefacts etc. being added to the project archive, the Archaeological Contractor will contact an appropriate receiving institution to discuss the intended fieldwork and seek their agreement to accept the project archive for long-term storage and curation. An Accession Number will be sought for the project archive.
- 4.8.8 The relevant Archaeological Curators and the Archaeological Contractor will agree with the receiving institution a policy for the selection, retention and disposal of excavated material, and confirm requirements in respect of the format, presentation and packaging of archive records and materials, and will notify the receiving institution in advance of any fieldwork.
- 4.8.9 Written archives will be on clean, stable materials, and will be suitable for photocopying. The materials used will be of the standard recommended in Guidelines for the Preparation of Excavation Archives for Long-term Storage (Walker, 1990).
- 4.8.10 The timetable for depositing archives with the receiving institution after completion of the post-fieldwork programme will be agreed based on a Method Statement prepared for the Company by the Archaeological Contractor following fieldwork.

## **5 INVESTIGATIONS**

### **5.1 DESIGN PHASE INVESTIGATIONS**

- 5.1.1 Investigations will be carried out during the Design Phase to supplement archaeological information identified by studies carried out prior to submission of the licence application. Design Phase Investigations will inform the detailed design of archaeological mitigation to take place during and after construction of the Marine Energy Park and Compensation Site.
- 5.1.2 Design Phase Investigations will take place ‘pre-construction’ and may include:
- Review of existing geophysical data;
  - Acquisition and interpretation of additional geophysical data;
  - Geoarchaeological investigation, including the development of a deposit model taking account of previous work;
  - Additional documentary research notably into the brick and tile yards and historic shipping records relating to the anchorage of Whitebooth Roads (off Killinghome);
  - Investigation of unidentified foreshore sites;
  - Diver-based investigations of geophysical anomalies;
  - Development of dredge reporting protocol.
- 5.1.3 Towards the end of the Design Phase Investigations, this WSI will be revised on the basis of their results. The revised WSI will set out a Mitigation Programme comprising such Construction Phase Investigations and other mitigatory actions as are required. The revised WSI, including the Mitigation Programme, will be agreed between the Company and the Archaeological Curator.



- 5.1.4 All investigations will accord with methodologies to be advised by the Retained Archaeologist and set out in Method Statements. Methodological recommendations are included in Appendix 3.

#### **Review of existing geophysical data**

- 5.1.5 The results of a single beam echo sounder survey, magnetometer survey and sub-bottom survey conducted by Emu Limited for Vinci Construction in 2010 have been drawn upon in the course of the AMEP EIA (Emu 2010). Although Emu's report was made available, the geophysical data itself was not available and has not been interpreted archaeologically. However, should this data become available, then archaeological interpretation is recommended, subject to an audit of its suitability for the purpose.

#### **Acquisition and interpretation of additional geophysical data**

- 5.1.6 It is noted that no sidescan sonar survey was undertaken in the course of the Emu survey, though such a survey and/or diving was subsequently recommended by Emu in order to identify the sources of magnetometer anomalies (Emu 2010 section 4.2). In the event that further geophysical investigations are carried out in the course of the design phase archaeological input to the specification of such survey and archaeological interpretation of the resulting datasets, would be advisable.
- 5.1.7 Due to the prohibitive effects of the prevailing environmental conditions within the Humber Estuary, side-scan sonar is likely to be preferable to diver surveys.

#### **Geoarchaeological investigations**

- 5.1.8 Previous geotechnical investigations have been subject to archaeological review including archaeological recording and sub-sampling of retained cores by WA (Wessex Archaeology, 2011; 2012). This work has indicated the following sequence of sediments:
- Chalk bedrock (Unit 1);
  - Devensian glacial till (Unit 2);
  - Glacial and alluvially derived silty ravel and sands (Unit 3/4);
  - Holocene peat (Unit 5);
  - Holocene estuarine alluvial and tidal flat deposits (Unit 6).
- 5.1.9 Potential for *in situ* archaeological and palaeoenvironmental material is considered possible on the surface of Unit 2 although Units 5 and 6 represent the best potential (Wessex Archaeology, 2012). Deposited within saltmarsh, estuarine and tidal flat environmental, these deposits are considered likely to date from Later Prehistory (Neolithic or Bronze Age) to more recent historic periods. Within Unit 6, the types of archaeology which may be present include foreshore infrastructure such as fish traps or jetties, or even boat or ship remains. Derived (reworked) material may also be present within Units 3/4.
- 5.1.10 Following this work, it is recommended that the sediments that have been geoarchaeologically recorded and sub-sampled are subjected to Stage 3 (see Appendix 3: Geoarchaeological Investigations) palaeoenvironmental assessment and scientific dating. This would include assessment for:
- pollen;

- diatoms;
  - foraminifera;
  - ostracods;
  - plant macrofossils and charcoal;
  - insects;
  - molluscs; and
  - 14C dating.
- 5.1.11 If present it is envisaged that these palaeoenvironmental remains in conjunction with scientific dating would help enhance the archaeological understanding of the sedimentary sequence, particularly regarding the later prehistoric Humber wetland environments in the AMEP area.
- 5.1.12 In addition, it is noted that there are a number of geotechnical and geophysical datasets relating to the AMEP project and it is possible that geoarchaeological interpretation of these may further enhance the archaeological and palaeoenvironmental interpretation of the area. As a first stage, an assessment of the quality, size and scope of these datasets and their potential archaeological utility would be necessary.

#### **Documentary research**

- 5.1.13 Further documentary research will be undertaken with respect to:
- the brick and tile yards the within the AMEP footprint; and
  - historic records of shipping in the Humber and Whitebooth Roads.
- 5.1.14 The results of the research will both inform the design phase and provide context for any discoveries made during archaeological investigations or during the AMEP and Compensation Area construction phase.

#### **Foreshore investigations**

- 5.1.15 Further survey and research will be undertaken with respect to:
- the post alignment features on the edge of the reed beds; and
  - the possible jetties identified at the low water mark.
- 5.1.16 Additional works will include detailed survey, recording and sampling. Analysis of the posts (including wood species identification, origin and date) will facilitate assessment of the sites' archaeological importance. Test pits or small area excavations may assist with establishing extent, level of survival and function.

#### **Diver-based investigations**

- 5.1.17 Archaeological diver-based investigations may be employed in order to gather archaeological data concerning wreck sites and geophysical anomalies. This data may be used to enhance the archaeological record, to alter (enlarge, reduce, move or remove) archaeological exclusion zones, or to provide a foundation for further archaeological recording or excavation.

- 5.1.18 No diver-based investigations have yet taken place in respect of the AMEP and Compensation Site, though Emu noted that diving may be required in order to identify the sources of magnetometer anomalies (Emu 2010 section 4.2).
- 5.1.19 Diver-based investigations may take place as part of the Design Phase Investigations. Any proposals for diver-based investigations will be made following review of existing or new geophysical data (see above).

#### **Development of Dredge Reporting Protocol**

- 5.1.20 Protocols for Archaeological Discoveries (PADs) are systems of monitoring for unexpected or incidental finds relating to the historic environment.
- 5.1.21 Industry led protocols include the British Marine Aggregate Producers Association (BMAPA) *Protocol for the Reporting of Finds of Archaeological Interest* (2005), which has been applied across the marine aggregates industry since 2005, and the Crown Estate *Protocol for Archaeological Discoveries*, which came into effect for offshore renewables projects in December 2010.
- 5.1.22 As part of the Design Phase, a Reporting Protocol will be developed and agreed by the Company and Archaeological curator. Although existing protocols may be used as a basis, the design may need to be refined to reflect the results of archaeological investigations during the Design Phase, and taking account of the specific design and contractual arrangements relating to dredging and excavation works.

5.1.23

## **5.2 CONSTRUCTION PHASE INVESTIGATIONS**

- 5.2.1 Construction Phase Investigations will provide mitigation where preservation *in situ* cannot be achieved, and will include investigations in advance of construction as well as investigations during construction. The scope of Construction Phase Investigations will be established and agreed towards the end of the Design Phase Investigations, and included in the Mitigation Programme within a revised WSI.
- 5.2.2 Pre-construction investigations will be informed by Design Phase Investigations, and may include:
- archaeological excavation; and
  - recording and recovery of archaeologically important material.
- 5.2.3 Archaeological investigations during construction will include:
- implementation of Dredge Reporting Protocol; and
  - investigations in response to discoveries arising from Dredge Reporting Protocol.
- 5.2.4 Archaeological investigations during construction may also include:
- intertidal watching briefs;
  - marine-based watching briefs; and
  - investigations in response to discoveries arising from watching briefs.

- 5.2.5 Towards the end of the Construction Phase investigations, a major revision to this WSI will be prepared, to include an overarching programme of Post-Investigation Activities to be agreed between the Company and the Archaeological Curator.
- 5.2.6 All investigations will accord with methodologies to be advised by the Retained Archaeologist and set out in Method Statements. Methodological recommendations are included in Appendix 3.

#### **Archaeological Excavation, Recording and Recovery**

- 5.2.7 Archaeological excavations may be required if the project design cannot accommodate preservation *in situ* of known archaeological sites or if pre-construction investigations reveal the presence of sites of archaeological importance that require further investigation. This approach is commonly referred to as 'preservation by record'.

