



# Beatrice Offshore Wind Farm

## Marine Archaeological WSI and PAD

June 2016

  
**Beatrice**  
Offshore Windfarm Ltd

Project Title/ Location	Beatrice Offshore Wind Farm
Project Reference Number	LF000005
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# Beatrice Offshore Wind Farm

## Marine Archaeological

## Written Scheme of Investigation

## &

## Protocol for Archaeological Discoveries

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Rev	Prepared By	Sign Off	Checked By	Sign Off	Approved By	Sign Off	Date of Issue
1.0.	Headland Archaeology	Ian Simms, Arcus	Lis Royle, BOWL	Jonathan Wilson, BOWL	Steve Wilson, BOWL		06/05/2015
2.0	Michael Walsh, Cotswold Archaeology		Liz Reynolds, BOWL		Lis Royle, BOWL		07/06/16

## Table of Contents

List of Abbreviations and Definitions .....	4
1 Introduction.....	8
2 BOWL Commitments .....	9
3 Scope of the Marine Archaeological Written Scheme of Investigation and Protocol for Archaeological Discoveries .....	9
4 Archaeological Written Scheme of Investigation .....	10
4.1 Introduction .....	10
4.2 Consultation .....	11
4.3 Proposed Development .....	11
4.4 Known Archaeological and Cultural Heritage Assets and Targets .....	11
4.4.1 Wind Farm and OTM Study Areas.....	11
4.4.2 Offshore Transmission Works Study Areas .....	12
4.5 Archaeological Exclusion Zones (AEZs) .....	12
4.5.1 Location and extent of AEZs .....	13
4.5.2 50 m radius AEZs.....	13
4.5.3 100 m radius AEZs.....	14
4.5.4 Monitoring of AEZs.....	14
4.6 Reporting and Deliverables .....	14
5 Protocol for Archaeological Discoveries.....	14
5.1 Scope.....	14
5.2 Types of Find.....	15
5.3 Legislation and Guidance .....	15
5.4 Potentially Significant Materials .....	16
5.5 Circumstances of Discovery .....	16
5.6 Roles and Responsibilities.....	17
5.7 Lines of Communication .....	17
5.8 Discoveries on the seabed and on the deck of a works vessel .....	18
5.8.1 Preliminary Actions by BOWL or its Contractors.....	18
5.8.2 Initial Actions by the Client Representative.....	18
5.8.3 Initial Actions by ECoW and Client Representative.....	18
5.8.4 Contact the Archaeological Consultant.....	19
5.8.5 Contact the Relevant Authority .....	19

5.8.6	Advise other teams/vessels working on the site .....	19
5.8.7	Establishing new AEZs.....	19
5.8.8	Altering AEZs .....	20
5.9	Finds recovered within the UK twelve nautical mile limit .....	20
5.10	Reporting and Archiving .....	20
6	References .....	22
Appendix A: ES and SEIS Commitments .....		23
Appendix B: Locations and extents of Archaeological Exclusion Zones surrounding cultural heritage assets and targets .....		25
Appendix C: Guidelines for identifying finds of archaeological interest .....		27
Appendix D: Preliminary Record sheets, flow charts and sample storage guidance notes ..		29
Appendix E: Figures.....		34

### List of Abbreviations and Definitions

Term	Description
AEZ	Archaeological Exclusion Zone.
Application	The Application letters and Environmental Statement submitted to the Scottish Ministers by BOWL on 23 April 2012 and Supplementary Environmental Information Statement submitted to the Scottish Ministers by BOWL on 29 May 2013.
Archaeological Consultant	Specialist archaeologists responsible for advising on all archaeological matters relating to the Project that might impact on archaeological and cultural heritage resources.
Asset	Archaeological or cultural heritage remains on the seabed.
BOWL	Beatrice Offshore Windfarm Limited (Company Number SC350248) and having its registered office at Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ.
Client Representative	A representative appointed by BOWL to represent BOWL and act as a first point of contact for Project staff, including all contractors. Will ensure compliance with the terms and conditions of this WSI and PAD so that archaeological and cultural heritage resources are protected. In this document, the term ' <b>Site Champion</b> ' used in guidance (The Crown Estate, 2014) will be replaced with the term <b>Client Representative</b> .
Commencement of the OfTW	The date on which the first vessel arrives on the Site to begin carrying on the Licensable Marine Activity in connection with the construction of the OfTW, as described in Part 2 of the OfTW Marine Licence.
Commencement of the Wind Farm	The date on which Construction begins on the site of the Wind Farm in accordance with the S.36 Consent.
Consent Conditions	The terms that are imposed on BOWL under the S.36 Consent or OfTW Marine Licence that must be fulfilled throughout the period that they are valid.
Construction	As defined at section 64(1) of the Electricity Act 1989, read with section 104 of the Energy Act 2004.
Contractor	Any company working on the Project other than BOWL.

Term	Description
Dead wreck	A recorded wreck that surveys undertaken for the ES and SEIS have failed to identify.
Development	The Wind Farm and the OfTW.
ECow	Ecological Clerk of Works.
EIA	Environmental Impact Assessment.
ES	Environmental Statement, submitted to the Scottish Ministers by the Company on 23 April 2012 as part of the Application as defined above.
Finds	All forms of artefact that can be found on the seabed.
HES	Historic Environment Scotland, the statutory body for archaeology and heritage within Scotland including marine archaeology from the mean high water mark to 200 nautical miles (nm) offshore. They are advisors to Marine Scotland Licensing and Operations Team (MS-LOT) on behalf of Scottish Ministers.
Licencing Authority	The Scottish Ministers.
Licensee	Beatrice Offshore Windfarm Limited, a company registered in Scotland having its registered number as SC350248.
Marine Licences	The written consents granted by the Scottish Ministers under Section 20(1) of the Marine (Scotland) Act 2010, which were issued on 2 September 2014.
MARP	Marine Archaeology Reporting Protocol, the equivalent to a PAD.
MS-LOT	Marine Scotland Licensing Operations Team.
NMRS	National Monuments Record of Scotland
OfTW	Offshore Transmission Works. The OfTW includes the transmission cable required to connect the Wind Farm to the OnTW. This covers the Offshore Transformer Modules (OTMs) and the cable route from the OTMs to the Mean High Water Springs (MHWS) at the landfall west of Portgordon on the Moray coast.



Term	Description
OfTW corridor	The area within which the OfTW cable is to be located as presented in the ES and SEIS.
OTM	Offshore Transformer Module means an alternating current (AC) offshore substation platform (OSP) which is a standalone modular unit that utilises the same substructure and foundation design as a wind turbine generator.
PAD	Protocol for Archaeological Discoveries (equivalent to a MARP), which sets out the procedures that must be followed in the event of archaeological discoveries either on the seabed or on the deck of working vessels and identifies the personnel with responsibility for ensuring that the PAD is implemented.
Preliminary Record	The record of unexpected archaeological discoveries on the seabed, intertidal zone or on the deck of a works vessel.
Project	The construction, operation, maintenance and monitoring of the Development.
Receiver of Wreck	A centralised function, dealing with all reports of wrecks from around the UK including Northern Ireland. It is based within the Maritime and Coastguard Agency headquarters in Southampton, with assistance from Coastguard personnel around the coast.
Relevant Authority	MS-LOT on behalf of Scottish Ministers and Historic Environment Scotland.
ROV	Remotely-operated vehicle.
S.36 Consent	The written Consent granted by the Scottish Ministers under Section 36 of the Electricity Act 1989, on 19 March 2014.
SEIS	Supplementary Environmental Information Statement, submitted to the Scottish Ministers by the Company on 29 May 2013 as part of the Application as defined above.
Site	The area outlined in red in Figure 1 attached to the S.36 Consent at Annex 1, and in black in the Marine Licence in Part 4.
Target	An anomaly on the seabed identified in the geophysical survey data that may be an archaeological feature.

Term	Description
UKHO	United Kingdom Hydrographic Office.
UTM	Universal Transverse Mercator, a grid-based method of mapping locations on the surface of the Earth.
WGS	World Geodetic System, a mapping reference for the Earth for use in navigation.
Wind Farm	The Beatrice Offshore Wind Farm in the outer Moray Firth as assessed in the ES including wind turbines, their foundations and inter-array cabling.
Works	The “Beatrice Offshore Windfarm Ltd. Offshore Transmission Works” (the OfTW), as described in the Marine Licence.
Wreck	Materials that come to be on the seabed as a direct result of once being aboard or part of a vessel or aircraft.
WSI	Written Scheme of Investigation, which establishes the mitigation procedures that must be followed in order to avoid damage to cultural heritage assets and targets of archaeological potential for the entire scope of the Project. The WSI sets out the respective responsibilities of BOWL, the Contractor, and the Archaeological Consultant prior to and during installation, and creates formal lines of communication between the parties and relevant stakeholders.



## 1 Introduction

The Beatrice Offshore Wind Farm (the Wind Farm) received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 19th March 2014 (the S.36 Consent) and was granted two Marine Licences from the Scottish Ministers, one for the Wind Farm and one for the Offshore Transmission Works (OfTW) respectively, on 2nd September 2014 (the Marine Licences).

For the purposes of this document, the Wind Farm and OfTW will be known as the Development. The construction, operation, maintenance and monitoring of the Development will be known as the Project.

This Marine Archaeological Written Scheme of Investigation (WSI) and Protocol for Archaeological Discovery (PAD) is prepared to enable the Conditions of the S.36 Consent and the relevant Marine Licence conditions (the Consent Conditions) to be discharged.

The report contains the following sections:

- Scope of the Marine Archaeological WSI and PAD;
- WSI; and
- PAD.

Table 1.1 sets out the consent conditions which this Archaeology WSI and PAD provides the information required to discharge.

