



Eastern Green Link 2 - Marine Scheme

Environmental Appraisal Report Volume 2

Chapter 12 - Marine Archaeology

nationalgrid



National Grid Electricity Transmission and Scottish Hydro Electric Transmission plc

June 2022

Prepared for:

National Grid Electricity Transmission and
Scottish Hydro Electric Transmission plc

Prepared by:

AECOM UK Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

T: +44 131 301 8600
aecom.com

In association with:

Xodus Group (Shipping and Navigation);

Wessex Archaeology (Marine Archaeology); and

Brown and May Marine Ltd (Commercial Fisheries).

© 2022 AECOM UK Limited. All Rights Reserved.

This document has been prepared by AECOM UK Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

12.	Marine Archaeology	12-1
12.1	Introduction.....	12-1
12.2	Legislation, Policy, and Guidance.....	12-1
12.3	The Study Area.....	12-4
12.4	Approach to Appraisal and Data Sources	12-4
12.5	Baseline Conditions	12-10
12.6	Appraisal of Potential Impacts.....	12-14
12.7	Mitigation and Monitoring	12-20
12.8	Residual Impacts	12-33
12.9	Summary of Appraisal.....	12-34
12.10	References	12-36

Figures

Figure 12-1:	Location of Eastern Green Link 2	12-5
Figure 12-2:	Recommended AEZs within the Marine Installation Corridor	12-23

Tables

Table 12-1:	Criteria to Assess the Archaeological Value of Marine Assets.....	12-7
Table 12-2:	Classification of Magnitude of Impact.....	12-7
Table 12-3:	Significance Matrix	12-8
Table 12-4:	Value of Seabed Prehistory Assets	12-10
Table 12-5:	Recorded Losses Based on NRHE and HER Data.....	12-14
Table 12-6:	Impact Summary	12-15
Table 12-7:	Marine Archaeology Embedded Mitigation	12-16
Table 12-8:	Recommended AEZs around 15 A1 Features Identified within Scottish Territorial Waters	12-21
Table 12-9:	Recommended AEZs within the Scottish Offshore Waters.....	12-22
Table 12-10:	Recommended AEZs within the English Offshore Waters.....	12-22
Table 12-11:	Recommended AEZs within English Territorial Waters.....	12-22
Table 12-12:	Paleogeographic features assigned P1 archaeological rating.....	12-31
Table 12-13:	Paleogeographic features assigned P2 archaeological rating.....	12-32
Table 12-14:	Summary of Environmental Appraisal	12-34

12. Marine Archaeology

12.1 Introduction

This chapter of the Environmental Appraisal Report (EAR) provides an appraisal of the potential interaction of the Marine Scheme with the known and potential marine archaeology and cultural heritage resource below Mean High Water Springs (MHWS).

A description of the marine archaeology and cultural heritage baseline, as understood through desk-based research, analysis of the geophysical survey results¹ and consultation undertaken to support the Marine Scheme is presented in Section 12.5 of this chapter. Potential impacts of the Marine Scheme on marine archaeological receptors are appraised in Section 12.6 for the Installation, Operation and Maintenance, and Decommissioning Phases as presented in Chapter 2: Project Description. Where appropriate, proportionate measures to avoid, mitigate or compensate for any identified adverse effects are identified.

The potential for interaction between the Marine Scheme and other plans/projects, which may result in significant cumulative effects, is considered in Chapter 17: Cumulative and In-Combination Effects.

This chapter is supported by Appendix 12.1: Marine Archaeology Technical Report, which includes the full gazetteer and illustrated figures, and can be found in Volume 4 Technical Appendices.

12.2 Legislation, Policy, and Guidance

This appraisal has taken into account the current legislation, policy and guidance relevant to marine archaeology. More comprehensive details are provided in Chapter 3: Legislative and Policy Framework, Appendix 3.2: Topic Specific Legislation and Appendix 12.1: Marine Archaeology Technical Report.

12.2.1 Legislation

12.2.1.1 International Legislation

The UK is a signatory and therefore subject to the following international agreements relating to the marine historic environment that are relevant to this section:

- European Convention on the Protection of the Archaeological Heritage (Valletta) 1992;
- International Council of Monuments and Sites (ICOMOS) Charter on the Protection and Management of Underwater Cultural Heritage (1996) (the Sofia Charter);
- United Nations Convention for the Law of the Sea (UNCLOS) 1982; and
- UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001.

12.2.1.2 National Legislation

The following legislation has informed the approach of the appraisal in this chapter:

- Protection of Wrecks Act 1973;
- Ancient Monuments and Archaeological Areas Act 1979 (as amended);
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

Scotland

Historic Environment Scotland is responsible for the archaeological resource within Scotland's territorial waters. Marine Scotland Licensing Operations Team (MS-LOT) is responsible for licencing, regulating and planning marine activities within Scotland's territorial waters.

¹ A geophysical survey was undertaken in 2021 to inform the Marine Scheme design and inform the marine archaeology appraisal.