#### **Implementation of Dredge Reporting Protocol**

- 5.2.8 The Dredge Reporting Protocol developed during the Design Phase will be applied during all dredging and excavation works associated with the Construction Phase of both the AMEP and Compensation Site.
- 5.2.9 The Protocol sets out the procedures for reporting discoveries of potential archaeological interest made during the Construction Phase.
- 5.2.10 Where discoveries are made, the Protocol makes provision for the temporary cessation of works in the vicinity of the discovery, call-out investigations and such other actions as may be necessary.
- 5.2.11 Where the presence of important archaeological material is confirmed, works will not resume in the vicinity of the discovery without the approval of the Archaeological Curator.

#### **Watching Briefs**

- 5.2.12 Provision may be made for archaeological watching briefs to take place during phases of construction that are expected to impact deposits identified as having archaeological potential (coastal, intertidal or marine).
- 5.2.13 Provision will be made by the Company for temporary cessation of works in the immediate area of any important archaeological material that comes to light in the course of a watching brief. Where the presence of important archaeological material is confirmed, works will not resume in the vicinity of the discovery without the approval of the Archaeological Curator.
- 5.2.14 Provision will be made to carry out call-out works to investigate any important archaeological material that comes to light in the course of a watching brief, and to institute suitable mitigation as agreed with the Archaeological Curator.

#### **Call-out investigations in response to discoveries**

- 5.2.15 Provision will be made to carry out archaeological investigations in response to call-outs arising from discoveries made through:
- the Reporting Protocol; and
  - coastal/intertidal/marine watching briefs.

5.2.16 Call-out investigations will include provision for the immediate preparation and submission of Archaeological Reports, to include recommendations in respect of the resumption of construction. Archaeological Reports relating to call-out investigations will be submitted by the Company to the Archaeological Curator for immediate consideration.

5.2.17 Generic Method Statements for call-out investigations will be submitted to the Archaeological Curator four weeks prior to construction commencing.

### **5.3 ARCHAEOLOGICAL MEASURES WITHIN AN ENVIRONMENTAL MONITORING PLAN**

5.3.1 In the event that The Company develops an overarching Environment Monitoring Plan (EMP) in connection with the development of the AMEP and/or the Compensation Site, the provisions of this WSI will be incorporated within that EMP. Where practical, the requirements of this WSI will be met through integration with marine environmental monitoring requirements raised by other topics.

5.3.2 Each monitoring survey that has the potential to contribute to this WSI will be subject to a Method Statement prepared and agreed in accordance with this WSI. Where the survey is integrated with the marine environmental monitoring requirements of other topics, proposals for data acquisition will be subject to archaeological advice from the Retained Archaeologist and such advice will be reflected in the Method Statement.

5.3.3 The processing and interpretation of survey data for archaeological purposes will be carried out by competent and suitably experienced Archaeological Contractor(s).

5.3.4 The Company and the Archaeological Curator will meet annually (at least) to review results of the EMP relating to the historic environment.

5.3.5 In the event that archaeological review of EMP monitoring surveys during and following construction identifies significant adverse effects on the historic environment that are attributable to construction of the AMEP and Compensation Site, the Company will agree with the Archaeological Curator an appropriate means of mitigation.

5.3.6 The Company will notify the Retained Archaeologist of any Environmental Management Plan or Construction Method Statements put in place as part of the development.

5.3.7 The Retained Archaeologist will ensure that any archaeological Method Statements produced for the project are compliant with any Environmental Management Plan and consistent with the environmental protection requirements of method statements for construction work.

### **5.4 POST-INVESTIGATION ACTIVITIES**

5.4.1 An integrated approach will be applied to post-fieldwork activities with each discrete phase of Post-Investigation Activity subject to a Method Statement. Methodologies for the analysis, interpretation, dissemination and archiving of material have been outlined above (section 4) and in Appendix 2.

5.4.2 Some post-investigation activities will be undertaken in the Design Phase and the Construction Phase, as well as post-construction. Such activities include processing of data and material (for example artefacts and samples). Processing will include

conservation assessment, first-aid conservation and storage of any recovered material.

5.4.3 Some post-investigation activities will take place as soon as practicable following the investigation to which they relate. Other post-investigation activities will take place following completion of the relevant phase of construction, including:

- post-investigation assessments of results from investigations;
- conservation (other than First Aid Conservation);
- archaeological analyses and interpretation;
- dissemination, including publication;
- preparation and deposition of a publicly-accessible paper, material and digital archive, by agreement with a suitable repository.

5.4.4 An overarching programme of Post-Investigation Activities will be prepared as part of the major revision to this WSI that is anticipated towards the end of the Construction Phase investigations. The programme will identify each investigation that has been carried out, any post-investigation activities already completed or underway, and post-investigation activities that have yet to be carried out.

5.4.5 Both the overarching programme and individual Method Statements for Post-Investigation Activities will be subject to agreement with the Archaeological Curator.

#### **Post-investigation assessment**

5.4.6 The results of archaeological investigations from all phases of development will each be subject to post-investigation assessment to establish what further work, if any, is required as part of the post-investigation programme. The assessments will draw on the project archive and will also address the potential for future analysis and publication, wider dissemination, and detailed arrangements for deposition of the paper, digital and material archive.

5.4.7 Post-investigation assessments will be carried out within six months of the completion of on-site investigations (unless otherwise agreed with the Archaeological Curator) and may be carried out in respect of a specific site subject to investigation, or across a series of related sites or types of investigation.

5.4.8 Where finds (including structure) that are 'wreck' for the purposes of the Merchant Shipping Act 1995 have been recovered, post-investigation assessments will be initiated within one year of recovery, in order that the assessment can inform decisions by the Receiver of Wreck. The assessment of finds will address the disposal/discard of finds and any further cleaning, stabilisation or other conservation measures required prior to deposition.

5.4.9 Prior to any analysis an updated project design should be produced setting out any revisions of new additions to the current WSI. The updated design will be based upon the post-investigation assessment and will be produced as a new iteration of the WSI.

#### **Conservation**

5.4.10 In accordance with the recommendations of individual Conservation Assessment, and with the agreement of the long-term curator of the project archive, a programme



of material conservation will be carried out in respect of archaeologically-important finds.

- 5.4.11 Advice on conservation will be obtained by the Retained Archaeologist from a suitably accredited and experienced conservator.

#### **Analysis and Interpretation**

- 5.4.12 A programme of analysis and interpretation of archaeologically-important results will be carried out in accordance with the results of the post-investigation assessment.

#### **Dissemination**

- 5.4.13 Provision will be made to disseminate the results of investigations.
- 5.4.14 Archaeologically-important results will be subject to scholarly dissemination through notes and articles in relevant county, period or thematic journals. Material for scholarly publication will be circulated in draft to the Archaeological Curator for comment.
- 5.4.15 The Company will make provision for the dissemination of archaeological results to the wider public through, for example, project web pages, news items, presentations to local stakeholders, booklets and other media.

#### **Archiving**

- 5.4.16 Material resulting from archaeological works – comprising all archaeological records, including the finds, samples, digital records and written, drawn and photographic documentation – will be developed into a stable, ordered, accessible archive in accordance with the Institute for Archaeologist's *Standard and Guidance for the creation, preparation, transfer and deposition of archaeological archives* (2008).
- 5.4.17 Arrangements for the deposition of the project archive for long-term curation will be agreed with the Archaeological Curator at the outset of the Design Phase in accordance with guidance set out in section 4 of this WSI..
- 5.4.18 Where archival material relates to areas that fall within separate/ adjoining collection areas, such material will be kept within the single archive but with cross-references to other relevant depositories.
- 5.4.19 The archaeological works associated with the AMEP and Compensation Site will not be regarded as complete until the archive has been transferred to the agreed repository.

### **5.5 HEALTH, SAFETY AND WELFARE**

- 5.5.1 Health, safety and welfare considerations will be of paramount importance in conducting all archaeological work. Safe working practices will override archaeological considerations at all times.
- 5.5.2 All work carried out under the auspices of this WSI will be carried out in accordance with the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety Regulations 1992, and all other relevant Health and Safety legislation, regulations and approved codes of practice in force at the time.
- 5.5.3 The Company will notify the Retained Archaeologist of all Health, Safety and Welfare plans that are put in place to accompany the development of the Marine Energy Park and Compensation Site.

- 5.5.4 The Retained Archaeologist will ensure that any Method Statements prepared to meet the requirements of the WSI are compliant with the requirements of Health, Safety and Welfare plans notified by the Company.
- 5.5.5 Archaeological Contractors will supply the Retained Archaeologist with Risk Assessments in advance of any work. The Retained Archaeologist will in turn supply the Company with copies of archaeological Risk Assessments before the commencement of archaeological work. Risk Assessments will be read and acknowledged by all members of staff involved in archaeological work.
- 5.5.6 Risk Assessments for archaeological works will make explicit reference to Risk Assessments applicable to any other construction work that is associated with the archaeological work.