**Table 1.1: Consent Conditions**

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of this WSI and PAD
Section 36	Condition 37	<p>The Company must, no later than 6 months prior to the Commencement of the [Wind Farm], submit a Reporting Protocol which sets out what the Company must do on discovering any marine archaeology during the construction, operation, maintenance and monitoring of the [Wind Farm], in writing, to the Scottish Ministers for their written approval.</p> <p>Such approval may be given only following consultation by the Scottish Ministers with any such advisors as may be required at the discretion of the Scottish Ministers.</p> <p>The Reporting Protocol must be implemented in full, at all times, by the Company.</p> <p><b>Reason: To ensure any discovery of archaeological interest is properly and correctly reported.</b></p>	<p>This WSI and PAD</p> <p>To be undertaken by the Scottish Ministers. Section 3</p>
OfTW Marine Licence	3.2.2.16	<p><b>Marine Archaeology Reporting Protocol (MARP)</b></p> <p>The Licensee must, no later than 6 months prior to the Commencement of the [OfTW], submit a MARP which sets out what the Licensee must do on discovering any marine archaeology during the construction, operation, maintenance and monitoring of the [OfTW], in writing, to the Licensing Authority for their written approval.</p> <p>Such approval may be given only following consultation by the Licensing Authority with any such advisors as may be required at the discretion of the Licensing Authority.</p> <p>The MARP must be implemented in full, at all times, by the Licensee.</p>	<p>This WSI and PAD</p> <p>To be undertaken by the Scottish Ministers. Section 3</p>

## 2 BOWL Commitments

In addition to the conditions in Table 1.1, Condition 8 of the S.36 Consent states “*The [Wind farm] must be constructed and operated in accordance with the terms of the Application and related documents, including the accompanying ES [Environmental Statement], the Supplementary Environmental Information Statement (“SEIS”) and Annex 1 of this letter, except in so far as amended by the terms of this section 36 consent.*”

The ES and SEIS set out a number of commitments in relation to various aspects of the Development (design, monitoring, mitigation etc). The effects of the Development on the cultural heritage and archaeological resource were assessed in the ES and SEIS on the basis that these commitments would be implemented. The commitments were made to ensure that the Development followed good practice in relation to its interaction with archaeology. Appendix A provides an overview of the commitments made in the ES relevant to this WSI and PAD. It also highlights where the commitments are addressed in this WSI and PAD.

## 3 Scope of the Marine Archaeological Written Scheme of Investigation and Protocol for Archaeological Discoveries

This Archaeological WSI and PAD has been prepared based on COWRIE & Wessex Archaeology (2007); The Crown Estate (2014) and The Crown Estate & Wessex Archaeology (2010) guidelines for:

- Desk-based assessments;
- Geotechnical surveys;
- Geophysical surveys;
- Historic environment and setting appraisals.

The WSI establishes the mitigation procedures that must be followed in order to seek to avoid damage to cultural heritage assets and targets of archaeological potential for the scope of the Project. These assets and targets were identified during the Environmental Impact Assessment (EIA) for the Development.

The PAD sets out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries whilst undertaking work related to the Project.

The main objectives of this Archaeological WSI and PAD, following the Model Clauses for Archaeological Written Schemes of Investigation (The Crown Estate & Wessex Archaeology 2010), are to:

- Set out the respective responsibilities of BOWL, their Contractors, the Project ECoW, the Client Representative and the Archaeological Consultant prior to and during the Project, and formal lines of communication between these parties and Marine Scotland Licensing and Operation Team (MS-LOT) and Historic Environment Scotland (HES);
- Establish mitigation procedures to seek to avoid damage to cultural heritage assets and targets of archaeological potential;
- Propose measures for mitigating effects upon archaeological material that may be encountered during the Project;

- Ensure that, in the event that unexpected archaeological discoveries are made, archaeological advice is sought and the discovery is subject to archaeological input, review, recording and sampling; and
- Establish the reporting, publication, conservation and archiving requirements for the archaeological works undertaken in the course of the Project.

The primary mitigation strategy for the protection of archaeological and cultural heritage assets and targets in situ is through avoidance, by implementing site-specific Archaeological Exclusion Zones (AEZs).

The Archaeological Consultant will liaise with BOWL prior to the commencement of the Project to put procedures in place to comply with this WSI and PAD for Marine Archaeology.

BOWL is responsible for the implementation of its obligations under this Archaeological WSI and PAD as well as contractually obliging other parties to implement theirs.

## **4 Archaeological Written Scheme of Investigation**

### **4.1 Introduction**

This WSI sets out the procedures that will be followed in order to protect cultural heritage assets and targets throughout the duration of the Project. Assessments of geotechnical data (Headland Archaeology, 2011a and 2011b), desk-based assessments (Headland Archaeology, 2011c and 2011d) and geophysical survey assessments (Headland Archaeology, 2011e and 2011f) have been conducted for the Wind Farm (WF) and OfTW in order to identify potential cultural heritage assets and targets that may be affected by the Project and to establish their current condition.

This work provided information upon which to base the assessment of the archaeological potential as outlined in the Archaeology and Cultural Heritage chapters in the ES and SEIS. These assessments have been used to identify and delineate the assets and targets and the appropriate buffer zones around these assets and targets forming the Archaeological Exclusion Zones (AEZs).

39 assets and targets within the Development were originally assigned AEZs. In June 2015 BOWL appointed APEM Ltd./ MSDS Marine to undertake a ground truthing survey of 13 of the AEZs which could possibly impact on the proposed design of the Development. The ground-truthing survey was undertaken using a remotely-operated vehicle (ROV). APEM/ MSDS produced an archaeological ground truthing report which recommended that the 13 AEZs be removed (Ref.: LF000005-REP-575). Headland Archaeology reviewed this report and confirmed that all 13 AEZs should have their AEZ designations removed in their report Beatrice Offshore Windfarm Review of Archaeological Exclusion Zones (Ref.: LF000005-REP-666). Subsequently Historic Environment Scotland (HES) and MS-LOT confirmed their agreement with the removal of the 13 AEZs on 04 November 2015 (via letter ref: LF000005-LET-292) and 14 January 2016 (via email ref: LF000005-EMA-242) respectively. The remaining 26 AEZs, which remain the scope of this WSI, are listed in Appendix B.

Due regard will be given to the remaining twenty six AEZs in the design of the Wind Farm and OfTW, and they will be implemented by BOWL prior to commencement of the Project.

## 4.2 Consultation

The Archaeological WSI and PAD was formally accepted by MS-LOT on 22 May 2015, and section 36 condition 37 and Marine Licence (OfTW) condition 3.2.2.16 discharged. Further consultation has taken place with MS-LOT and HES to discuss the results of the ground truthing survey and the Headland Archaeology review of same. In agreement with MS-LOT and HES this WSI and PAD has been updated to remove the 13 AEZs.

## 4.3 Proposed Development

The works encompassed by the Archaeological WSI include the construction of the Wind Farm of around 84 wind turbine generators (WTGs) and associated infrastructure including inter-array cabling to the connection point on the two Offshore Transformer Modules (OTMs). The associated export cable corridor will cover a distance of approximately 60 km before making landfall near Portgordon.

Elements of the Project have the potential to affect archaeological and cultural heritage assets and targets.

## 4.4 Known Archaeological and Cultural Heritage Assets and Targets

Archaeological and cultural heritage assets and targets described hereafter are separated into either the Wind Farm or the OfTW. Cultural heritage assets and targets are further divided into their respective Inner and Outer Study Areas (ISA and OSAs). An overview of the Development area can be seen in Figure 1, in Appendix E.

For the Wind Farm site, which includes the OTMs, the ISA is comprised of the proposed Site, while the OSA is comprised of a 1 km buffer zone beyond the proposed Site.

For the OfTW export cable corridor, the ISA is comprised of the OfTW corridor, while the OSA comprises a 1 km buffer zone beyond the OfTW corridor.

### 4.4.1 Wind Farm and OTM Study Areas

The following archaeological and cultural heritage assets and targets within the ISA of the Wind Farm and OTMs, as shown in Figure 2 of Appendix E, were identified from the marine geophysical survey assessment (Headland Archaeology, 2011e):

- Nine targets (HA2, HA22, HA41, HA53, HA111, HA130, HA137, HA139 & HA140) were unidentified. These targets displayed features that could be interpreted to be of archaeological significance. They were therefore considered to be of medium potential for this assessment. Two of these targets (HA22 and HA111) were subsequently investigated further using a ROV and were found to be of no archaeological interest (Ref: LF00005-REP-666)
- There are no designated archaeological or cultural heritage assets or targets within the ISA.

The following cultural heritage assets and targets within the OSA of the Wind Farm, as shown in Figure 2 of Appendix E, were identified during the marine geophysical survey assessment (Headland Archaeology, 2011e):

- One wreck (HA1) of high potential was identified which is charted by the United Kingdom Hydrographic Office (UKHO) (Headland Archaeology, 2011c);
- Three targets (HA122, HA136 & HA138) of medium archaeological potential were

identified from the marine geophysical survey assessment (Headland Archaeology, 2011e), one of which (HA136) was investigated using a ROV and found to be geological in nature (Ref: LF000005-REP-666);

- There are no designated archaeological or cultural heritage assets or targets within the OSA.

#### 4.4.2 Offshore Transmission Works Study Areas

Archaeological and cultural heritage assets and targets for the OfTW ISA and OSA are shown in Figures 3 to 5 in Appendix E. The following cultural heritage assets and targets within the ISA of the OfTW were identified during the marine geophysical survey assessment (Headland Archaeology, 2011f):

- Fourteen targets (HA17, HA20, HA28, HA33, HA63, HA87, HA90, HA102, HA126, HA127, HA133, HA135, HA154, & HA156) of medium archaeological potential were identified from the marine geophysical survey assessment (Headland Archaeology, 2011f). Ten of these targets (HA17, HA20, HA28, HA33, HA63, HA87, HA126, HA127, HA135 & HA156) were investigated using a ROV and were found to be of no archaeological interest (Ref: LF000005-REP-666);
- There are no designated archaeological or cultural heritage assets or targets within the ISA.

The following cultural heritage assets and targets within the OSA of the OfTW, were identified within the OSA during the marine geophysical survey assessment (Headland Archaeology, 2011e):

- One target (HA68) of high potential was identified from the marine geophysical survey assessment (Headland Archaeology, 2011f);
- Four targets (HA52, HA61, HA121, HA143) of medium potential were identified from the marine geophysical survey (Headland Archaeology, 2011f);
- Eight wrecks (HA1001 - HA1008) from UKHO records were reported in the desk based assessment (Headland Archaeology, 2011d), and confirmed during the geophysical survey:
  - a. Five wrecks (HA1001, HA1003, HA1005, HA1006, HA1008) are 'live' and therefore high potential;
  - b. Three wrecks (HA1002, HA1004, HA1007) are 'dead':
    - i. Two (HA 1002, HA1004) are of medium potential;
    - ii. One (HA1007) is considered to be of low potential, having not been detected in the survey and having coordinates which are known to be unreliable.
- There are no designated archaeological or cultural heritage assets or targets within the OSA.

#### 4.5 Archaeological Exclusion Zones (AEZs)

AEZs will be the principal means used to preserve in situ any sites or deposits of potential or known archaeological interest. In all cases, known and potential cultural heritage assets and targets will be avoided. AEZs were originally established based on the results of the



completed archaeological assessments (Headland Archaeology, 2011a to 2011f). Further investigation of thirteen targets originally ascribed AEZs, using a ROV, demonstrated that these targets had little or no archaeological potential and therefore did not warrant protection, so in consultation with HES and MS-LOT these AEZs have been removed. All remaining AEZs have been established in consultation with HES. The remaining AEZs will be in place for the entire duration of the Project, unless otherwise altered or removed (see sections 5.8.7 and 5.8.8).