The following relevant legislation applies within Scottish territorial waters:

- Marine (Scotland) Act 2010;
- Protection of Wrecks Act 1973 (PWA 1973): Section Two;
- Ancient Monuments and Archaeological Areas Act 1979 (AMAA 1979) (as amended);
- Protection of Military Remains Act 1986 (PMRA 1986); and
- Merchant Shipping Act 1995 (MSA 1995).

Beyond the 12 NM limit, within the Scottish Exclusive Economic Zone (EEZ), the following legislation applies:

- Marine and Coastal Access Act 2009;
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

England

Historic England is responsible for the archaeological resource within England's territorial waters, up to the 12 NM limit and is consultee for the resource in the UK EEZ. The Marine Management Organisation (MMO) is responsible for licencing, regulating and planning marine activities in English territorial waters and the EEZ to ensure they are carried out in a sustainable way.

Within English territorial waters the following relevant legislation applies:

- Marine and Coastal Access Act 2009;
- Protection of Wrecks Act 1973: Sections One and Two;
- Ancient Monuments and Archaeological Areas Act 1979 (as amended);
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

Beyond the 12 NM limit, within the English EEZ, the following legislation applies:

- Marine and Coastal Access Act 2009;
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

12.2.2 Guidance

There is no specific guidance for offshore cable projects, therefore the guidance below is taken from current best practice. The appraisal has therefore been completed in line with the following national, regional and industry specific standards and guidance, as relevant to cable projects:

- Standard and Guidance for Archaeological Advice by Historic Environment Services (ClfA, 2014a);
- Code of Conduct (ClfA, 2014b);
- Regulations for Professional Conduct (ClfA, 2019);
- Military Aircraft Crash Sites – Archaeological Guidance on their Significance and Future Management (English Heritage (now Historic England), 2002);
- Managing Significance in Decision-Taking in the Historic Environment (English Heritage (now Historic England), 2015a);
- Management of Research Projects in the Historic Environment: the MoRPHE Project Managers' Guide (English Heritage (now Historic England), 2015b);
- Preserving Archaeological Remains: Decision-Taking for Sites under Development (English Heritage (now Historic England), 2016);

- Deposit Modelling and Archaeology. Guidance for Mapping Buried Deposits, Historic England, Swindon (Historic England, 2020);
- Code of Practice for Seabed Development (JNAPC, 2006);
- Annex to the Protocol Guidance on the Use of the Protocol for Reporting Finds of Archaeological Interest in Relation to Aircraft Crash Sites at Sea (Wessex Archaeology, 2008a);
- Our Seas - A shared resource: High level marine objectives (Defra, 2009);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE, 2011);
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology, 2007);
- Ships and Boats: Prehistory to Present - Designation Selection Guide (English Heritage (now Historic England), 2012);
- Standard and Guidance for Historic Environment Desk-based Assessment (ClfA, 2014c);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage (now Historic England), 2013);
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (English Heritage (now Historic England), 2015c);
- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects. (The Crown Estate, 2021);
- Protocol for Archaeological Discoveries: Offshore Renewables Projects (ORPAD). (The Crown Estate, 2014); and
- Commercial Renewable Energy Development and the Historic Environment (Historic England, 2021).

12.2.3 Policy

The UK Marine Policy Statement (MPS) (MPS, 2011) was adopted in 2011 by all UK Administrations in March 2011 as part of a new system of marine planning being introduced across UK seas (Department for Environment, Food and Rural Affairs (Defra) (Defra, 2011). The statement was intended to facilitate and support the formulation of Marine Plans, ensuring that marine resources are used in a sustainable way in line with high level marine objectives. For further information on marine policy refer to Chapter 3: Legislative and Policy Framework.

12.2.3.1 Scotland

A National Marine Plan (Marine Scotland, 2015) has been adopted by Scottish Ministers under the Marine (Scotland) Act 2010, the primary legislation relevant to marine development plans within Scottish territorial waters. The Scottish Marine Regions Order 2015 identifies 11 Scottish Marine Regions for the purposes of regional marine planning and establishes their boundaries. The Marine Scheme is partly located within the North East region. No regional North East marine plan has yet been published.

12.2.3.2 England

Under the Marine and Coastal Access Act (MCAA) 2009, England was divided into marine planning regions, with an associated authority responsible for preparing a Marine Plan for that area. Marine plans under this legislation must be consistent with the MPS and in accordance with other UK national policy, including the National Planning Policy Framework (revised 2021). The Marine Scheme is located within the East Inshore Marine Plan Area (Defra, 2014), and travels through North East Offshore Marine Plan Area and into the southern end of the North East Inshore Marine Plan Area (HM Government, 2021).

Appendix 3.1 summarises the relevant policies specific to marine archaeology.

12.3 The Study Area

For the purposes of the marine archaeology appraisal, the Marine Scheme has been sub-divided as follows:

- **Scottish territorial waters** – extending from KP0 to just south of KP28;
- **Scottish offshore waters** – within the EEZ from just south of KP28 to south of KP150;
- **English offshore waters** – within the EEZ from just south of KP150 to between KP396 and KP397; and
- **English territorial waters** – from between KP396 and KP397 to the landfall east of KP436.