## **6 ARRANGEMENTS FOR MONITORING AND REVIEWING THE WSI**

- 6.1.1 As discussed above, this WSI will be subject to revision to reflect the results of archaeological investigations, to account for changes to the project design or construction methodologies and if any other archaeological information comes to light.
- 6.1.2 This WSI will be monitored jointly, through regular meetings, by the Archaeological Curator and the Company, advised by the Retained Archaeologist. Monitoring meetings may include site visits and the notes of all meetings will be recorded and agreed.
- 6.1.3 Method Statements and Archaeological Reports will contribute to the monitoring of the WSI and will be made available in advance of at monitoring meetings as appropriate. Other reports, as might be required on the implementation of the WSI, will be prepared by the Retained Archaeologist as instructed by the Company.
- 6.1.4 It is anticipated that major revisions of the WSI will occur:
- towards the end of the Design Phase Investigations (to reflect results of Design Phase Investigations and set out Mitigation Programme, including Construction Phase Investigations); and
  - towards the end of Construction Phase Investigations (to reflect results of Construction Phase Investigations and to set out overarching programme for remaining Post-Investigation Activities)
- 6.1.5 Revisions to the WSI will be drafted by the Retained Archaeologist and will be subject to agreement between the Company and the Archaeological Curator.
- 6.1.6 Agreed revisions to the WSI will be notified to the appropriate regulatory body in respect of any licences or consents referring to the WSI.

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## APPENDIX 1: ARCHAEOLOGICAL RECORDING LEVELS

These levels represent guidance formulated by Wessex Archaeology for use during the archaeological investigation of wreck sites. They are currently used by English Heritage, but have not been formally accepted as a standard means of grading work.

Level	Type	Objective	Sub-level	Character	Scope	Recording Task	Recording-Focus
1	Assessment	A record sufficient to establish the presence, position and type of site.	1a	Indirect (desk-based)	From documentary, cartographic or graphic sources, including photographic (incl. AP), geotechnical and geophysical surveys commissioned for purposes other than archaeology.		
			1b	Direct (field)	From geophysical, diving inspection etc., including surveys commissioned specifically for archaeological purposes.		
2	Evaluation	A record that provides sufficient data to establish the extent, character, date and importance of the site.	2a	Non-intrusive	To include light cleaning, probing and spot sampling, but without bulk removal of plant growth, soil, debris etc. and basic recording	Extent: -Acoustic tracking around site with ROV or diver or -Tape measurements of site extents based on geophysical data or -Sketch of extents based on video footage and geophysical data  Character & Date - Written description and - Sketch record and - Photographic record or - Video record	Extent: Focus on establishing the full site extent, including possible buried sections and debris fields.  Character & Date: Focus on: Build: - Construction (material, fastenings, methods) - Propulsion (sail, steam, diesel or a combination) - Diagnostic features (machinery, fittings, armament) Use - Artefacts/Cargo (dating objects) Survival: General survival of site Investigation:
			2b	Intrusive	To include vigorous cleaning, test pits and/or trenches. May also include recovery (following recording) of elements at immediate risk, or disturbed by investigation.		

							- Traces of any previous work on the site (salvage, excavation, etc).
3	In situ Recording	A record that enables an archaeologist who has not seen the site to comprehend its components, layout and sequences.	3a	Diagnostic	A detailed record of selected elements of the site.	Detailed Record: - Written description and - Measured drawings or detailed measured sketches and - Photographs (stand-off and close-ups) and - Detailed video survey or - Photo mosaic for visualisation purposes	Selection of elements to be recorded should be based on Level 2 survey. In general decision based on: - Diagnostic quality of elements - Representative quality of elements (are elements typical for period?) - Rarity (are elements rare and unusual for period?)- Accessibility of elements - State of preservation of elements
			3b	Unexcavated	A detailed record of all elements of the site visible without excavation.	As above but for whole site	All exposed elements
			3c	Excavated	A detailed record of all elements of the site exposed by open excavation of part or whole of the site.	As above but for whole site after excavation	All elements after exposure
4	Removal	A record sufficient to enable analytical reconstruction and/or reinterpretation of the site, its components and its matrix.			A complete record of all elements of the site in the course of dismantling and/or excavation.		
5	Intra-site Analysis	A record that places the site in the context of its cultural environment and other comparable sites.			A complete record and analysis of all elements of the site, including comparisons with other sites.		

## APPENDIX 2: KNOWN ARCHAEOLOGICAL RECEPTORS

### SIGNIFICANCE GRADING

Grading		Grades of Significance
A	National significance	Any designated or other asset considered to be of national significance due to its archaeological, architectural, artistic or historic interest. The asset would score high using the non-statutory criteria for assessing scheduled monuments.
B	Regional/County significance	Any asset considered to be of regional or county significance due to its archaeological, architectural, artistic or historic interest. The asset would score moderate using the non-statutory criteria for assessing scheduled monuments.
C	Local significance	Any asset considered to be of local significance due to its archaeological, architectural, artistic or historic interest. The asset would score low using the non-statutory criteria for assessing scheduled monuments.
D	Not significant	Any asset that is not considered to be of archaeological, architectural, artistic or historic interest significance

### AMEP SITE

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
17	-	517959	418238	Monument	One post seen on the foreshore east of the Killingholme High lighthouse, thought to be possible remains of jetty marked on 1855 OS Map.	Unknown	None	C
19	-	517024	419701	Monument	Jetty remains located next to the reed bed extending towards the river at on a bearing of 60° for an estimated length of 7m. The spacing between the two closest timbers is 1.75m and the jetty seems to narrow slightly along its length. A total of 6 posts were visible above the mud upstanding to a height of around 0.25m. Possibly the remains of a jetty marked on the 1887 OS Map.	Unknown	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
21	-	518253	417911	Monument	Jetty remains extend approximately 40m from the sea wall on a bearing of 54°. A total of 12 pairs of piles remain upstanding, two pairs have their cross beams still intact, and a further six individual piles have lost their pair. The jetty timbers measure approximately 30cm by 30cm and stand around 1.2m high. The jetty is approximately 3.6m wide, with pile spacings of around 2.6m. Possibly remains of jetty marked on 1887 OS map.	Unknown	None	C
22	MLS 20123 NMR 943015	517860	418560	Wreck	IVY, English Ketch, built 1874, recorded wrecked 1897 whilst on a fishing trip. Owner: J Munby, Master: E J Barth, Crew: 5. Vessel foundered and was lost following a collision with the Goole registered SS Corea. Location unknown.	Post-Medieval	None	C
23	NMR 943096	517860	418560	Wreck	WILLIAM, English Sloop Built 1883 recorded wrecked 1899. Owner: W Marshall & Sons, Grimsby, Master: J Ball, Crew: 2. Vessel foundered and was lost following collision with the Hull registered steam trawler ORINOCO. Location unknown.	Post-Medieval	None	C
24	NMR 907861 UKHO 8510	517858	418559	Wreck	SERGEI, Hull built screw steamer built 1899 wrecked after a collision, whilst en route from Malmo to Hull with pit props in 1923. The ship was raised and broken up 1923, however dispersal operations still on-going through to October 1924. UKHO provides alternative position 518697, 418548, which lies 40m outside of the AMEP.	Modern	None	C
25	NMR 907862 UKHO 8511	518674	418595	Wreck	COOK S26, barge wrecked 11th February 1955. Salvage work undertaken in 1959, but still charted as a wreck on current charts. Remains of the barge have been confirmed as present on the seabed through geophysical survey.	Modern	None	C
27	-	518429	418869	Magnetometer anomaly	Apparent large single object, relative target size 8.83 (Emu 1).	Unknown	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
28	-	518238	418550	Magnetometer anomaly	Apparently multiple objects, relative target size 9.47 (Emu 3).	Unknown	None	C
29	-	517594	419145	Magnetometer anomaly	Strong singular signature, relative target size 12.58 (Emu 5). Possible wreck site.	Unknown	None	C
30	-	517638	419593	Magnetometer anomaly	Strong singular signature, relative target size 11.55 (Emu 6). Possible wreck site.	Unknown	None	C
122	NMR 1341163	520110	416760	Documentary evidence	Handley Page Halifax Mk. III heavy bomber; one of a batch of 360 delivered between March and August 1944, Squadron 10. Two engines feathered; ditched off Immingham 28th October 1944. Location unknown	Modern	None	A
124	-	516978	419746	Monument	Linear alignment of 5 unworked wooden posts roughly 0.04m diameter, surviving to an average height of 0.30m. Orientated east-west eroding out of the reed bank towards the river. Total length approximately 0.7m.	Unknown	None	B/C
125	-	516970	419782	Monument	Linear alignment of 24 unworked wooden posts roughly 0.04m diameter, surviving to an average height of 0.30m. Total length approximately >8m. Orientated east-west eroding out of the reed bank towards the river.	Unknown	None	B/C
126	-	516950	419808	Monument	Linear alignment of unworked wooden posts roughly 0.04m diameter, surviving to an average height of 0.30m. T shaped with 2.1m orientated 80° and 2m orientated 320°. Eroding out of the reed bank parallel to the river.	Unknown	None	B/C
127	-	516942	419820	Monument	Linear alignment of unworked wooden posts roughly 0.04m diameter, surviving to an average height of 0.30m. Orientated 320° and exposed for 7.1m, eroding out of the reed bank at either end, lying parallel to the river.	Unknown	None	B/C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
167	-	517571	419443	Magnetometer anomaly	Apparently multiple objects, could be unidentified wreckage. Target size 11.41 (Emu 7).	Unknown	None	C