The locations and extents of all AEZs are outlined in Appendices B and C and will be conveyed to BOWL's key Contractors, the Client Representative and the ECoW through this report to ensure all Project staff respect their boundaries. The importance of respecting the AEZs will be emphasised at Toolbox talks for each phase of the Project by the Archaeological Consultant in collaboration with the ECoW.

#### 4.5.1 Location and extent of AEZs

AEZs are required for all known sites of high, medium and uncertain potential where the location of the archaeological asset or target is known, or where the asset or target has at one time been identified by geophysical/diver/ROV survey. AEZs are asset or target specific depending on the extent of the site or wreckage, and are based on their archaeological potential. Sites of a high potential have been assigned AEZs with a radius of 100 m and sites of medium potential have been assigned AEZs with a radius of 50 m.

AEZs comprise a circular zone centred on a point on each site. The radius of the zone will vary according to the archaeological potential of each site (see sections 4.5.2 and 4.5.3).

AEZs will be respected by any activities that may disturb the seabed.

Based on the assessments undertaken as part of the ES and SEIS, thirty-nine assets and targets were originally assigned AEZs (around assets and targets set out in Section 4.4). Further investigations using a ROV resulted in the removal of thirteen of these AEZs, see Section 4.5. Twenty-six AEZs remain and will be respected throughout the duration of the Project unless otherwise agreed with HES and MS-LOT.

The gazetteer of the 26 AEZs surrounding cultural heritage assets and targets can be found in Appendix B.

#### 4.5.2 50 m radius AEZs

Nineteen archaeological assets and targets have been ascribed AEZs of a 50 m radius as they have been assessed to be of medium potential.

- Seventeen are geophysical:
  - Seven (HA2, HA41, HA53, HA130, HA137, HA139 & HA140) are located within the ISA of the Wind Farm;
  - Two (HA122 & HA138) are located within the OSA of the Wind Farm;
  - Eight (HA52, HA61, HA90, HA102, HA121, HA133, HA143 & HA154) are located within the ISA of the OfTW;
- Two (HA1002 & HA1004) are 'dead' wrecks charted by the UKHO. All are located within the OSA of the OfTW.

#### 4.5.3 100 m radius AEZs

Seven archaeological assets and targets have been ascribed AEZs of a 100 m radius as they have been assessed to be of high potential.

- Six are wrecks charted by the UKHO:
  - One (HA1) is located within the OSA of the Wind Farm;
  - Five (HA1001, HA1003, HA1005, HA1006, & HA1008) are located within the OSA of the OfTW;
- One is a geophysical anomaly:
  - Target (HA68) is considered of high potential. It is located within the OSA of the OfTW.

#### 4.5.4 Monitoring of AEZs

The effectiveness of the AEZs will be periodically monitored by the Archaeological Consultant with support from the Client Representative and the ECoW to ensure their efficacy. If deemed necessary, these may be monitored by periodic consultations between works crews and the Archaeological Consultant when construction is being planned in particular areas considered to be of medium or high archaeological potential.

No activities associated with the Project will 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 Archaeological Consultant in accordance with their obligations with respect to AEZs and the detail of this WSI as relevant to any identified AEZs.

If deemed necessary by it, the Archaeological Consultant will periodically visit the construction teams when construction activities are being planned in particular areas considered to be of medium or high archaeological potential.

BOWL will issue regular compliance reports during the construction of the Development, which will include a section on archaeology with specific emphasis on AEZs and any archaeological discoveries made during operations associated with the Project. The reports will also include any recommendations regarding amendment of the extent, removal and/or creation of new AEZs, and whether there are still archaeological grounds for maintaining each AEZ. These decisions must be made by the Archaeological Consultant representing BOWL in consultation with MS-LOT and HES.

### 4.6 Reporting and Deliverables

On completion of the different stages of the Project, if deemed necessary by the Archaeological Consultant and BOWL, a report may be compiled on the effectiveness of the AEZs, any alterations to them (as described in section 5.8.8), and the results of monitoring. This will be determined in consultation with MS-LOT and HES.

## 5 Protocol for Archaeological Discoveries

### 5.1 Scope

This PAD sets out best practice in the reporting of finds of archaeological interest during the Project based on guidance produced by The Crown Estate for offshore wind developments



(The Crown Estate, 2014). The principles that are set out here are intended to address mitigation measures for any archaeological and cultural heritage assets and targets that have not been identified to date.

BOWL is responsible for implementing its obligations under this PAD, as well as contractually obliging the other parties to implement theirs.

## **5.2 Types of Find**

Finds are considered here to mean all forms of artefact that can be found on the seabed. To be an artefact, the item must have been made, modified, used or transported by people; i.e. their presence on the seabed is 'artificial' or 'cultural' rather than 'natural'. Guidelines on the identification of finds of archaeological interest are presented in Appendix C.

For legal purposes, finds from the seabed fall into two categories. Wreck has a specific legal definition broadly encompassing materials that come to be on the seabed as a direct result of once being aboard or part of a vessel or aircraft. Statutory law relating to wreck is set out principally in the Merchant Shipping Act 1995, applicable to territorial waters out to twelve nautical miles. The common law relating to wreck is to be found in legal cases. All other finds are referred to as 'non-wreck'. 'Non-wreck' includes things such as prehistoric flint artefacts that were lost on land that has since been inundated by rising sea level, or artefacts that have been eroded from sites on the shore. The law applicable to 'non-wreck' is largely common law, to be found in legal cases.

## **5.3 Legislation and Guidance**

For sites or finds of archaeological and cultural heritage interest discovered in offshore waters, principles of good practice for the protection of archaeological remains set out in international legislation and guidance are relevant. Such legislation and guidance include;

- The United Nations Convention on the Law of the Sea 1982 (UNCLOS 1982) which provides international protection of archaeological and historical objects located on the seabed (ratified by the UK in 1997);
- The ICOMOS Charter (1996) on the Protection and Management of Underwater Cultural Heritage, which aims to encourage the protection and management of underwater cultural heritage in inland, near shore and offshore waters. The Charter provides decision makers, such as curators, and archaeologists with criteria for the management of archaeological projects and is important as a statement of international 'best practice' for the investigation of underwater cultural heritage;
- The Valletta Convention which was ratified by the UK Government in 2000, came into force in 2001. The convention requires the implementation of protective measures for the archaeological heritage within the jurisdiction of each party, including marine areas. Insofar as the UK exerts jurisdiction over the Continental Shelf, then it would appear that the provisions of the Valletta Convention apply to that jurisdiction; and
- The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001 (UNESCO 2001) provides an international legal framework to regulate underwater cultural heritage in domestic and international waters. The Convention is not currently ratified by the UK Government, but the Annex outlining rules and standards for conducting archaeological investigations is accepted by UK Government as 'best practice'.

#### **5.4 Potentially Significant Materials**

It is possible that during construction a range of archaeological and palaeo-environmental materials may be recovered. Palaeo-environmental materials may include waterlogged organics from deposits of peat to large wooden timbers from the remains of trees from submerged forests. These deposits and materials are important as they offer an opportunity to reconstruct former terrestrial (peat) environments through the analysis of microfossil (e.g. pollen and spores) and macrofossil (e.g. seeds and insect analysis) evidence. Waterlogged wood from former trees (e.g. submerged forests) offers a unique opportunity to analyse the original woodland from thousands of years ago through analyses such as tree species identification and dendrochronology (the study of tree-rings). The importance of such deposits and materials for palaeo-environmental study is well recognised (English Heritage 2002, 2007).

Materials of a more artefactual and hence archaeological nature may also be recovered from samples including lithic artefacts (e.g. flint tools) and pottery fragments, together with potential timbers from watercraft. The recovery and subsequent analysis of such items can identify previously unknown archaeological sites such as shipwrecks and prehistoric occupation sites. The latter are of particular interest in areas of drowned landscapes (former terrestrial areas now submerged by relative sea-level rise) with sampling of this nature providing a rare opportunity to recover materials from and hence discover such sites. This is particularly pertinent in light of recent work undertaken on submerged landscapes like the prehistoric site of Doggerland (Gaffney et al 2009).

Faunal and human bone may also be found during construction. Any recovered bone fragments (burnt and unburnt) can potentially provide information regarding populations that inhabited the area in the past. The analysis of human bone (osteo-archaeology) can provide details of sex, age and any trauma suffered by the individual. Isotopic analysis of bone and in particular teeth can also provide information on the diet and movement of the individual during their lifetime. Any human bone recovered will be recorded in accordance with Historic England guidelines (English Heritage 2004). Animal bone can also be analysed for information on the species present and possibly evidence for butchery or gnawing, which may provide information regarding how they died and/or how their remains were used. Any animal bone recovered will also be recorded in accordance with Historic England guidelines (English Heritage 2002).

#### **5.5 Circumstances of Discovery**

The PAD addresses finds of archaeological or cultural heritage interest as set out in 5.4 above and Appendix C made in the following circumstances:

- Discoveries on the seabed during seabed inspections, seabed clearance or scheme installation:
  - For example, an anomaly (such as possible wreck or a cultural heritage feature identified during any stage of the Project) has been encountered on the seabed.
- Discoveries on board. A find of archaeological interest is made on a works vessel:
  - For example wreck or objects recovered to the deck caught in equipment such as grapnels, anchors, or ploughs.

## 5.6 Roles and Responsibilities

### *Client Representative*

For the Project, BOWL will identify a Client Representative, (who will represent BOWL) to act as a first point of contact for Project staff, including all contractors. Included in their responsibilities will be to liaise with the ECoW in respect of the implementation of the PAD during the course of the Project. The Client Representative will be issued with a series of preliminary record sheets and flow charts (see Appendix D: Preliminary Record sheets and flow charts), setting out the actions to be taken when they are told about a discovery either on the seabed or on the deck of the vessel.

### *Ecological Clerk of Works (ECoW)*

The ECoW is the representative from BOWL who will be responsible for liaison with the Archaeological Consultant and the Client Representative on a day to day basis. The ECoW will be familiar with the requirements set out in the Archaeological WSI and PAD.

### *Archaeological Consultant*

The Archaeological Consultant will be the initial point of contact for the ECoW. They shall:

- Brief the Client Representative on the nature of archaeological finds and features and appropriate measures for interim conservation and safe storage;
- Advise on the identification of finds and features of interest and, if possible, the character of their seabed locations;
- Advise on material conservation of any recovered finds;
- Agree appropriate actions to be taken; and
- Where appropriate, pass on all details and records associated with any discoveries to MS-LOT and HES.