The area appraised in this chapter is defined by the extent of the Marine Scheme, which comprises a 500 m wide Marine Installation Corridor (see Figure 12-1).

The geophysical study area, located within the boundary of the Marine Installation Corridor, (see Figure 12.1-5i-xxx in Appendix 12.1: Marine Archaeology Technical Report) is defined as the extent of the side scan sonar (SSS) dataset, running from the Scottish landfall at Sandford Bay, through Scottish territorial waters, Scottish and English offshore waters, into English territorial waters and the English landfall at Fraithorpe Sands.

An Archaeological Study Area (ASA) consisting of an additional 500 m buffer area around the extent of the marine cable route was used as the search area for obtaining records from relevant archive databases. The wider ASA allows for a greater understanding of the wider archaeological baseline environment, with the dual purpose of enabling any archaeological trends within the region to be recognised and to allow any marine heritage assets identified to be represented in a broader archaeological context.

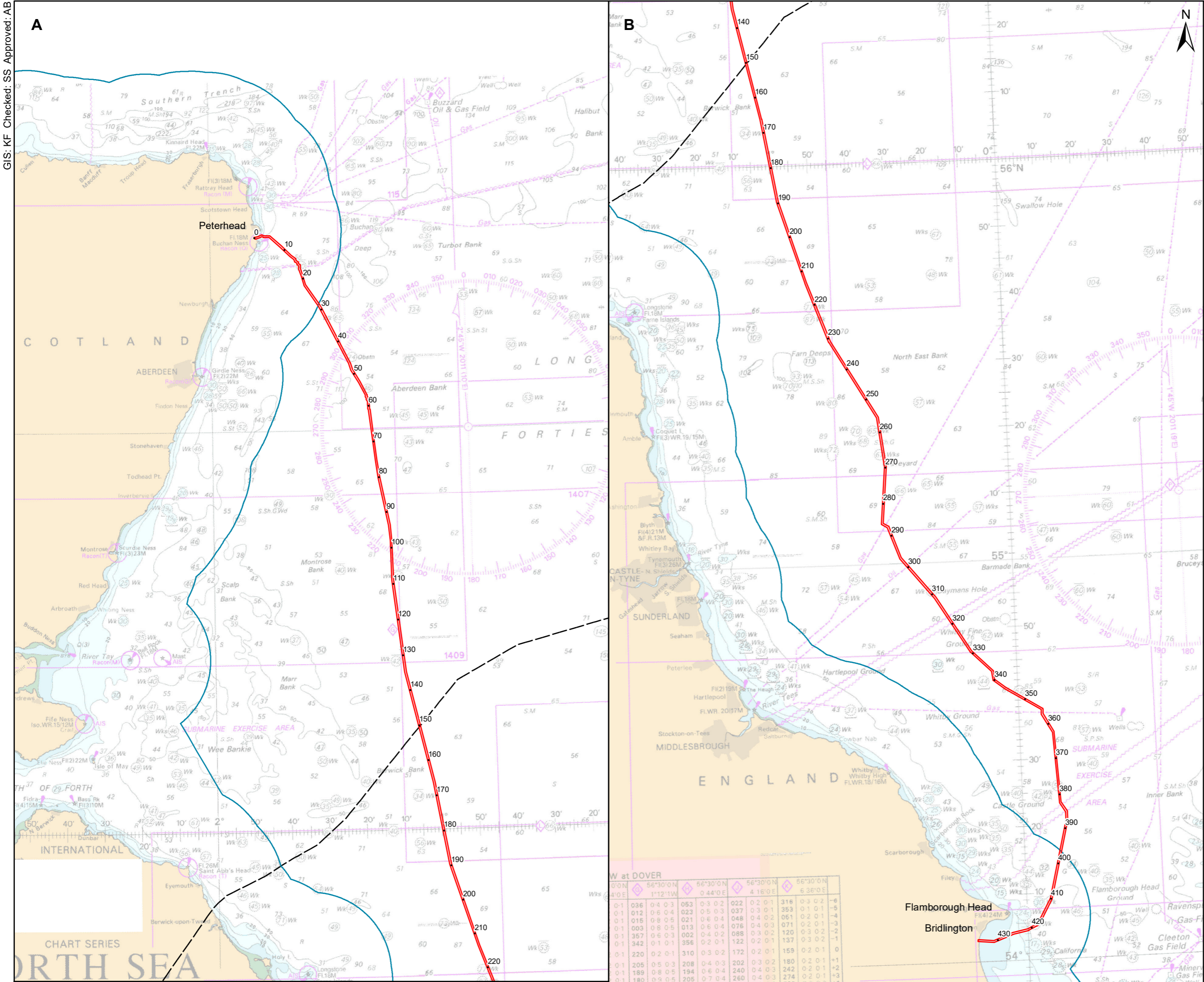
12.4 Approach to Appraisal and Data Sources

12.4.1 Appraisal Methodology

The environmental appraisal documented within this EAR follows the methodology outlined within Chapter 4: Approach to Environmental Appraisal. The appraisal methodology used for marine archaeology is described below and is based on the best practice professional guidance outlined by the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA, 2014c). Further detail on the methodology and surveys undertaken to inform the appraisal are presented in Appendix 12.1: Marine Archaeology Technical Report.