**COMPENSATION SITE**

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
501	-	523092	419662	Cartographic	A single building is first shown on the Ordnance Survey map of 1824. By 1855 a small complex of buildings shown.	Post-medieval	None	C
502	81701	522000	420000	Cartographic	A system of roads connecting Keyingham with Sunk Island. Grid reference refers to a locality and appears to be inaccurate.	?Medieval	None	C
503	-	522622	420111	Air photographs/Cartographic	Small sub-rectangular features are former ponds left after reclamation	Post-Medieval	None	C
504	-	523033	419511	Air photographs/Cartographic	Small sub-rectangular features are former ponds left after reclamation	Post-Medieval	None	C
505	-	521952	420456	Fieldwalking	Remains of chalk block built groyne	Post-Medieval	None	C
506	-	522262	420078	Fieldwalking	Remains of chalk block built groyne	Post-Medieval	None	C
507	-	522545	419740	Fieldwalking	Remains of chalk block built groyne	Post-Medieval	None	C



Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
508	-	523079	419173	Fieldwalking	Remains of chalk block built groyne	Post-Medieval	None	C
605	NMR 1459683  18430	521000	422700	Extant structure	Naval Bombing Decoy. A WW2 bombing decoy, part of a series built to deflect enemy bombing from Royal Naval installations on the Humber estuary. The site operated a 'Permanent Starfish' decoy (operated by setting alight controlled fires during an air raid to replicate a military area already targeted) and a 'QL' decoy ( a grid of muted lights set around man-made ponds to resemble the glow of lights that would replicate Hull docks) In use between August 1941 and March 1942. Remains of buildings still extant and in good condition.	Modern	Scheduled Monument  No 34704	A
606	NMR 914137  4528	523852	418766	Extant structure`	Heavy Anti Aircraft Battery Humber H9. A WW2 battery at Stone Creek. It includes the well preserved standing and buried remains of the original station complete with 4 gun emplacements and associated structures. First recorded in 1939 and abandoned in 1944. This is the best preserved example in the East Riding with nearly a full layout of the station complete. The remains of the domestic camp, although ruined, are an especially rare survival.	Modern	Scheduled Monument  No 32706	A
607	166644	523686	418903	Extant structure	Weighbridge House at Stone Creek. c.1855	Post-medieval	Listed Building Grade II	A

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
608	166565 4783	523777	421629	Extant structure	Saltaugh Grange Farmhouse. Late C18-early C19, with C16 or earlier origins. Rebuilding work in 1986 removed C16 or earlier timber-framed walls, remnants may survive in entrance hall. Meaux Abbey established a grange at Saltaugh in the C12 and the hall and chambers of the house are mentioned in the late C14	Post-medieval	Listed Building Grade II	A
609	2673	521700	421650	Air photograph	Possible rectilinear ditched enclosure, probably of late date	Undated	None	C
610	11075	521930	422500	Extant structure	Sands Bridge. Named by the late C18, carries the road from Keyingham Marsh to Cherry Cobb sands.	Post-medieval	None	C
611	11072	521930	422500	Site of	Site of sluice, Sands Bridge. Before 1772 the sluice was constructed following impaired drainage caused by the formation of offshore banks in the Humber during the C18.. In 1772 Keyingham drainage authority was created and the sluice was moved further downstream.	Post-medieval	None	C
612	11802	522166	422728	Cartographic	'Brick and tile yard' shown on first-edition Ordnance Survey map of 1855	Post-medieval	None	C
613	11803	522544	422581	Cartographic	'Old cottage' marked on first edition Ordnance Survey map. Buildings first shown in that position on map of 1749	Post-medieval	None	C
614	11800	522043	422080	Cartographic	Several buildings of unknown usage shown on the first edition Ordnance Survey map of 1855	Post-medieval	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
615	11067	522848	421437	Extant structure	Keyingham Fleet drainage channel. The parish was mainly drained by the Fleet until it became inadequate and was straightened following an act of 1802	Post-medieval	None	C
616	11074	523423	421287	Site of	Little Dam Lane. A road from Salthaugh across Cherry Cobb sands to Sunk Island made between 1766-1785 and used until the 1830s.	Post-medieval	None	C
617	2749	523530	421573	Documentary Site of	Salthaugh Grange. A grange was established by 1153 and belonged to the Abbey of Meaux. It acted as an estate centre for communities at the Meaux granges of Tharlesthorpe to the SE (lost to the sea), Ottingham to the NE and Keyingham to the NW. The site lay on siltland reclaimed from the Humber before the 11th century and was often subject to disastrous flooding. The process of accretion was reversed in the mid 13th century when the river consumed some of the reclaimed ground and the grange was forced to move inland to the site of Salthaugh Grange Farmhouse (site 6)	Medieval	None	B
618	19501	524277	419480	Cropmark	Cropmarks NW of Stone Creek Farm, plotted from air photographs	Undated	None	C
619	7508	524585	418972	Extant structure	Stone Creek Farm	Post-medieval	None	C
620	7510	524408	418740	Cropmark	Creek, Air photo plots possibly indicate a continuation of the '3rd' stone creek.	Undated	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
621	7509	522521	421506	Extant structure	Sands House	Post-medieval	None	C
622	10941	523771	418922	Site of	Coastguard Station, Stone Creek. There was a coastguard station here from at least 1849 to 1923, for which a surviving row of 3 cottages was built c1860	Post-medieval-modern	None	C
623	10945	523458	418671	Site of	Stone Creek Harbour. Already in use by boats for transporting agricultural produce from the island or landing lime and coal before its improvement in the mid C19. Wharves were built soon after the road was turnpiked in 1852 and the weigh-bridge was built soon after. The harbour was mainly used by Sunk Island tenants and seven fishing boats worked it in 1912. Commercial use of the creek ended in 1952.	Post-medieval	None	B
624	NMR 914151 18822	523524	418863	Extant structure	Pillbox. Rectangular brick and shuttered structure set into river bank. In good condition	Modern	None	B
625	11801	523437	418972	Extant structure	Stone Creek House. Marked as 'Stone Creek House P.H' with two other buildings on Ordnance Survey maps of 1855 and 1899	Post-medieval	None	C
626	UKHO 8509	523712	417678	Wreck	GOLDBELL. Records suggest the site has been salvaged and lifted.	Undated	None	C
627	UKHO 8506	523636	417468	Wreck	State: Lift	Undated	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
628	NMR 1357695	520200	420800	Wreck	The NEWLAND, from Riga, arrived in the Humber on 3rd September 1828, but on the 5th September is reported as on the Holm Sand with 5 feet water in her hold. Cargo discharging into craft. About 40 tons of hemp were saved from ship dry, the remaining part of the cargo is discharging in a damaged state. The ship fills with water every tide, and will be a wreck. Location unknown.	Post-Medieval	None	C
629	NMR 1431654	520200	420800	Wreck	2nd September 1833 wreck of the British registered wooden sailing vessel FAIRY was reported stranded on Holme Spit during a gale, while en route from Newcastle-upon-Tyne to Gainsborough. Location unknown.	Post-Medieval	None	C
630	NMR 1358152	520200	420800	Wreck	The ATALANTA, from Boston, was reported as totally wrecked on the sands above Hull on 19th March 1831. Crew drowned. NB: The 'sands' are not identified, there being several possible candidates, and the named location of "Offshore Killingholme", covering Foul Holme Spit, has been chosen by NMR for convenience. Location unknown.	Post-Medieval	None	C
631	-	522488	419695	Monument	Inaccessible group of short wooden posts within the channel between Cherry Cobb Sands and Foul Holme Sands. Position estimated. Possible interpretations include channel markers, remnants of fish traps or other small boat infrastructure or navigation aids.	Unknown	None	B/C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
632	-	523100	419096	Monument	Inaccessible group of short wooden posts within the channel between Cherry Cobb Sands and Foul Holme Sands. Position estimated. Possible interpretations include channel markers, remnants of fish traps or other small boat infrastructure or navigation aids.	Unknown	None	B/C
633	-	522910	419396	Monument	Linear area of dumped building stone including lintels, cobbles, curb stones, wall capping stones. Stone is not associated with the sea wall or groynes. Appears to have come from older buildings, whilst other areas of dumped stone include reinforced concrete and modern bricks.	Post-Medieval to Modern	None	C/D
634	NMR 1336159	525530	425890	Cropmark	A rectangular enclosure, defined by a broad ditch, is visible as a cropmark on air photographs (1999). Its one measurable dimension is 74m and it is centred at TA 2553 2589. Possible Iron Age or Roman date.	Iron Age/Romano-British	None	C
635	NMR 1462832	525540	425890	Cropmark	A possible Iron Age or Roman period rectilinear enclosure is visible as cropmarks on air photographs.	Iron Age/Romano-British	None	C
636	NMR 1462834	525100	425720	Cropmark	The southern corner of a possible Iron Age or Roman period rectilinear enclosure is visible as cropmarks on air photographs.	Iron Age/Romano-British	None	C
637	NMR 1336122	527560	423900	Cropmark	At least two sub-rectangular enclosures aligned on a sinuous boundary are visible as ditch cropmarks on air photographs (1999). Probable Iron Age or Roman date.	Iron Age/Romano-British	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
638	NMR 1336145	526700	426210	Cropmark	Two conjoined, sub-rectangular enclosures are visible as cropmarks on air photographs (1999). Their approximate dimensions, as far as is visible, are 65m by 55m and 44m by 36m. Possible Iron Age or Roman date.	Iron Age/ Romano-British	None	C
639	NMR 1462819	525800	424850	Cropmark	Two sides of a possible Iron Age or Roman period enclosure are visible as cropmarks on air photographs.	Iron Age/ Romano-British	None	C
640	NMR 1462838	526600	426200	Cropmark	Up to four Iron Age or Roman period rectilinear enclosures are visible as cropmarks on air photographs.	Iron Age/ Romano-British	None	C
641	NMR 1448534	527700	417300	Cropmark	Possible Iron Age or Roman rectangular enclosures and a hut circle are visible as cropmarks on air photographs.	Iron Age/ Romano-British	None	C
642	NMR 1449797	526300	417300	Cropmark	An Iron Age or Roman square barrow or rectangular enclosure and a possible ditch are visible as cropmarks on air photographs.	Iron Age/ Romano-British	None	C
643	NMR 1449806	527700	417300	Cropmark	Two possible prehistoric ring ditches, a possible rectangular enclosure with internal pit and other ditches or hollows of uncertain date are visible as cropmarks on air photographs.	Iron Age/ Romano-British	None	C
644	NMR 81694	522000	426000	Findspot	Large numbers of pieces of coarse Romano-British pottery were found during gravel extraction.	Romano-British	None	C
645	NMR 81695	523800	426100	Findspot	A stray find of Romano-British pottery sherds of Huntcliffe type.	Romano-British	None	C



Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
646	NMR 81691	524000	425000	Findspot	4th century AD bronze Roman coin of one of the Constantines.	Romano-British	None	C
647	NMR 81700	526780	424430	Extant structure	12th century origins, possibly earlier. A church is documented here in 1083, but it is uncertain whether one or 2 churches served the parish at that time. Between 1293 and 1323 a chantry chapel supplied with 7 monks from Meaux Abbey was installed at Ottringham church, and it may have been here. C12 origin but much rebuilt in the C13 and C14, clerestory added in the C15. Fine C14 W. tower with C12 chevron moulded tower arch and stone broach spire. Some restoration but the building remains a good example of C14 and C15 work. There are a number of interesting fittings, including a C14 carved font, stone gospel lectern, C19 box pews and altar rails.	Medieval	None	B
648	NMR 1345268	517900	426890	Documentary  Site of	Hospital of St Mary Magdalene at Newton Garth founded in 1162 by William le Gros. Originally for a master and leprous brothers, non-lepers were admitted after 1335. Suppressed circa 1547.	Medieval	None	B

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
649	NMR 81702	520590	423660	Extant structure	<p>The remains of a moated site and contemporary adjacent earthworks. The S end of the W arm has been brick-revetted to form a washing pond for the farm. At the NW corner of the moat a wide drainage ditch continues the line of the moat N for 50m; it is interpreted as an element of the medieval site. Immediately to the E of this ditch is an embanked trackway which may have provided access to the moated site. To the N of the moat a rectangular pond may be medieval in origin but is not included in the Scheduling as it has recently been scoured out.</p> <p>The site was originally held by the monks from Albemarle and was a manor from 1260. In 1395 the property was conveyed to Kirkstall Abbey and held by them until the Dissolution. A brick shed and brick built air-raid shelter stand on the island.</p>	Medieval	Scheduled RSM No 21200.	A
650	NMR 907859	522076	416688	Wreck	<p>Remains of 1915 wreck of Norwegian schooner which foundered north of Immingham, located south of the modern Number 9A buoy, following a collision. She had just left Goole for Rouen with coal (some sources state her departure point as Kingston-upon-Hull). The wreck was later dispersed. Constructed in 1915 of steel, she was a sailing vessel with a motor engine.</p>	Modern	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
651	NMR 914236	524830	417540	Monument	This site, situated on the north west side of the Sunk Island Battery, represents the pre-cursor of the pillbox. Survey in 1992 found the foundations in the form of a large concrete raft of polygonal shape. Blockhouses were placed around the perimeter of the battery as a means of defence against infantry attack. The site was in poor condition when it was surveyed, and was considered to be beyond repair	Modern	None	C

Site No	HER/NMR Reference	Easting	Northing	Form/Type	Description	Period	Designation	Significance
652	NMR 914213	524967	417575	Monument	Sunk Island Battery was part of the Humber estuary's coastal defence system. It was built between 1914 and 1915. The battery comprised two gun emplacements, a command post, officers' quarters, mess room, hospital, domestic hutting, recreation hut, ablution block, engine room, water tower, magazine, and searchlights. It was equipped with two 6-inch breech loading Mk. VII weapons. Field defences installed at the site included ditch obstacles, pillboxes, earthwork shelters for battery personnel, infantry fire trenches and machine gun pits. It was manned by 2/I Company and 4/I Company of East Riding Royal Garrison Artillery. A Port War Signal Station and fire command post was constructed on the approach road to the battery. The guns were removed in 1919 and the site released in 1926. It was reused during the Second World War and in 1940 was fitted with a pair of 4.7-inch quick-firing guns and two searchlights for close defence. The partial remains of Sunk Island Battery survive, but in poor condition. Aerial photography from 1993 shows that the battery observation post is partially demolished and the coastal artillery searchlights are gone. However, First World War features of the site such as two gun towers and the Port War Signal Station remain.	Modern	None	C
653	NMR 1341163	520110	416760	Documentary evidence	Handley Page Halifax Mk. III heavy bomber; one of a batch of 360 delivered between March and August 1944, Squadron 10. Two engines feathered; ditched off Immingham 28th October 1944. Location unknown	Modern	None	A

## APPENDIX 3: INVESTIGATION METHODOLOGIES

### FINDS AND ENVIRONMENTAL SAMPLES

#### ENVIRONMENTAL SAMPLING

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.

For each programme of archaeological work, environmental sampling strategies and methods – including methods for processing, assessing and/or analysing samples – will be set out in the Method Statement for the archaeological work.

Approaches and methods will be consistent with the following guidance:

- Geoarchaeology: using earth sciences to understand the archaeological record (English Heritage 2007);
- Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains (English Heritage 2008); and
- Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (Centre for Archaeology Guidelines, English Heritage 2011).

#### FINDS

Finds handling and initial processing will normally be carried out by the Archaeological Contractor(s), with support from the Retained Archaeologist. In the event that the finds require assessment by further finds specialists or external advice is required, the Retained Archaeologist will obtain appropriate provision.

All retained finds will be notified by the Archaeological Contractor(s) to the Retained Archaeologists. In addition to any finds records instituted by the Archaeological Contractor(s), all finds notified to the Retained Archaeologists will be registered in an overarching Finds Management database for the AMEP and Compensation Site. Any special requirements of each find will be noted in the Finds management database.

The Retained Archaeologists will prepared and implement a finds monitoring and maintenance programme, which will cross-refer to finds management / monitoring systems maintained by the Archaeological Contractor(s).

All retained finds will be processed in accordance with the Institute for Archaeologists' *Standard and guidance for the collection, documentation, conservation and research of archaeological material* (2008). All finds will be recorded and labelled appropriately.

Objects that require immediate conservation treatment to prevent deterioration will be treated according to guidelines laid down in *First Aid for Finds* (Leigh, Watkinson and Neal (eds.) 1998) and/or *First Aid for Underwater Finds* (Robinson 1998). A full record of any treatment given will be made by the person applying the treatment and these records will form part of the archive.

Additional guidance includes:

- Standards in the Museum Care of Archaeological Collections (Museums and Galleries Commission 1992);

- Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood (English Heritage 2010); and
- Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation (English Heritage 2012).

## **HUMAN REMAINS, ORDNANCE, MILITARY AIRCRAFT**

Procedures for reporting human remains, ordnance, and military aircraft will normally come into effect upon discovery, i.e. with the material still on the seabed, unless the character of the find only becomes apparent upon recovery.

As ordnance, military aircraft and human remains may also be of archaeological etc. interest, and constitute or be immediately associated with 'wreck', then the general procedures for archaeological finds will also apply, insofar as they are compatible with the special procedures set out below.

### **Human Remains**

In the case of the discovery of human remains, the requirement for issuing and conditions attached to licences for the excavation of human remains is subject to legal review. Until such time as the legal position has been clarified by the Ministry of Justice, the Retained Archaeologist will, in the event of discovery of human remains, immediately inform the Coroner, the Police and the Ministry of Justice via submission of the relevant application form. The Retained Archaeologist will also inform the Company and the Archaeological Curator.

The human remains will initially be left *in situ*, covered and protected. Where a licence for their excavation is issued by the Ministry of Justice, the requirements of that licence will be followed.