### *Relevant Authorities*

MS-LOT, acting on behalf of Scottish Ministers, is responsible for discharging BOWL Consent Conditions.

HES is the statutory body for archaeology and cultural heritage within Scotland including marine archaeology in waters adjacent to the Scottish coast up to the mean high water mark and out to 200 nautical miles.

In the event that the Archaeological Consultant and BOWL consider it necessary, HES and MS-LOT will be informed of any archaeological or cultural heritage finds, and will as soon as practicable:

- Liaise with other relevant archaeological authorities;
- Advise on proposals to further evaluate any finds; and
- Advise on proposals to mitigate the effects of work activities upon any finds, if required.

## 5.7 Lines of Communication

Contractors will report any discoveries to BOWL's Client Representative and the ECoW. The ECoW has a wide ranging role across the Project in relation to the implementation of mitigation and monitoring compliance with the consent. In the event of an archaeological

discovery, the ECoW will liaise with the Archaeological Consultant to provide them with the details of the reported discovery. The Archaeological Consultant will assess the nature of the appropriate action to be taken, and whether to contact HES and MS LOT.

The Archaeological Consultant will also brief BOWL, BOWL's key Contractors, the Client Representative and the ECoW on the types of archaeological finds and features that may be encountered during the course of the Project, including the possible importance of such finds. Key staff will be briefed on the operation of the PAD prior to the commencement of work on each phase of the Project, and at regular intervals during each phase if required.

## **5.8 Discoveries on the seabed and on the deck of a works vessel**

The following presents the actions to be taken in the event of an archaeological discovery during the course of the Project. The preliminary record sheets and flow charts illustrating the actions to be followed are presented in Appendix D: Preliminary Record sheets and flow charts.

### **5.8.1 Preliminary Actions by BOWL or its Contractors**

If a find is discovered on the deck of a vessel or an anomaly or structure has been encountered on the seabed, the Contractor shall inform the Client Representative. The Client Representative will examine any archaeological material and will arrange for sub-sea gear to be examined to see if any archaeological material is recovered with it, as soon as practicable after it has been discovered.

### **5.8.2 Initial Actions by the Client Representative**

Where it is possible to identify the position from which the find originated, the Client Representative may arrange for a Temporary Exclusion Zone (TEZ) within which construction activities must temporarily cease until the advice of the Archaeological Consultant has been obtained. The feedback and advice of the Archaeological Consultant will be available 24 hours a day in order to provide the necessary response required during any survey or offshore construction activity.

The Client Representative shall record the occurrence as soon as possible in the Daily Progress Report or vessel log together with the time and exact vessel position. Where possible, the report entry should include a close approximation of the original position of the anomaly on the seabed. Additionally, the Client Representative shall ensure that the area, if possible, shall be marked on navigational software, site drawings and survey charts. The Client Representative shall compile a Preliminary Record of the occurrence both for discoveries on the seabed and on the deck of the vessel.

The Client Representative shall inform the ECoW of the occurrence as soon as possible and pass on all available information, including a copy of the Preliminary Record and copies of any photographs, drawings or other relevant records made. If any finds have been recovered, the Client Representative shall arrange for them to be immersed in seawater in a suitable clean container, which should be covered. Any rust, concretion or marine growth should not be removed. The flow charts in Appendix D present the procedures to be followed in the event of a discovery.

### **5.8.3 Initial Actions by ECoW and Client Representative**

Once informed of a find by the Client Representative, the ECoW will confirm with the Client Representative that all the details set out in the Preliminary Record are comprehensive and

correct. The ECoW shall ensure that any find is appropriately assessed and documented by the Archaeological Consultant and if deemed necessary reported to the Relevant Authority.

The ECoW should be contacted as follows:

*[To be inserted near time of construction.]*

#### 5.8.4 Contact the Archaeological Consultant

The ECoW will approach the Archaeological Consultant who will offer advice on the nature of any discoveries and ensure appropriate action is taken.

The Archaeological Consultant should be contacted as follows:

*[To be inserted near time of construction.]*

#### 5.8.5 Contact the Relevant Authority

In the event that the Archaeological Consultant and BOWL consider it necessary, HES and MS-LOT will be informed by the Archaeological Consultant for further advice. All available information relating to the circumstances of the occurrence, including a copy of the Preliminary Record and copies of any photographs, drawings or other records that have been made will be passed on to the HES and MS-LOT.

HES and MS-LOT should be contacted as follows:

Philip Robertson Historic Environment Scotland Longmore House Salisbury Place Edinburgh EN9 1SH Tel: 0131 668 8843	Alexander Ford Marine Scotland Licensing Operations Team 375 Victoria Road Aberdeen AB11 9DB Tel: 01224 295579
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#### 5.8.6 Advise other teams/vessels working on the site

Where relevant, the Client Representative shall inform other vessels working in the area from which a find is thought to have been recovered. Such other vessels shall be advised by the ECoW to keep a particular watch for anomalies and finds.

#### 5.8.7 Establishing new AEZs

If new finds of archaeological importance come to light during the course of the Project they may be subject to the implementation by BOWL of a new AEZ based on their archaeological potential. This decision will be taken by BOWL and the Archaeological Consultant in consultation with MS-LOT and HES for any marine construction activities within the Wind Farm and OfTW area.

#### 5.8.8 Altering AEZs

If archaeological material is discovered during the course of the Project, then AEZs may be altered (enlarged, reduced, moved or removed) as a result. These discoveries might include material recovered during the course of construction works on the Project. Any alteration will be defined by BOWL and the Archaeological Consultant in consultation with MS-LOT and HES and will be communicated via the ECoW or Client Representative to key Contractors and staff working on the Project.

Should an encroachment of an AEZ be unavoidable then further archaeological investigation will be undertaken in consultation with the Archaeological Consultant in order to enable micro-siting within the AEZ to avoid any cultural heritage assets and targets.

#### 5.9 Finds recovered within the UK twelve nautical mile limit

The ECoW shall make any recovered finds available for inspection by MS-LOT and HES. If the find is, or appears to be wreck, the ECoW shall as soon as possible give notice that a find has been recovered to the Receiver of Wreck in accordance with Section 236(1) of the Merchant Shipping Act 1995. This is a legal requirement.

The Receiver of Wreck can be contacted as follows:

Receiver of Wreck  
Bay 1/05  
Spring Place  
105 Commercial Road  
SOUTHAMPTON  
SO15 1EG  
Telephone: 023 8032 9474  
Fax: 023 8032 9477

#### 5.10 Reporting and Archiving

Reporting activities may include the results of archaeological assessment of serendipitous discoveries during the Project, and the effectiveness and/or implementation of new exclusion zones. On completion of the different stages of works related to the Project, an archaeological summary report may also be prepared to synthesize the results of any reports noted. If a final archaeological report is deemed necessary by BOWL after appropriate consultation it will address the following themes:

- Maritime sites and finds; and
- Palaeo-environmental and submerged prehistoric archaeology.

Archaeological reports produced as a result of the implementation of the PAD will be sent for review to MS-LOT and HES prior to finalisation.

BOWL will be responsible for ensuring that copies of any archaeological assessment or summary reports are deposited with the National Record for the Historic Environment with a digital copy of the report.

Reference to all archaeological assessment work will be made in any summary report which



will consolidate the key results of the archaeological assessment undertaken upon completion of a Project phase. The final report will be delivered to MS-LOT and HES for consultation in a timely manner upon completion of the works.

Any samples, finds or objects of cultural heritage interest that may be recovered during the works will be handled and stored in the appropriate manner under the guidance of the Archaeological Consultant, curators and staff from the receiving institution. All subsequent decisions regarding the handling, transport and storage of retained finds will be agreed with the relevant authority and the relevant staff from the allocated receiving institution.

Depending on outcomes, each element of work may give rise to one or more reports, the provision of which will be the responsibility of the BOWL through their appointed Archaeological Consultant.



## 6 References

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## Appendix A: ES and SEIS Commitments

Document	Chapter No.	Chapter	Ref (page, para)	Details of Commitment	Reference to Section in WSI/PAD
ES	15	Wind Farm Marine Archaeology and Cultural Heritage	74 p. 21	Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation which may include diver survey or Remote Operated Vehicle (ROV) investigation will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed upon with Historic Environment Scotland.	Section 4 and 5
	26	OFTW Marine Archaeology and Cultural Heritage	59 P. 14		
ES	15	Wind Farm Marine Archaeology and Cultural Heritage	75 p. 21	Where cultural heritage assets and targets may potentially be subject to secondary physical effects during construction and operation, temporary exclusion zones will be implemented to prevent these resulting from invasive activities, such as cable installation, anchoring or installation of jack-up vessels. Exclusion zones of 100 m will be established around sites identified as being of high sensitivity in this assessment, while an exclusion zone of a minimum 50 m will be established around those of medium sensitivity.	Section 4.5
	26	OFTW Marine Archaeology and Cultural Heritage	61 p. 14		
ES	26	OFTW Marine Archaeology and Cultural Heritage	60 p. 14	All sites of cultural heritage interest will be avoided where possible with the implementation of temporary exclusion zones and the micro-siting and re-routing of the OFTW cable. In addition, data gathered as part of pre and post-installation geophysical and geotechnical survey should be made available for archaeological assessment.	Section 4.5
ES	26	OFTW Marine Archaeology and Cultural Heritage	61 p. 14	In the event that dynamic positioning systems are used for operational vessels, the implementation of temporary exclusion zones may be deemed unnecessary and appropriate alternative archaeological mitigation agreed with Historic Environment Scotland.	DP vessels will follow the same protocols as all vessels, as set out in Section 5.8.2.
ES	15	Wind Farm Marine Archaeology and Cultural Heritage	77 p. 22	In order to mitigate the risk of damage to any previously unrecorded archaeological remains, an archaeological Protocol for Archaeological	Section 5

Document	Chapter No.	Chapter	Ref (page, para)	Details of Commitment	Reference to Section in WSI/PAD
	26	OfTW Marine Archaeology and Cultural Heritage	62 p.14	Discoveries (PAD) will be prepared for the approval of Historic Environment Scotland and Moray Council Archaeologist to mitigate direct or secondary effects in the event of any unexpected discoveries of archaeological remains during installation.	
ES	26	OfTW Marine Archaeology and Cultural Heritage	64 p.14	A WSI (Written Scheme of Investigation) will be implemented	Section 4 <b>Error! Bookmark not defined.</b>