The impacts identified with relevance for marine archaeology would in the main, occur during the Installation Phase of the Marine Scheme. Impacts resulting from the Operation and Maintenance Phases of the Marine Scheme have been assessed on marine receptors relating to seabed prehistory and seabed features, as listed above. Impacts from decommissioning are anticipated to be similar to those during installation if infrastructure is removed from the seabed at the end of operational life. The marine themes relevant to marine archaeological baseline as assessed are:

- Seabed prehistory (for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts e.g., handaxes);
- Seabed features, including maritime sites (such as shipwrecks and associated material including cargo, obstructions, and fishermen's fasteners) and aviation sites (aircraft crash sites and associated debris);
- Intertidal heritage assets; and
- Historic seascape character.



Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: ETRS1989 UTM Zone 30N

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

PROJECT

Eastern Green Link 2

KEY

- Kilometre Point (KP)
- Marine Installation Corridor
- UK Territorial Sea Limit
- Scottish and English Exclusive Economic Zone

TITLE

Figure 12-1
Location of Eastern Green Link 2

REFERENCE

SEGL2_M_SR_1_v1_20220621

SHEET NUMBER

1 of 1

DATE

21/06/2022

Scale @ A3 1:1,000,000

12.4.1.1 Impact Appraisal Criteria

Receptor/Asset Sensitivity

This section outlines how the sensitivity of marine heritage assets are ascertained.

The capability of an asset to accommodate change and its ability to recover if affected is a function of its sensitivity. Asset sensitivity is typically assessed via the following factors:

- Adaptability - the degree to which an asset can avoid or adapt to an effect;
- Tolerance - the ability of an asset to accommodate temporary or permanent change without significant adverse impact;
- Recoverability - the temporal scale over and extent to which an asset will recover following an effect; and
- Value - a measure of the asset's importance, rarity and worth.

Marine heritage assets cannot typically adapt, tolerate or recover from physical impacts resulting in material damage or loss caused by project activities. Consequently, the sensitivity of each asset is predominantly quantified only by its value.

Value of a Receptor/Asset

Based on Historic England's Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England), 2008, p. 21) the significance of a heritage asset *'embraces all the diverse cultural and natural heritage values that people associate with it, or which prompt them to respond to it'*.

Within this chapter, significance is weighed by consideration of the potential for the asset to demonstrate the following value criteria:

- Evidential value – deriving from the potential of a place to yield evidence about past human activity;
- Historical value – deriving from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative;
- Aesthetic value – deriving from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value – deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values but tend to have additional and specific aspects.

With regards to assessing the value of shipwrecks, the following criteria listed in English Heritage's Ships and Boats: Prehistory to Present – Designation Selection Guide (English Heritage (now Historic England), 2012) can be used to assess an asset in terms of its value:

- Period;
- Rarity;
- Documentation;
- Group value;
- Survival/condition; and
- Potential.

These aspects help to characterise each asset whilst also comparing them to other similar assets. The criteria also enable the potential to contribute to knowledge, understanding and outreach to be assessed.

The value of known marine heritage assets were appraised on a four-point scale using professional judgement informed by criteria presented in Table 12-1. Value has been assigned to individual receptors based on available information including both primary and secondary sources.

Table 12-1: Criteria to Assess the Archaeological Value of Marine Assets

Value	Definition
High	<ul style="list-style-type: none"> Best known, only example or above average example and / or significant or high potential to contribute to knowledge and understanding and / or outreach. Assets with a demonstrable international or national dimension to their importance are likely to fall within this category; Wrecked ships and aircraft that are protected under the Marine Scotland Act 2010, Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value; and Known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material or palaeogeographic features with demonstrable potential to include artefactual and/or palaeo-environmental material, possibly as part of a prehistoric site or landscape.
Medium	<ul style="list-style-type: none"> Average example and / or moderate potential to contribute to knowledge and understanding and / or outreach; Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	<ul style="list-style-type: none"> Below average example and / or low potential to contribute to knowledge and understanding and / or outreach; Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Negligible	<ul style="list-style-type: none"> Poor example and / or little or no potential to contribute to knowledge and understanding and / or outreach. Assets with little or no surviving archaeological interest.

Impact Magnitude

The magnitude of an impact is defined by a series of factors including the spatial extent of any interaction, the likelihood, duration, frequency, and reversibility of a potential impact. The definitions of the levels of magnitude used in this appraisal are described in Table 12-2.