Where the Ministry of Justice is unable to issue a licence and it is reasonably determined that the remains are likely to be subject to further unavoidable disturbance or deterioration, the Retained Archaeologist will advise the Ministry of Justice of their intention to excavate the remains with due decency and in accordance with the general conditions formerly attached to licences issued for excavation of human remains under similar circumstances.

Should human remains be excavated and recovered, all excavation and post-excavation will be in accordance with the standards set out in the IFA *Technical Paper No 7 Guidelines to the Standards for Recording Human Remains* (IFA 2004).

The final placing of human remains following analysis will be subject to the requirements of the Ministry of Justice Licence.

Additional guidance includes:

- Human Bones from Archaeological Sites (English Heritage 2004); and
- Guidance for Best Practice for Treatment of Human Remains Excavated From Christian Burial Grounds in England (English Heritage 2005).

### **Ordnance**

Any finds that are suspected of being ordnance, firearms, explosives etc. will be reported immediately by the Retained Archaeologist to the Company. The Company will inform the Joint Services EOD Operations Centre. Any subsequent actions will be guided by advice received from JS EOD.

## **Military Aircraft**

Any aircraft that has crashed whilst in military service is automatically protected under the Protection of Military Remains Act 1986 and it is an offence to tamper, damage, move, remove or unearth the remains.

Any finds that are suspected of being military aircraft will be reported immediately to the Retained Archaeologist. The Retained Archaeologist will inform the Able Humber and the Service Personnel and Veterans Agency (SPVA: Joint Casualty and Compassionate Centre – SO3 Historic Casualty Casework). Any subsequent actions will be guided by *Crashed Military Aircraft of Historical Interest: Licensing of Excavations in the UK – Guidance Notes for Recovery Groups*, April 2007, and by advice received from SPVA. In the case of a military aircraft being investigated under licence, any human remains will be reported immediately in accordance with paragraph 14 of *Guidance Notes for Recovery Groups*, April 2007.

Additional guidance includes:

- Military Aircraft Crash Sites Archaeological guidance on their Significance and Future Management (English Heritage 2002).

## **MATERIALS CONSERVATION AND STORAGE**

All recovered materials will be subject to a Conservation Assessment no more than four weeks after recovery to gauge whether special measures are required while the material is being held. If warranted, all or part of the Conservation Assessment will be carried out at an earlier stage - in advance of recovery, or onboard immediately following recovery, for example.

This Conservation Assessment will be carried out by the Retained Archaeologist or a suitably qualified archaeological contractor with advice from appropriate specialists, and following recommendations in the *Guidance for Archaeological Conservation Practice* (United Kingdom Institute for Conservation (UKIC) 1990).

The Retained Archaeologist or a suitably qualified archaeological contractor will implement recommendations arising from the Conservation Assessment.

Where no special measures are recommended, finds will be conserved, bagged and boxed in accordance with guidelines set out in the Archaeology Section of the United Kingdom's Institute for Conservation's *Conservation Guidelines No 2: packaging and storage of freshly excavated artefacts from archaeological sites* (1993).

Plans for the permanent storage of the finds and samples should be determined in line with the *Conservation Guidelines No. 3: environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1993).

Materials conservation and storage will accord with the *IfA Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (2008).

Additional guidance includes:

- *Investigative Conservation* (English Heritage 2008);
- *Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood* (English Heritage 2010); and
- *Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation* (English Heritage 2012).



## **ARCHAEOLOGICAL EXCLUSION ZONES: DESIGN AND MONITORING**

AEZs agreed between the Company and the Archaeological Curator will be the principal means used to preserve *in situ* any features or deposits of known or potential archaeological interest.

The Company will require its Agents and Contractors to conduct all construction activity in such a way as to prevent the incursion into AEZs of any impacts on the seabed by dredging or other works, including seabed impacts from plant and equipment that is not directly engaged in dredging / construction.

Although AEZs are fixed, provision is made below for their alteration, following appropriate archaeological investigation and consultation, should this become necessary before or during construction.

The design, alteration and removal of AEZs will be subject to agreement with the Archaeological Curator.

The Company will notify its Agents and Contractors of AEZs and of any alteration or removal of AEZs.

## **LOCATION AND EXTENT OF ARCHAEOLOGICAL EXCLUSION ZONES**

Provision may be made for AEZs around confirmed wreck sites, anomalies and palaeogeographic features that can be safeguarded *in situ*.

AEZs are formed by establishing a buffer around the known extents of the wrecks and their debris fields, or around geophysical anomalies for which the available evidence suggests that there could be archaeological material present on the seabed. For wrecks and anomalies for which there is not detailed enough information available to ascertain the site's archaeological importance, the AEZ will be implemented based on the potential apparent to the Retained Archaeologist.

## **ESTABLISHING NEW ARCHAEOLOGICAL EXCLUSION ZONES**

If new finds of archaeological importance come to light during the course of construction, they may also be subject to the implementation of additional AEZs.

The need for and the design (position, extent) and implementation of any new AEZs will be subject to the agreement of the Archaeological Curator.

## **ALTERING ARCHAEOLOGICAL EXCLUSION ZONES**

AEZs may be altered (enlarged, reduced, moved or removed) as a result of further data assessment or archaeological field evaluation of data covering those areas that are subject to AEZs. Further data assessment could include a formal archaeological analysis of new geophysical data, and archaeological field evaluation could include suitable high-resolution marine geophysical survey and/or diver-based survey.

The alteration of AEZs will only be undertaken with the agreement of the Archaeological Curator. Following alteration, a new plan giving details of the AEZs will be drawn up and issued to each relevant party.

## **MONITORING OF ARCHAEOLOGICAL EXCLUSION ZONES**

Development-related activities will not be undertaken within an AEZ. If it becomes apparent that activities have taken place within any AEZ, the party responsible will obtain advice from the Retained Archaeologist in accordance with their obligations with respect to AEZs under this WSI as set out in Section 3.

Monitoring of AEZs will form part of the Monitoring Plan for the AMEP and Compensation Site.

As part of the Monitoring Plan, periodic Archaeological Reports will be prepared to review whether there have been any incursions into each AEZ and whether there are still archaeological grounds for maintaining each AEZ. Archaeological Reports on AEZs will include recommendations regarding amendment of the extent, removal and/or creation of new AEZs.

Within three months of completion of the Construction Phase, a report will be compiled on the effectiveness of the AEZs, any alterations to them, and the results of the monitoring.

Post-construction monitoring will be carried out in accordance with the methods and timescales set out in the Monitoring Plan with a view to identifying any impacts on AEZs attributable to indirect effects of construction.

## **MARINE GEOPHYSICAL INVESTIGATIONS**

### **PLANNING FURTHER GEOPHYSICAL SURVEYS**

The specification of any proposed marine geophysical surveys 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.

The archaeological input will take the form of advice from an appropriately qualified marine archaeologist on the following points:

- Available details of sites and/or anomalies identified in previous studies;
- Archaeological potential of areas where no existing sites and/or anomalies are yet known;
- Geophysical sources/equipment;
- Methodologies, including spacing and orientation of lines and cross lines;
- Source/equipment settings;
- Requirements for post-processing, interpreting and archiving resulting data.

### **UNDERTAKING FURTHER GEOPHYSICAL SURVEYS**

Consideration will be given to having a suitably experienced archaeologist attend the survey during the acquisition of data. The archaeologist 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 for repeat surveys.

Surveys will be carried out to a single datum and co-ordinate system. All survey data – including navigation (position, heading and velocity) - will be acquired digitally in industry-standard formats. Care is to be taken to maintain the orientation and attitude of sensors on

line. Track-plots are to be corrected for layback (including catenary effects) and made available in digital (GIS) form.

Once the surveys have been processed to meet their primary objectives, the survey data – together with factual reports – will be made available in digital formats to an appropriately qualified marine archaeologist for archaeological analysis and interpretation.

### **Sidescan Sonar Survey**

Sidescan sonar survey can be used to identify wrecks and other related debris of all periods that lie (at least in part) above the surface of the seabed.

Sidescan sonar survey should be carried out at frequency, range and gain settings capable of resolving all objects that are 0.5m and above throughout the survey. Preferably, line spacing should be equal to or less than the effective range, and no more than 1.75x the effective range. Where known sites and anomalies fall within or close to the scheme impacts they should be 'boxed' by at least two and preferably four lines along and across the principal axis of the anomaly. These lines should be offset so that the anomaly does not lie immediately beneath the fish, and run at optimal frequency and range settings for imaging the anomaly. For archaeological purposes, true sidescan is preferable to multibeam pseudo-sidescan. Sidescan sonar data should be available in the form of raw, un-mosaiced files in a suitable proprietary format.

### **Magnetometer Survey**

Magnetometer survey may identify wrecks and other related debris of all periods (although principally post-medieval and modern) on the surface of and under the seabed.

Magnetometer survey should be carried out using a caesium gas or equivalent system capable of resolving anomalies of 5 nano Teslas and above. Lines can be run in conjunction with other sensors (i.e. on the same line spacings and orientations) but provision should be made to run additional lines and cross-lines across the known sites and anomalies. Magnetometer data should be made available as cleaned, de-spiked text (x,y,z) files for each line, including layback.

### **Sub-bottom Survey**

Sub-bottom, or seismic, survey may identify features and deposits that relate to the topography of an area prior to its burial and inundation during the prehistoric period, and buried objects such as wrecks.