## Appendix B: Locations and extents of Archaeological Exclusion Zones surrounding cultural heritage assets and targets

HA No.	Name/Type	SeaZone ID/ UKHO ID	NMRS ID	Status	Position WGS 84 UTM 30N	Location	Study Area	Extent of AEZ buffer
HA2	Sonar Target				503988.1 6452797.9	WF	ISA	50 m radius
HA41	Sonar Target				509895.6 6461456.1	WF	ISA	50 m radius
HA53	Sonar Target				510640 6462129.2	WF	ISA	50 m radius
HA130	Sonar Target				509703.2 6462000.9	WF	ISA	50 m radius
HA137	Sonar Target				504159.15 6456488.94	WF	ISA	50 m radius
HA139	Sonar Target				507805.04 6463086.4	WF	ISA	50 m radius
HA140	Sonar Target				508585.71 6464099.88	WF	ISA	50 m radius
HA1	Carisbrook (possibly)				515045 6461955	WF	OSA	100 m radius
HA122	Sonar Target				500505.6 6449732.6	WF	OSA	50 m radius
HA138	Sonar Target				504831.35 6462581.89	WF	OSA	50 m radius
HA52	Sonar Target				498347.52 6392925.68	OFTW	Inner	50 m radius
HA61	Sonar Target				498398.56 6393553.55	OFTW	ISA	50 m radius
HA68	Wreck				498407.62 6393620.09	OFTW	ISA	100 m radius
HA90	Sonar Target				498311.99 6394662.17	OFTW	ISA	50 m radius
HA102	Sonar Target				498267.34 6393862.75	OFTW	ISA	50 m radius
HA121	Sonar Target				497834.03 6430902.59	OFTW	ISA	50 m radius
HA133	Sonar Target				498987.44 6443815.26	OFTW	ISA	50 m radius
HA143	Sonar Target				497084.81 6421066.66	OFTW	ISA	50 m radius
HA154	Sonar Target				498979.07 6443812.46	OFTW	ISA	50 m radius
HA1001	Sunbeam (possibly)	00897		Live	496719.788 6439047.215	OFTW	OSA	100 m radius
HA1002	Day Jet	00895		Dead	498924.265 6428676.953	OFTW	OSA	50 m radius
HA1003	Unknown Craft	02119	101775	Live	497031.018 6422183.054	OFTW	OSA	100 m radius
HA1004	Unknown Craft	02116	101773	Dead	498756.869 6418503.008	OFTW	OSA	50 m radius

HA No.	Name/Type	SeaZone ID/ UKHO ID	NMRS ID	Status	Position WGS 84 UTM 30N	Location	Study Area	Extent of AEZ buffer
HA1005	John Dunkin	02096	101769	Live	497192.683 6417336.969	OfTW	OSA	100 m radius
HA1006	Unknown Aircraft	02117	101711	Live	497335.503 6410124.405 (Position Unreliable)	OfTW	OSA	100 m radius
HA1008	Bpt No 31	02068		Live	496876.409 6391921.638	OfTW	OSA	100 m radius

## Appendix C: Guidelines for identifying finds of archaeological interest

(from The Crown Estate & Wessex Archaeology 2010)

### *Rubber, plastic etc.*

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

### *Iron and steel*

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

### *Other metals*

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

### *Bone*

Occasional discoveries of animal bone, teeth and tusks are of archaeological interest because they may date to periods when the seabed formed dry land, and should be reported. Such bones, teeth, tusks etc. may have signs of damage, breaking or cutting that can be directly attributed to human activity. Large quantities of animal bone may indicate a wreck (the remains of cargo or provisions) and should be reported. Human bone is definitely of archaeological interest, and is also subject to special legal requirements under the Burial Act 1857. Any suspected human bone should be reported, and treated with discretion and respect. Objects made out of bone – such as combs, harpoon points or decorative items – can be very old and are definitely of archaeological interest. All occurrences should be reported.

### *Wood*

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

### *Stone*

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

### *Pottery*

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

### *Brick*

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

### *Peat and clay deposits*

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

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



## **Appendix D: Preliminary Record sheets, flow charts and sample storage guidance notes**

### **Example of Preliminary Record sheet for discoveries on the seabed**

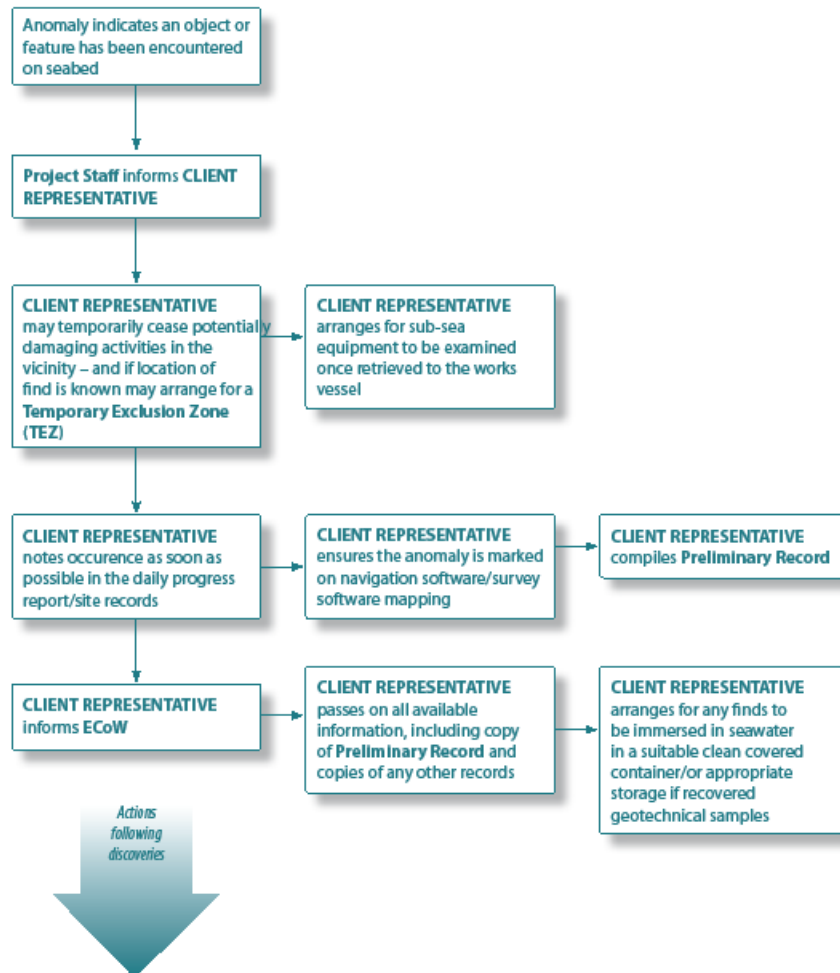
<b>Discoveries on the Seabed: Preliminary Record</b>	
Vessel Name:	
Working Area:	
Date:	
Time of compiling information:	
Name of compiler (Client Representative):	
Name of Officer on Watch:	
Name of finder (if different to above):	
Time at which anomaly encountered:	
Vessel position at time when anomaly was encountered:	
Original position of the anomaly on the seabed:	
Notes on likely accuracy of original position stated above:	
Description of the anomaly:	
Apparent extent of the anomaly:	
Details of examination of gear:	
Details of any find(s) recovered:	
Details of photographs taken of the find(s):	
Details of any drawings or other records made of the find(s):	
Details of treatment given to any recovered find(s) (see Sample Storage Guidance Notes):	
Any other notes:	
Date and time at which ECoW informed:	

**Example of Preliminary Record sheet for discoveries on the deck of the vessel**

<b>Discoveries on the vessel deck: Preliminary Record</b>	
Vessel Name:	
Working Area:	
Date:	
Time of compiling information:	
Name of compiler (Client Representative):	
Name of Officer on Watch:	
Name of finder (if different to above):	
Time at which find(s) is encountered:	
Vessel position at time when the find(s) was encountered (if possible):	
Original position of the find(s) on the seabed (if possible):	
Notes on likely accuracy of original position stated above:	
Description of the find(s):	
Details of examination of gear:	
Details of any find(s) recovered:	
Details of photographs taken of the find(s):	
Details of any drawings or other records made of the find(s):	
Details of treatment given to any recovered find(s):	
Any other notes:	
Date and time at which ECoW informed:	

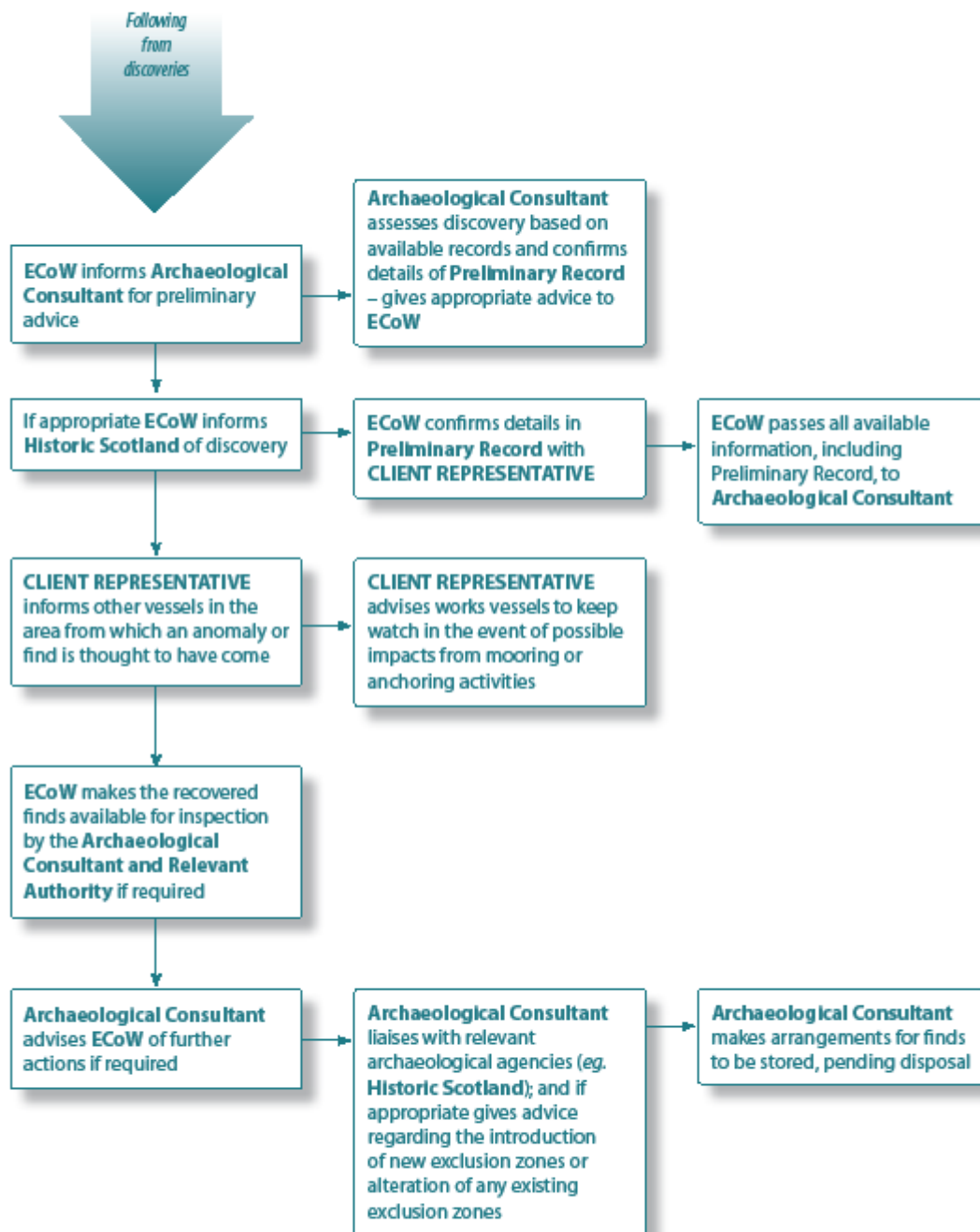
The flow charts on the next pages present the procedures to be followed for discoveries on the seabed; on the deck of a vessel; and actions following discoveries.