Table 12-2: Classification of Magnitude of Impact

Magnitude	Definition
High	<ul style="list-style-type: none"> Complete or comprehensive physical damage or changes to the character of the asset.
Medium	<ul style="list-style-type: none"> Considerable changes that affect the character of the asset, resulting in considerable physical damage.
Low	<ul style="list-style-type: none"> Minor change that partially affects the character of the asset, resulting in some physical damage.
Negligible	<ul style="list-style-type: none"> Very minor or negligible change to the character of the asset, with no or negligible physical damage leading to an imperceptible change to the baseline.

Significance Criteria

The significance of effect has been appraised by comparing the sensitivity of the receptor against the magnitude of impact. Residual effects (i.e., those remaining after mitigation measures) have been taken into consideration and have been assessed.

The overall significance has been appraised using the matrix show in Table 12-3. Effects deemed to be significant for the purpose of this appraisal are those which are described as 'major' and 'moderate/major'. In addition, 'moderate' effects can also be deemed as significant. Whether they do so shall be determined by a qualitative analysis of the specific impact and will be based on professional judgement. If/where this is the case, the basis for any judgement will be outlined.

Table 12-3: Significance Matrix

		Magnitude of Change			
		Negligible	Low	Medium	High
Value/Sensitivity	High	Negligible	Moderate	Major/Moderate	Major
	Medium	Negligible	Minor/Moderate	Moderate	Major/Moderate
	Low	Negligible	Minor	Minor/Moderate	Moderate
	Negligible	Negligible	Negligible	Negligible	Negligible/Minor

12.4.2 Data Sources and Consultations

12.4.2.1 Data Sources

The baseline has been established by from a desktop review of published information and through consultation with relevant organisations. The data sources used to inform the baseline description and appraisal include:

- UK Hydrographic Office (UKHO) data for charted wrecks and obstructions;
- Geophysical survey datasets acquired for the Project by NEXT in 2021 and MMT in 2012;
- Client supplied survey reports (MMT, 2012) (NEXT, 2020) (NEXT, 2021);
- National Record of the Historic Environment (NRHE) maintained by HE, comprising data for terrestrial and marine archaeological sites, find spots and archaeological events;
- National Heritage List for England maintained by HE, comprising data of designated heritage assets including sites protected under the PMRA 1986 and the PWA 1973;
- Canmore Historic Environment Records (HER) maintained by Historic Environment Scotland, comprising a database of all recorded terrestrial and marine archaeological sites, find spots and archaeological events;
- Aberdeenshire Council HER, comprising a database of all recorded terrestrial and marine archaeological sites, find spots and archaeological events within Aberdeenshire and offshore;
- Humber County Council HER, comprising a database of all recorded terrestrial and marine archaeological sites, find spots and archaeological events within the county and offshore;
- Historic Seascape Characterisation (HSC) for the Northumberland to Yorkshire published by SeaZone Solutions Ltd for English Heritage and Yorkshire and Lincolnshire Rapid Coastal Zone Assessment carried out by Humber Field Archaeology;
- Relevant mapping including Admiralty Charts, British Geological Survey (BGS), Ordnance Survey and historic maps; and
- Relevant documentary sources and grey literature held by Wessex Archaeology, and those available through the Archaeology Data Service and other websites (presented in the 'References').

Desk-based Assessment

This chapter is supported by a Geographic Information System (GIS) using ArcGIS 10.6.1, incorporating the positional information of the various data sources listed above, allowing the data to be spatially analysed. The data were subsequently compiled into gazetteers of the prehistoric, maritime and aviation, and intertidal resources within the study area; these were used to inform the assessment of geophysical data.

Within this assessment, the gazetteers for the marine and intertidal datasets are compiled and presented in Universal Transverse Mercator (UTM) Zone 30 North projected from a European Terrestrial Reference System (ETRS) 1989 datum.

Information relating to the marine heritage assets that did not include location or positional information were also used to inform the marine archaeological baseline assessment where relevant.

Further information on the key themes relevant to the marine archaeology baseline is described in Section 12.3 Methodology of Appendix 12.1: Marine Archaeology Technical Report.

Geophysical Survey Analysis

Geophysical data were acquired for the Project, including sub bottom profile (SBP), multi beam echo sounder (MBES), side scan sonar (SSS), and magnetometer (MAG) survey. The 2021 geophysical survey was carried out between May and July by NEXT Geosolutions Limited. The 2012 geophysical datasets were acquired between June and July by MMT. Further details on the equipment used is presented in Section 12.3.3.2 of Appendix 12.1: Marine Archaeology Technical Report.

The geophysical data sets were individually assessed for quality and their suitability for archaeological purposes rated following criteria presented in Section 12.3 Methodology of Appendix 12.1: Marine Archaeology Technical Report. All data sets apart from SBP data were rated as generally 'average', the latter being rated as 'good'. The data sets are considered to provide full and effective coverage of the Marine Scheme.

12.4.2.2 Summary of Consultations

Responses to the scoping report concerning marine archaeology have been considered and addressed as part of the preparation of this chapter. Full details of the consultation process and associated responses are presented in Chapter 6: Consultations and Stakeholder Engagement and its technical appendices.