Sub-bottom survey should be carried out using a source capable of resolving internal structures to the full depth of anticipated scheme impacts within Quaternary deposits. Line and cross-line spacings and orientations should be sufficient to resolve the extents and characteristics of the principal Quaternary deposits. A single beam echosounder should be run in conjunction with the sub-bottom survey; the first reflector (seabed) should be levelled with reference to a tidal gauge. Sub-bottom data should be made available in a suitable proprietary format.

### **Multibeam Survey**

Multibeam data can be used to characterise wrecks and other related debris that lies, at least in part, on the surface of the seabed.

Multibeam survey should be carried out using a system capable of achieving an effective cell/bin size better than 1m. Use of a beam-forming system is preferred. Where an anomaly of apparent archaeological potential is identified, an additional single slow pass should be

carried out at the highest possible ping rate. Single beam and multibeam data should be made available as de-spiked and tidally-corrected text (x,y,z) files for each line, in addition to any gridded/rendered surfaces.

### **Archaeological Interpretation of Further Geophysical Data**

New geophysical survey data will be interpreted by a suitably experienced archaeologist.

Archaeological interpretation will include:

- Examination of sidescan, magnetometer, sub-bottom and multibeam data for the area and surroundings of known wreck sites and previously identified geophysical anomalies;
- Examination of sidescan, magnetometer, sub-bottom and multibeam data within areas that will be subject to scheme impacts in order to identify as yet unknown wreck remains;
- Examination of sub-bottom data to identify sub-surface sediments with archaeological potential.

The results of further geophysical interpretation will be compiled as an Archaeological Report, which will identify new features or deposits (if any) that warrant additional mitigation measures or further investigation. Archaeological Reports on geophysical surveys will set out the methods used in processing and interpreting the geophysical data.

Additional guidance includes:

- MoRPHE Project Planning Note 1: Marine Archaeological Geophysical Survey (English Heritage 2006);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (Ruth Plets, Justin Dix and Richard Bates Forthcoming); and
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector, Published Guidance Note (Wessex Archaeology 2007).

## **GEOARCHAEOLOGICAL INVESTIGATIONS**

### **PLANNING FURTHER GEOTECHNICAL SURVEYS**

The specification of any proposed geotechnical surveys 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.

The archaeological input will take the form of advice from an appropriately qualified archaeologist on the following points:

- Available details of deposits and surfaces of archaeological interest identified in previous studies, include the results of geophysical work and deposit modelling;
- Archaeological potential of areas from which there is no previous evidence;
- The suitability for archaeological purposes of the proposed geotechnical methods and equipment;
- Methodologies, including positioning and spacing of trial pits /cores / boreholes and transects;

- Requirements for the archaeological description and sub-sampling of geotechnical exposures, cores and samples to yield the necessary information, to include the presence of suitably-experienced archaeologists during trial-pitting, coring and/or extrusion.
- Requirements for processing, interpreting and archiving resulting data.

The Archaeological Curator will be consulted regarding the proposed locations of geotechnical work and will be provided with the results of each stage of investigation (see below).

#### **STAGES OF GEOARCHAEOLOGICAL INVESTIGATION**

Geoarchaeological investigations will seek to establish a three-dimensional sedimentary model of the area within which the investigations have taken place, with special reference to buried sedimentary layers or surfaces indicative of human activity in the past.

The objectives, approaches and methods to be applied in each geoarchaeological investigation will be set out in a Method Statement which will be subject to agreement with the Archaeological Curator, as set out in Section 3.6.

The geoarchaeological investigation of geotechnical data will follow a staged approach. Each stage of the process will be dependent on the results of the preceding stage, including its recommendations as to the need for further work. The stages are as follows:

- Stage 1: Archaeological assessment of geotechnical logs - a review of the borehole/trial pit/CPT fieldwork logs upon completion of the geotechnical ground investigation;
- Stage 2: Archaeological recording of geotechnical cores – detailed recording of the sediments within selected cores for a range of palaeoenvironmental indicators and dating material;
- Stage 3: Archaeological sampling and laboratory assessment of geotechnical cores - sampling and laboratory analysis of selected core material to a level sufficient to enable an assessment of the value of the palaeo-environmental material (pollen, diatoms, ostracods and foraminifera, etc.) surviving within the cores, to include initial scientific dating to inform the assessment;
- Stage 4: Archaeological Analysis of Samples - full analysis of palaeo-environmental material of archaeological interest supported by a full programme of scientific dating of suitable sub-samples.

Each stage of geoarchaeological investigation will be accompanied by a report, as detailed in the Method Statement relating to the investigation. Where the results of a stage are such that implementation of the next stage is recommended, then the report may take the form of a short account of the findings and the recommendation as to further work.

Where the results of a stage are such that no further stage is warranted, then a full Archaeological Report will be prepared, which is consistent with Section 3.7 and will include the methods, results and interpretation of the data up to the point that the investigation ceased. A full Archaeological Report will be submitted following Stage 4, setting out the results and including a deposit model of the area subject to investigation.

The submission and sending of draft / final Archaeological Reports by the Company to the Archaeological Curator is detailed in Section 3.7 above.

Additional guidance includes:

- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE 2011);
- Offshore Site Investigation Group, Guidance Notes On Site Investigations For Offshore Renewable Energy Projects (Society of Underwater Technology);
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector, Published Guidance Note (Wessex Archaeology 2007)

## **DIVER-BASED INVESTIGATIONS**

Diver surveys may be undertaken primarily for archaeological purposes by an appropriately qualified marine archaeological team. In such cases, planning for the survey will follow normal archaeological procedures and the Diving Procedures outlined in the next section.

Any diver surveys undertaken primarily for engineering, ecological or other non-archaeological purposes will include archaeological input at the planning stage so that archaeological considerations can be taken into account.

For diver surveys, archaeological input will take the form of advice from an appropriately qualified marine archaeologist on measures to optimise archaeological results from the planned survey, including:

- Available details of sites and/or anomalies identified in the desk-based assessment;
- Archaeological potential of areas where no existing sites and/or anomalies are yet known;
- Type and level of diver positioning, voice recording and video/still recording;
- Clear guidance on the types of sites and finds that are to be reported and recorded.

Where the primary objectives of dive survey are non-archaeological, consideration will be given to having archaeologists present during the survey, either as observers or as participating divers to optimise archaeological results and thereby reduce the need for repeat survey.

## **REVIEW OF DATA COLLECTED BY DIVER SURVEYS**

Following the completion of a non-archaeological diver survey, all data, including video footage, will be reviewed by an appropriately qualified archaeologist.

This review will identify any sites that are potentially of archaeological interest – typically this will involve the identification of vessel remains, rather than just stray artefacts. The report will identify those sites and or/geophysical anomalies that are of sufficient archaeological interest to warrant further investigation. It will also identify those sites that are no longer of archaeological interest, and hence may be removed from the list of Archaeological Exclusion Zones.

## **ARCHAEOLOGICAL DIVER-BASED SITE ASSESSMENT**

Archaeological diver-based investigations will take place where the primary objectives are archaeological and the diving is led by archaeologists.

The objectives of the investigation will be set with reference to the Recording Levels set out in Appendix 1.



## **DIVING PROCEDURES**

Diving will be carried out under the Diving at Work Regulations 1997.

The diving contractor will apply the Approved Code of Practice (ACOP) for *Commercial Diving Projects Inland/Inshore* (1998).

Diving operations will be subject to preparation of a diving project plan (DPP) based on a risk assessment.

The diving team will consist of a minimum of four in the roles, of diver, diving supervisor, standby and tender, with an additional 'archaeological recorder' if the diving supervisor is not also able to carry out archaeological recording.

All members of the diving team will be qualified to HSE III or above and in First Aid at Work and will have a valid and in-date medical certificate. Supervisors will be appointed in writing and should normally be certified under the ADC Diving Supervisor scheme.

The vessel crew will not normally be counted as part of the diving team. However, as the vessel will normally be moored during diving operations, the crew will be on hand to render assistance if required.

The archaeological diving operations will be conducted using Surface Supplied Diving Equipment (SSDE). Both diver and standby will be equipped with SSDE. The breathing gas will be air, supplied to the diver via an umbilical from a high-pressure bank on the surface. In addition to the bank, there will be a HP reserve on the surface, and the diver/standby will be equipped with a bailout cylinder. The high pressure bank will be recharged with compressed breathing air on the diving vessel between operations. Umbilicals will include lifeline, hard wire communications and pneumo.

Every dive will be recorded using a digital video system with hat mounted camera.

The position of the diver will be determined using an acoustic navigation system. The position will be integrated into a diver tracking and recording system where the position of the objects on the seabed can be compared to the geophysical data, and the extent and character of the features recorded.

## **ARCHAEOLOGICAL WATCHING BRIEFS**

The objective of a watching brief is to establish and record the presence or absence, location, extent, character, condition and depth of any archaeological remains that may be present within the area subject to construction, whilst such construction is underway. Watching briefs may cover demolition, groundworks, clearance of wreckage, and dredging of material to the surface.

Watching briefs will include the recording, recovery and retention – where practicable – of finds and structural elements. Where recovery and retention is not practicable, a full record will be obtained using drawing, sketches and photographs.