### Discoveries on the seabed and on board flow chart



- For the Beatrice Off Shore Wind Farm:
- **ECoW** - Environmental Clerk of Works is the Nominated Contact
  - **Client Representative** is the Site Champion
  - **Relevant Authority** is Historic Scotland and MS LOT

## Actions following discoveries flow chart



For the Beatrice Off Shore Wind Farm:

- **ECoW** - Environmental Clerk of Works is the Nominated Contact
- **Client Representative** is the Site Champion
- **Relevant Authority** is Historic Scotland and MS LOT

### **Sample Storage Guidance Notes**

The section below offers some further information on the correct storage of any samples, including waterlogged wood that might be recovered during the geotechnical survey and is in accordance with English Heritage guidelines (2002, 2010).

Sample storage for any recovered samples:

- a. Make sure all samples are correctly labelled with location and depth information and method of recovery;
- b. Make sure all samples are wrapped using cling film; and
- c. Make sure all samples are stored either in a cool dark room, preferably a cold room or refrigerator (or chest freezer if possible).

Any wooden objects or timbers recovered should be treated as samples until its provenance can be verified by a relevant specialist. Such objects may include timbers of unknown ship wrecks, wooden fish traps, and worked wood from trackways together with individual wooden objects. Therefore the following guidelines should be carried out in relation to the recovery of such objects in accordance with those set-out by English Heritage (2010).

Sample storage for waterlogged wood finds:

- a. The co-ordinates of any worked wood found should be recorded so that it can be related back to the location of any potential archaeological feature, such as a wreck, a trackway or possible occupation site;
- b. For worked wood a worked wood recording sheet should also be completed to glean as much information as possible in the field – this can be completed by the Environmental Archaeologist following recovery;
- c. The wood should be wrapped in cling film and placed into a sample/zip-locked bag with water, to stop the wood from drying out;
- d. The sample bag should be clearly labelled with wood sample together with location, sample number and depth recorded (e.g. 5 cm);
- e. Any particularly fragile wooden objects should be placed into bags, which are then stored in rigid plastic boxes to prevent damage;
- f. Any timbers recovered which are too large to be placed in bags should be wrapped in cling film, labelled and placed into a large plastic tub filled with water, which will act as a wood tank;
- g. It is imperative that all wood is kept wet and not allowed to dry out to prevent shrinkage, warping and degradation of the wood;
- h. All wood should then be stored in a cool, dark area or ideally a cold room or fridge; and
- i. All waterlogged wood samples should be recorded on a sample register to maintain an archive for the collected artefacts.

## **Appendix E: Figures**

Figure 1 Overview of the Development area.

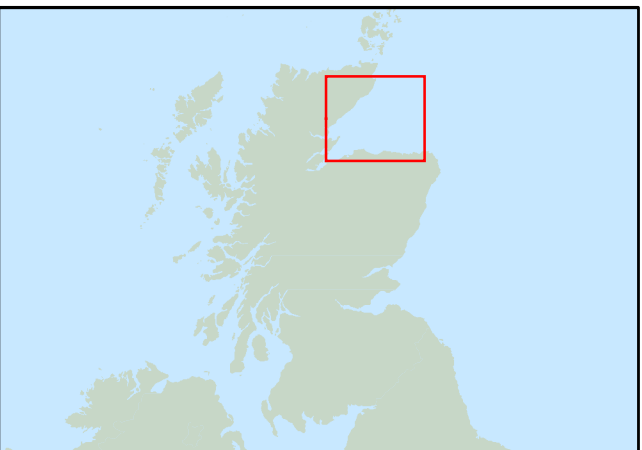
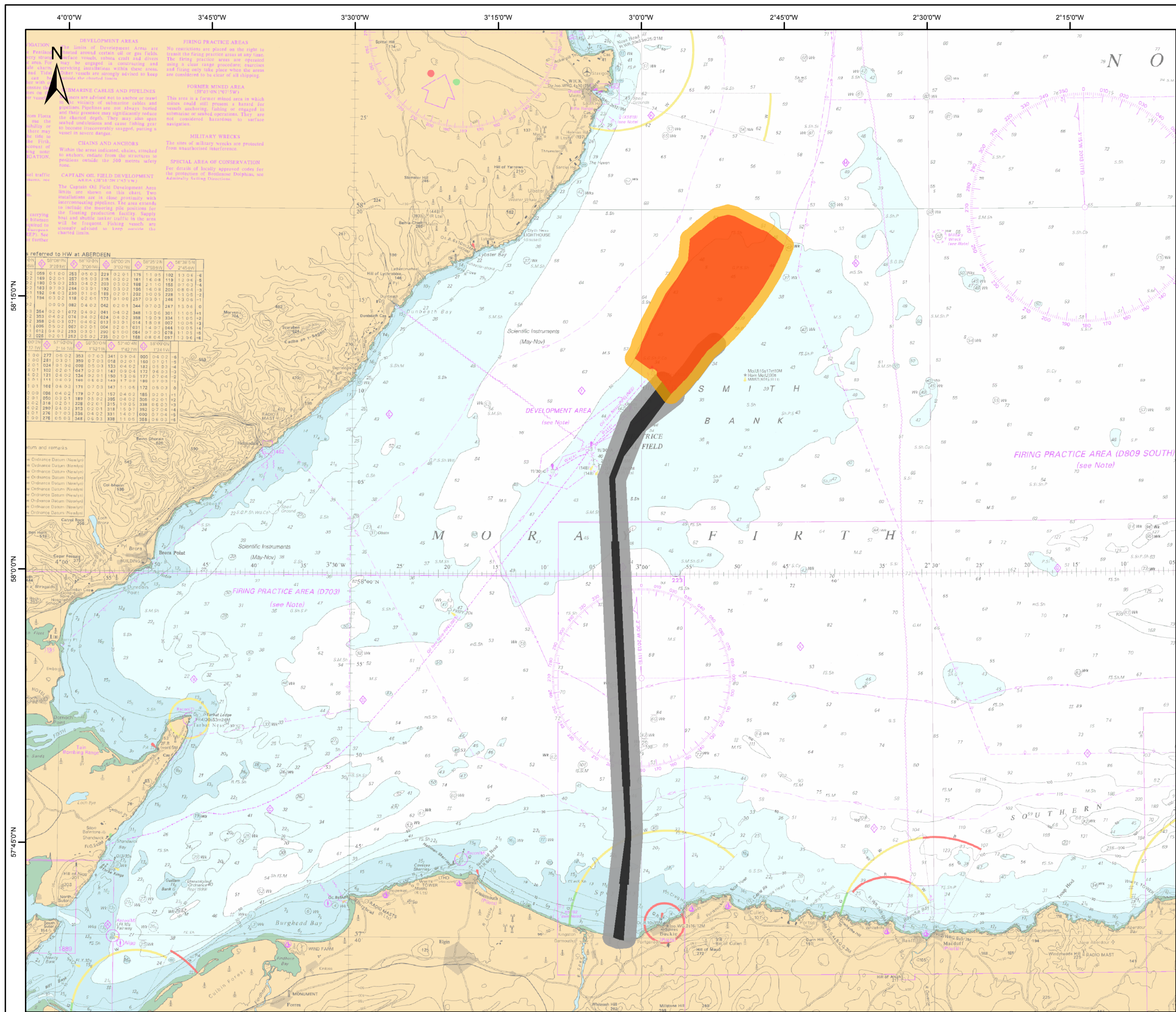
Figure 2 Cultural heritage assets and targets within the WF study areas.

Figure 3 Cultural heritage assets and targets within the OfTW, northern 1/3.

Figure 4 Cultural heritage assets and targets within the OfTW, middle 1/3.

Figure 5 Cultural heritage assets and targets within the OfTW, southern 1/3.

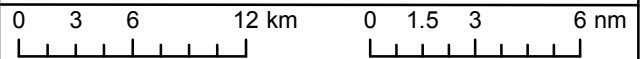




## Legend

- OWF Inner Study Area
- OWF Outer Study Area
- OFTW Inner Study Area
- OFTW Outer Study Area