12.4.3 Data Gaps and Limitations

12.4.3.1 Archaeological Data

Data used to compile this chapter comprises primary geophysical survey data and secondary information derived from a variety of sources, only some of which have been directly examined for the purposes of this appraisal. The assumption is made that the secondary data, as well as that derived from other secondary sources, are reasonably accurate.

The records held by the UKHO, NRHE, Canmore, HER and the other sources used in this appraisal are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

12.4.3.2 Geophysical Data

During acquisition, the 2021 survey data corridor was narrowed where there was existing geophysical data coverage acquired by MMT in 2012. Where this occurred, the 2012 SPB, SSS, MAG and MBES survey datasets were assessed to infill the survey corridor.

It should be noted that where 2012 MBES data have been used to infill the 2021 survey corridor, the resolution of 2.0 m means that any object and debris less than 2.0 m in size will not be identified in these areas within the MBES data.

12.5 Baseline Conditions

The detailed baseline resource of marine archaeology and cultural heritage, which includes known wrecks and obstructions, identified geophysical receptors, the potential for further maritime and aviation archaeological receptors, potential seabed prehistory, intertidal heritage assets and historic seascape character is presented in the Appendix 12.1: Marine Archaeology Technical Report. The full gazetteer of anomalies is presented in Appendices B – I in Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-3 to Figure 12.1-7. The section below presents an overview of the baseline.

12.5.1 Marine Installation Corridor and ASA

12.5.1.1 Seabed Prehistory

Thirty-three palaeogeographic features of archaeological potential have been identified within the geophysical study area, two within Scottish territorial waters, seventeen within Scottish offshore waters; thirteen within English offshore waters and one within English territorial waters (for full details see Appendix B in Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-3 and Figure 12.1-4 in Appendix 12.1: Marine Archaeology Technical Report). The assessment of SBP data shows that the shallow geology within this area can largely be described as predominantly clayey silty sand with gravel and sandy gravelly till with some localised channel systems. These latter features have the potential to contain *in situ* and derived archaeological material and palaeoenvironmental material. A summary of these features is also presented in Table 12-12 and Table 12-13.

Table 12-4 summarises the potential for seabed prehistory assets and their respective value based on the criteria described in Section 12.4.1.1.

Table 12-4: Value of Seabed Prehistory Assets

Asset Type	Definition	Value
Potential <i>in situ</i> prehistoric sites	Primary context features and associated artefacts and their physical setting (if found).	High
	Known submerged prehistoric sites and landscape features with the demonstrable potential to include artefactual material.	High
Potential submerged landscape features	Other known submerged palaeolandscape features and deposits likely to date to periods of prehistoric archaeological interest with the potential to contain <i>in situ</i> material.	High
Potential derived prehistoric finds	Isolated discoveries of prehistoric archaeological material discovered within secondary contexts.	Medium
Potential palaeoenvironmental evidence	Isolated examples of palaeoenvironmental material	Low
	Palaeoenvironmental material associated with specific palaeolandscape features or archaeological material	High

12.5.1.2 Seabed Features: Maritime

There are currently no sites within the study area that are subject to statutory protection from the PWA 1973, the PMRA 1986 or the AMAA 1979; the three legislative acts that protect marine archaeological sites. There are, however, a number of sites of interest as described below.

Scottish Territorial Waters

There are two known wreck sites (**70278** (KP14); **70317** (KP25)) within the Marine Installation Corridor which have been classified as A1 anomalies (features of anthropogenic origin of archaeological interest). Full details can be found in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-5 and Figure 12.1-6.

Wreck **70278** (KP14) is an unknown, recorded wreck that corresponds with UKHO record 74769 and Canmore record 324508 (Wreck Sheet 1 of Appendix 12.1: Marine Archaeology Technical Report). The wreck is visible in the SSS dataset as a large structure with distinct curvilinear dark reflectors that appear to be the hull outline, and multiple thin, linear internal dark reflectors with shadows that are possibly surviving deck structure, suggesting the wreck is upright. The wreck appears to be orientated approximately west north west to east south east and has multiple objects interpreted as debris surrounding it, suggesting it may be significantly broken up (**70280 – 70284** (KP14)). The wreck is

situated within an area of mobile seabed sediment and the full extent of the wreck, and its associated debris may be buried. This location was not directly covered by the MBES dataset. The wreck has a very large MAG anomaly associated with it measuring 8159 nT, indicating it is likely largely ferrous in construction.

In the UKHO record, the wreck was first reported in 2010 as being degraded and lying in two parts, partly buried in sand waves, with the bow lying WSW. The wreck had a strong MAG anomaly associated with it and geophysical dimensions of 71.0 m x 40.0 m x 9.6 m. The smaller dimensions recorded in the 2021 datasets may indicate the wreck has degraded further and/or has experienced further burial, and the surrounding debris also suggests it is significantly broken up.