Watching briefs will include recovery of palaeo-environmental samples, where practicable. Where the recovery of palaeo-environmental samples is not practicable, the presence of surfaces and deposits should be recorded using drawing, sketches and photographs.

Method Statements for watching briefs in hazardous areas, including intertidal areas and on vessels, will take into account the practicalities and additional health and safety concerns of those environments.



Where a watching brief is taking place during dredging of material to the surface (e.g. by backhoe to a hopper barge), provision will be made to periodically dump a sample of material through a grid or on deck so that it can be inspected by the archaeologist.

Watching briefs may be continuous or intermittent. Where the evidence of a watching brief suggests that no features of archaeological interest are likely to be present, the watching brief may be discontinued, subject to the agreement of the Archaeological Curator.

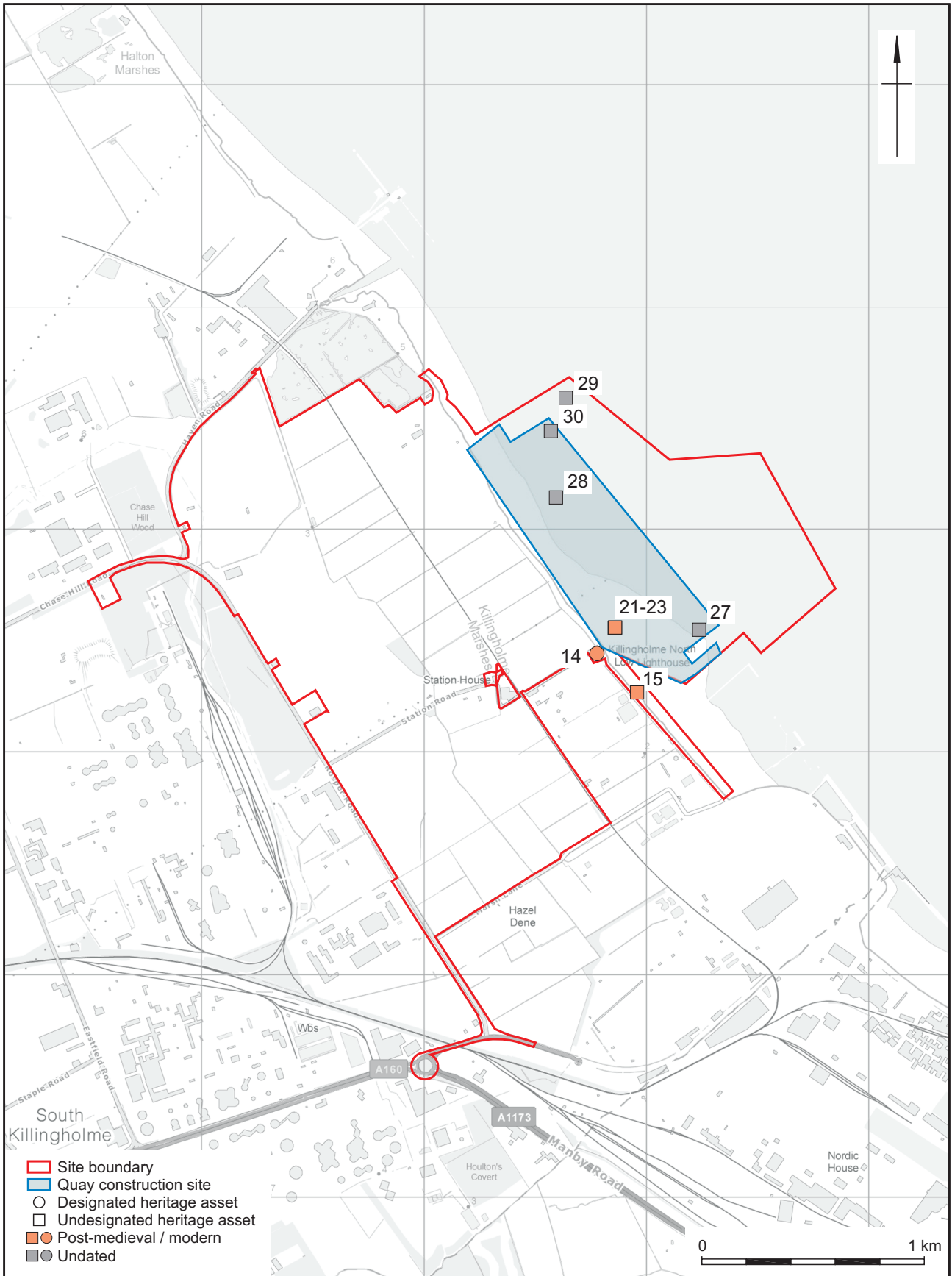
Where a watching brief identifies the presence of important archaeological material, construction will cease temporarily in the immediate vicinity and provision made, if necessary, for call-out investigations to take place.

Watching briefs will be conducted by suitably qualified and experienced archaeologists in accordance with the standard set out in the Institute for Archaeologists *Standard and Guidance for an archaeological watching brief* (2008).



Location of Marine Energy Park and Habitat Creation Site

Figure 1



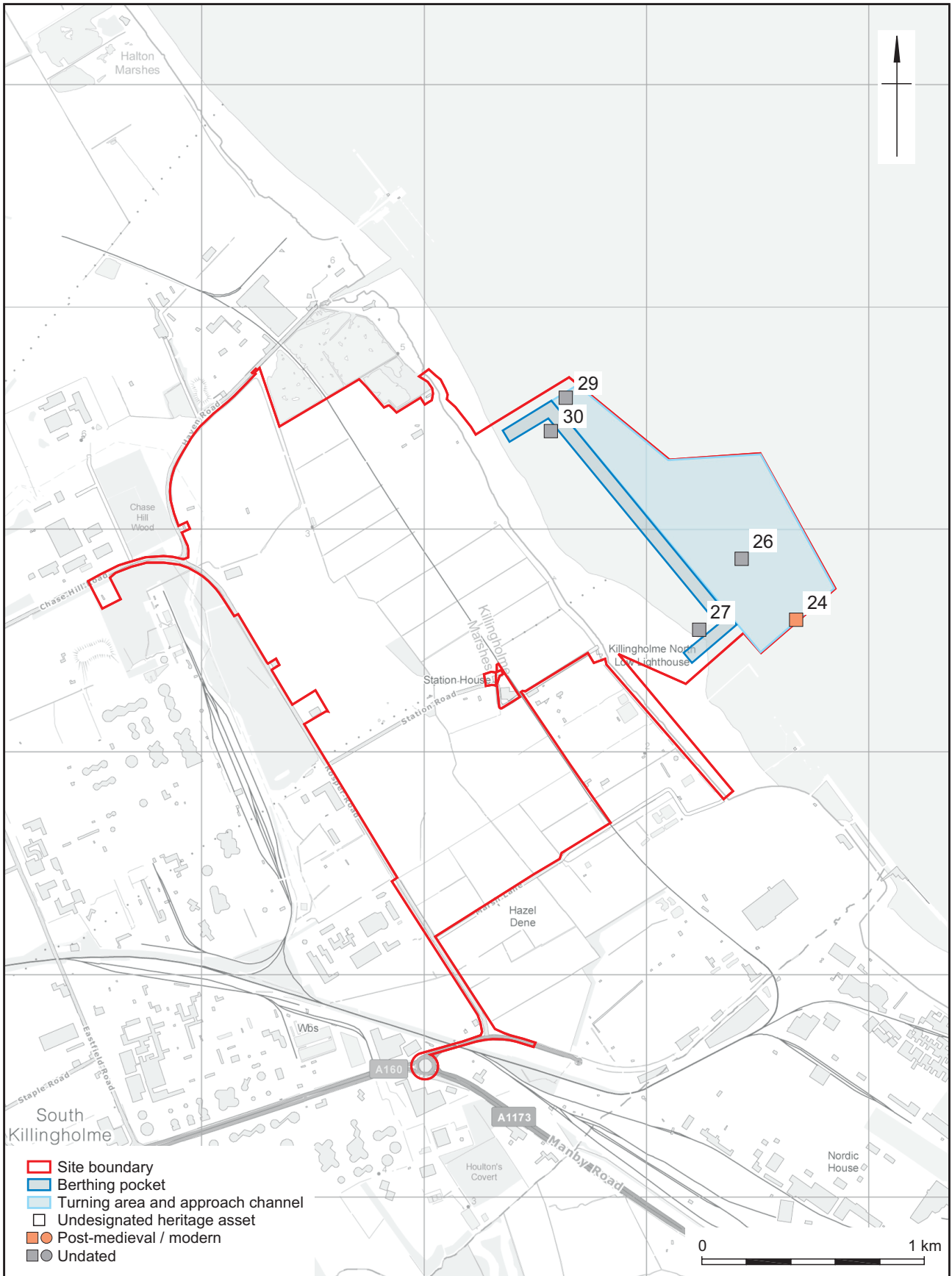
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Marine heritage assets located within and immediately around the maximum extents of the quay construction site

Figure 2



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Marine heritage assets located within and immediately around the maximum extents of the berthing pocket, turning area and approach channel Figure 3