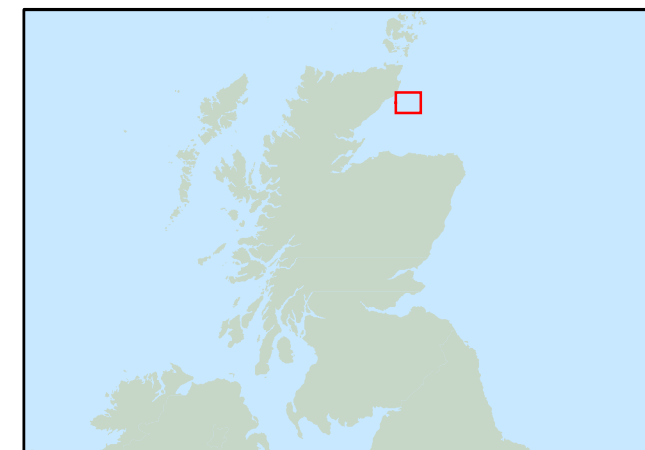
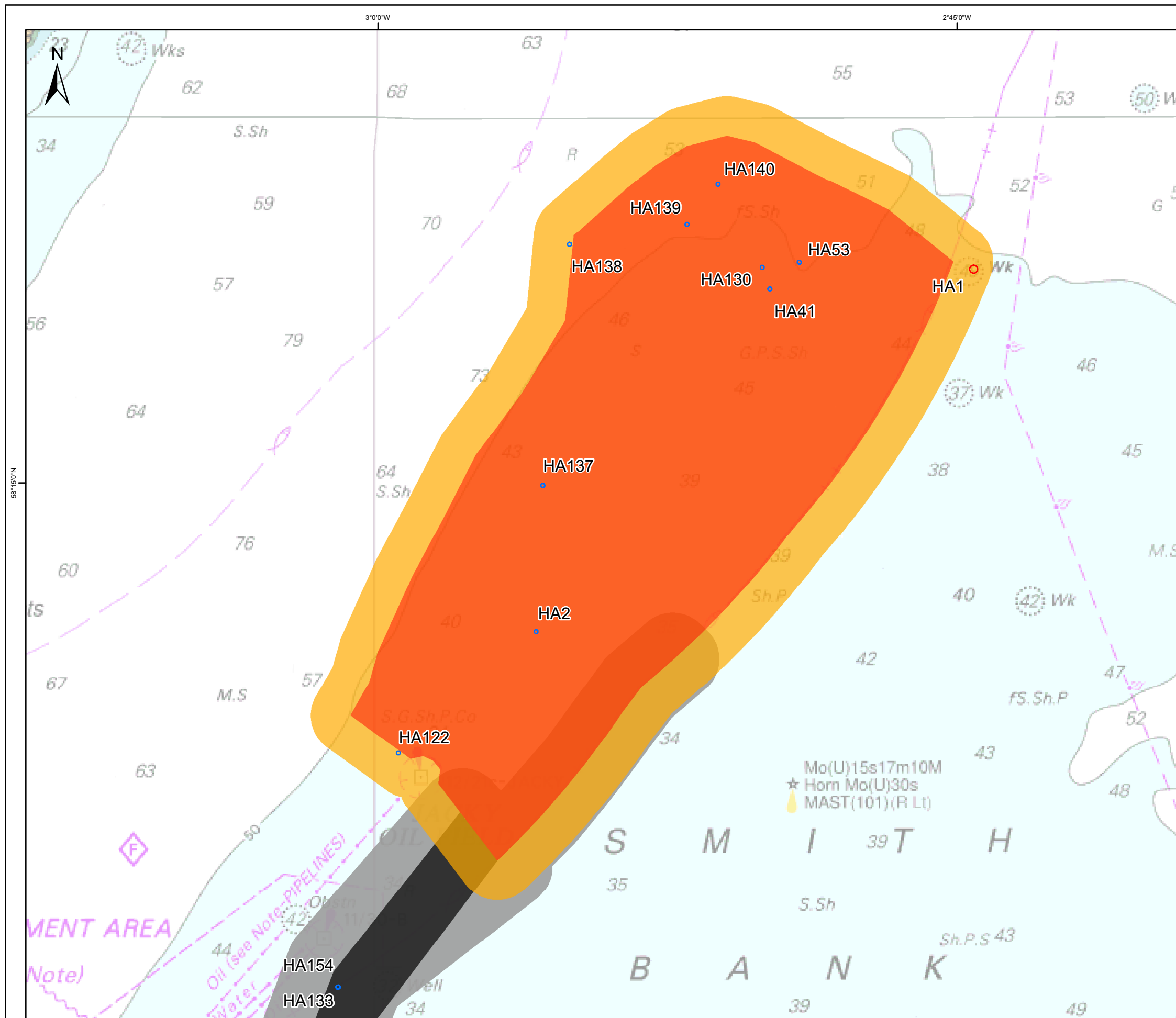
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Figure 1  
Beatrice Project Study Areas

Drawn: MM	Checked: LR	Approved: LR
Date: 11/03/2015	Scale: 1:400,000 @ A3	
Drawing Number: BEA-MAP-SSER-421	Version: 02	
Datum: WGS84	Projection: UTM30N	





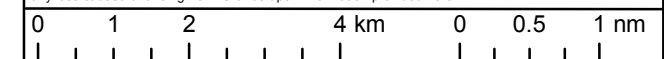
## Legend

### Archaeological Potential

- High - 100m AEZ
- Medium - 50m AEZ

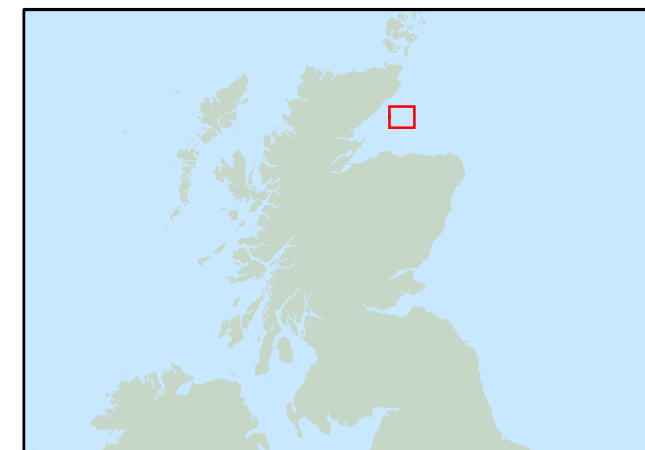
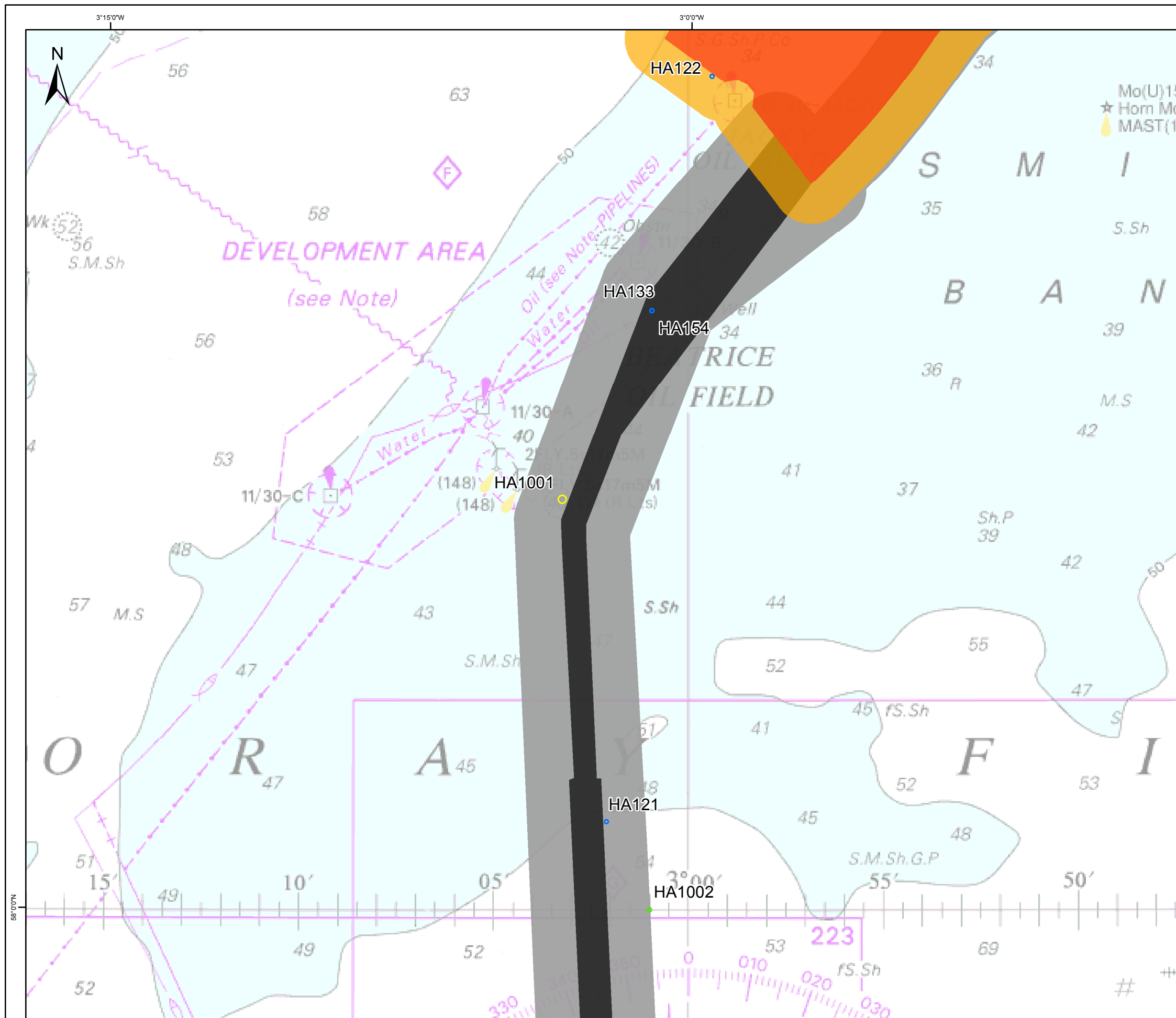
- OWF Inner Study Area
- OWF Outer Study Area
- OfTW Inner Study Area
- OfTW Outer Study Area

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Figure 2		
Cultural Heritage Assets and Targets Within WF Study Areas		
Drawn: MM	Checked: LR	Approved: LR
Date: 13/05/2016	Scale: 1:100,000 @ A3	
Drawing Number: BEA-MAP-SSER-422	Version: 04	
Datum: WGS84	Projection: UTM30N	

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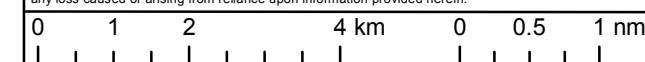
## Legend

### Archaeological Potential

- Medium - 50m AEZ
- Wreck, live - 100m AEZ
- Wreck, dead - 50m AEZ

- OWF Inner Study Area
- OWF Outer Study Area
- OFTW Inner Study Area
- OFTW Outer Study Area