Wreck **70317** (KP25) corresponds with UKHO record 2247 and Canmore record 101745 for the fishing vessel *Adventure* (Wreck Sheet 2 of Appendix 12.1: Marine Archaeology Technical Report). The wreck is orientated approximately north-east to south-west on the seabed and is visible in the SSS data as a distinct, elliptical dark reflector hull outline that appears to be relatively intact. Multiple internal slatted and rounded dark reflectors are visible interpreted as deck structure, which suggests that the wreck is upright on the seabed. The wreck is visible in the MBES dataset as an intact wreck, with steeply sloping sides and an uneven peak. The wreck has a mounded feature at its south west end that may be the single boiler, and there is a collapsed area on its north eastern edge that may be impact related. The wreck has significant scouring visible to the north east and south west measuring over 200 m long (approximately 0.6 m depth) and is situated within sand waves. The wreck has a large MAG anomaly measuring 272 nT associated with it, indicating some ferrous material is present.

In the UKHO and Canmore records, *Adventure* is recorded as being a single boiler fishing vessel built in 1906, with build dimensions of 33.6 m x 6.6 m x 3.5 m. The vessel was sunk in 1922 after collision with a mine. The wreck was last surveyed in 2010 where it was reported as being intact and upright on the seabed with dimensions of 40.0 m x 9.0 m x 5.4 m, with the bow likely situated to the north east and a poor MAG anomaly associated. The slightly larger geophysical dimensions recorded may suggest that the wreck has degraded and collapsed since the last survey.

In addition to the two wrecks mentioned above, there are 12 further A1 receptors which may be of anthropogenic origin (debris fields **70280**, **70281**, **70283**, **70284** (KP14), **70316** (KP25), **70073** (KP3); debris **70282** (KP14), **70318**, **70319**, **70320** (KP25); magnetic **70086**, **70089** (KP3)), and therefore of high value, within the Marine Installation Corridor. Nine of these receptors are associated with wrecks **70278** and **70317**. Full details can be found in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical Report.

Debris field **70073** (KP3) has been discriminated as A1 due to its anomalous appearance and very large associated magnetic anomaly, measuring 1033 nT. This was visible in both the 2021 and 2012 SSS dataset as an area of disturbed seabed comprising indistinct dark reflectors with shadows and bright reflectors. The feature is situated within an area of mobile sediments and was visible in the MBES dataset as a large, irregularly shaped low-lying mound. The feature has one distinct edge, with slight scour down its east side. This has been interpreted as a ferrous debris field.

Two magnetic anomalies have been discriminated as A1. Anomaly **70086** (KP3) has an amplitude of 1074 nT and anomaly **70089** (KP3) has an amplitude of 1126 nT. These have been interpreted as possible significant pieces of ferrous debris, that are either buried or with no surface expression, and have been classified as A1 due to their very large amplitudes.

One other recorded wreck (**70301** (KP17)) has been discriminated as A3 (historic record of possible archaeological interest with no corresponding geophysical anomaly). This is the recorded position of the wreck of the *Mercator* (UKHO 2258, Canmore 101742; 101833), a steam ship, sunk in 1939 after being torpedoed by a submarine. This position is situated outside of the geophysical study area and is not covered by either the 2012 or 2021 geophysical datasets; however, a 100 m Archaeological Exclusion Zone (AEZ) placed around this position will encroach upon the study area, and so it has been included in the gazetteer.

The remaining 311 features within the geophysical study area have all been discriminated as A2 (features of uncertain origin of possible archaeological interest) during this appraisal (see Appendix D of Appendix 12.1: Marine Archaeology Technical Report for full list of anomalies).

Scottish Offshore Waters

There are two anomalies (**70394** (KP80); **70327** (KP30)) within the Marine Installation Corridor which have been classified as A1 anomalies (features of anthropogenic origin of archaeological interest). Full details can be found in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-5 and Figure 12.1-6.

Wreck **70394** (KP80) is an unknown, recorded wreck that corresponds with UKHO record 73633 and Canmore 324447 (Wreck Sheet 3 of Appendix 12.1: Marine Archaeology Technical Report). The wreck is visible in the SSS dataset as multiple distinct curvilinear dark reflectors that appear to be an interrupted hull outline, and multiple internal thin, linear dark reflectors with shadows that are possibly surviving deck structure. This suggests the wreck is upright but not intact. The wreck has measured dimensions of 70.7 m x 20.7 m x 4.0 m and has multiple objects interpreted as associated debris surrounding it (**70395-70402** (KP80)), suggesting it may be broken up. It is also situated within an area of mobile sediments, therefore the full extent of the wreck and its associated debris, may be buried.

The UKHO record reports the wreck as being upright and intact with the bow to the north-east and scouring visible at the bow and stern. The wreck was last surveyed in 2010 and had geophysical dimensions of 66.0 m x 20.0 m x 5.0 m. Difference in the wreck dimensions may suggest the wreck has degraded slightly or has been buried further by mobile sediments.