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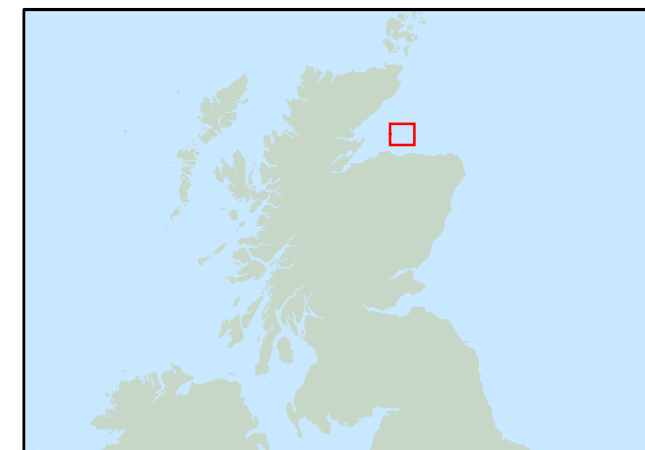
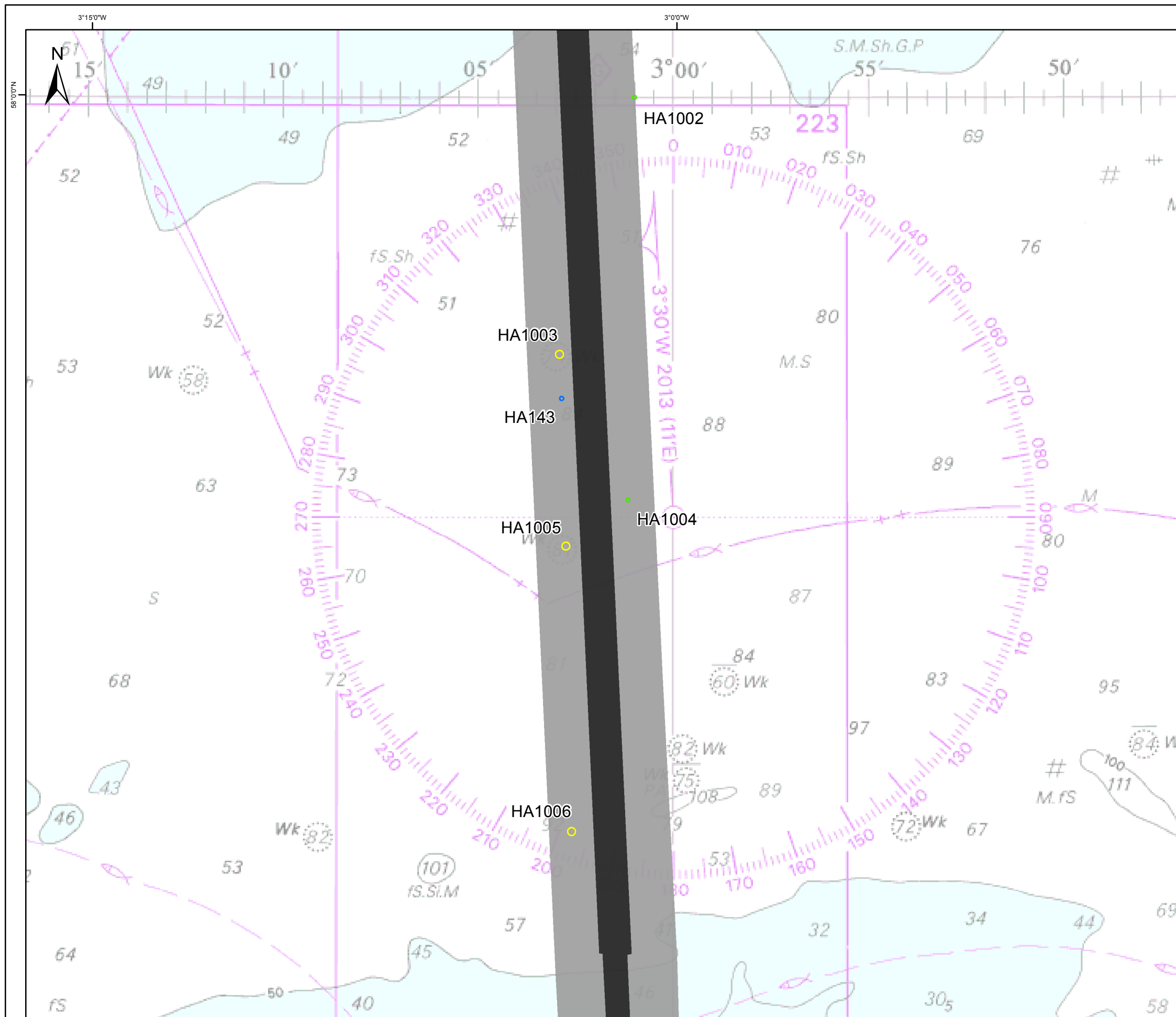
UK Offshore Development

Figure 3  
Cultural Heritage Assets and Targets  
Within the OFTW, Northern 1/3

Drawn: MM	Checked: LR	Approved: LR
Date: 13/05/2016	Scale: 1:100,000 @ A3	
Drawing Number: BEA-MAP-SSER-423	Version: 05	
Datum: WGS84	Projection: UTM30N	

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## Legend

### Archaeological Potential

Medium - 50m AEZ

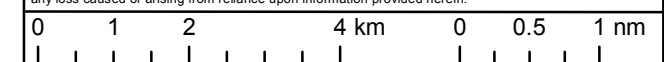
Wreck, live - 100m AEZ

Wreck, dead - 50m AEZ

OfTW Inner Study Area

OfTW Outer Study Area

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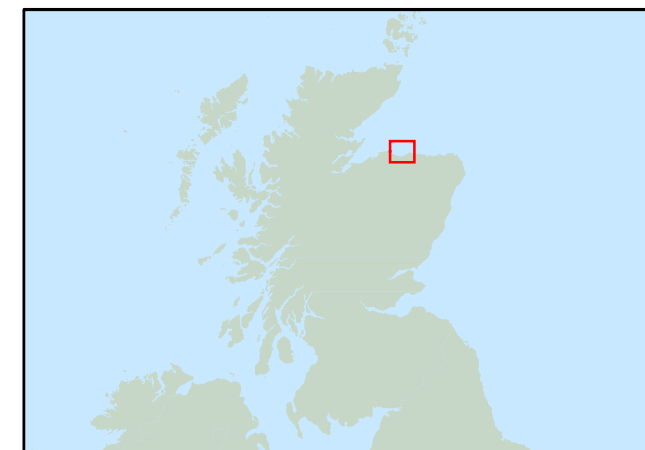
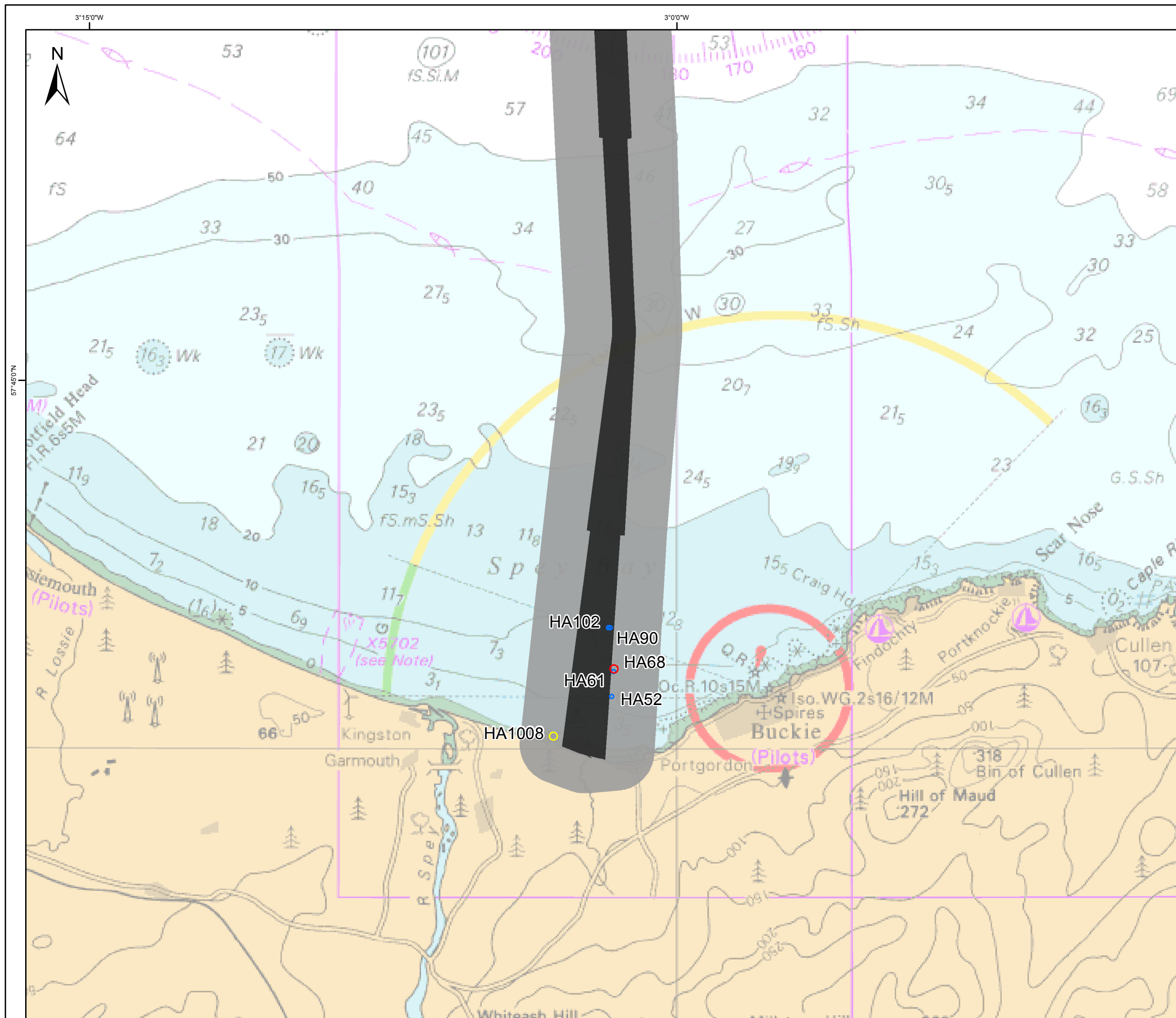
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Figure 4

### Cultural Heritage Assets and Targets Within the OfTW, Middle 1/3

Drawn: MM	Checked: LR	Approved: LR
Date: 13/05/2016	Scale: 1:100,000 @ A3	
Drawing Number: BEA-MAP-SSER-423	Version: 05	
Datum: WGS84	Projection: UTM30N	

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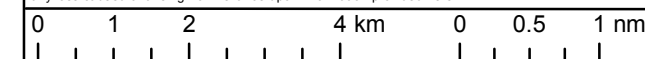


## Legend

### Archaeological Potential

- High - 100m AEZ
- Medium - 50m AEZ
- Wreck, live - 100m AEZ
- O&TW Inner Study Area
- O&TW Outer Study Area

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Figure 5

### Cultural Heritage Assets and Targets Within the O&TW, Southern 1/3

Drawn: MM	Checked: LR	Approved: LR
Date: 13/05/2016	Scale: 1:100,000 @ A3	
Drawing Number: BEA-MAP-SSER-423	Version: 05	
Datum: WGS84	Projection: UTM30N	

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