There are seven further A1 anomalies (**70395-70398** (KP80) and **70400-70402** (KP80)) which consist of debris associated with wreck **70394** (KP80). These features ranged in size from 1.0 m x 0.6 m x 0.3 m (**70402**), which was visible in the SSS data as a small, distinct round dark reflector with a bright tapered shadow, to 6.9 m x 0.6 m x 0.1 m (**70396**), which was visible as a distinct thin, linear dark reflector with a bright shadow situated directly on the northern edge of the wreck (**70394**). Full details can be found in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical Report.

The magnetic anomaly (**70327** (KP30)) has been discriminated as A1, due to its very large amplitude of 1350 nT. This has been interpreted as a possible significant piece of ferrous debris, that is either buried or with no surface expression.

One previously recorded wreck has been discriminated as A3 (**70441** (KP93)), which is the recorded position of an unknown wreck (UKHO 3170). This position is situated outside of the geophysical study area and is not covered by either the 2012 or 2021 geophysical datasets; however, a 100 m AEZ placed around this position will encroach upon the study area, and so it has been included in the gazetteer.

The remaining 156 features within the geophysical study area have all been discriminated as A2 (features of uncertain origin of possible archaeological interest) during this appraisal (see Appendix E of Appendix 12.1: Marine Archaeology Technical Report for full list of anomalies).

English Offshore Waters

There is one charted wreck within the Marine Installation Corridor, detailed in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical and illustrated in Figure 12.1-5 and Figure 12.1-6.

Recorded wreck (**70675** (KP309)) has been discriminated as A3 (historic record of possible archaeological interest with no corresponding geophysical anomaly). This is the recorded position of an unknown wreck (UKHO 6382). This position is situated outside of the geophysical study area and is not covered by either the 2012 or 2021 geophysical datasets; however, a 100 m AEZ placed around this position will encroach upon the study area, and so it has been included in the gazetteer.

One anomaly has been classified as A1 (features of anthropogenic origin of archaeological interest). This consists of debris field **70672** (KP309) which was identified in the SSS dataset as a distinct group of dark reflectors comprising several elongate and irregular objects, measuring 16.4 m x 9.4 m x 0.5 m. The feature was identified in the MBES dataset as multiple irregularly shaped mounds within an area of scour extending for 14.1 m. The debris field has a very large MAG anomaly associated with it, measuring 5080 nT, indicating ferrous material is present, and it has been interpreted to be a ferrous debris field.

The remaining 351 features within the geophysical study area have all been discriminated as A2 (features of uncertain origin of possible archaeological interest) during this appraisal (see Appendix F of Appendix 12.1: Marine Archaeology Technical Report for full list of anomalies).

English Territorial Waters

There are two known wreck sites within the Marine Installation Corridor, identified as anomalies **70931** (KP418) and **71021** (KP428), which have been classified as A1 anomalies (features of anthropogenic origin of archaeological interest). Full details can be found in Section 12.4.2.4 of Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-5 and Figure 12.1-6.

Anomaly **70931** (KP418) is a recorded wreck orientated approximately north east to south west and measuring approximately 10.5 m x 7.1 m x 0.7 m (Wreck Sheet 4 of Appendix 12.1: Marine Archaeology Technical Report). In the SSS data the wreck is visible as an oval area of disturbed seabed, comprising bright reflectors and small dark reflectors, with some areas of measurable height. The feature is situated in an area of mega ripples and appears anomalous to the surrounding seabed. In the MBES dataset the wreck is visible as a large and distinct mound, with gently sloping sides and an uneven peak. The wreck has one possible item of associated debris (**70928** (KP418)) identified 70 m north east. The wreck corresponds with UKHO record 85842, an unknown wreck first identified in 2016. This location was not directly covered by the MAG dataset, so it is not possible to ascertain whether ferrous material is present at this location; however, the UKHO record indicates that a survey undertaken in 2016 did not detect a magnetic anomaly, indicating it may be wooden. In the UKHO record the wreck has recorded geophysical dimensions of 10.0 m x 7.7 m x 1.0 m and is described as being mostly buried and orientated 030/210° on the seabed. In the 2021 geophysical data, there are no distinguishable wreck characteristics visible, it may be upturned, however this cannot be confirmed without further investigation. If the wreck is of a wooden composition, it is likely to be highly degraded and in a poor state of preservation. The lower height measurement recorded in the 2021 data (-0.3 m since the 2016 survey), may indicate the wreck has since experience further burial and the location of the wreck within sand mega ripples suggests it is likely to have a higher possibility for burial.

Anomaly **71021** (KP428) is a record/ed wreck that corresponds with UKHO record 5807 of the *Brabant*, a 1492 tonne steam ship sunk in 1917 (Wreck Sheet 5 of Appendix 12.1: Marine Archaeology Technical Report). In the SSS data the wreck is visible as an indistinct dark reflector with a dull shadow that is situated on a generally featureless area of seabed. The wreck is situated in a depression and orientated approximately north east to south west on the seabed. There are some possible linear, or slatted objects visible within the feature, however it is situated at the edge of the data range so this is unclear, and its dimensions of 14.4 m x 9.5 m x 0.8 m should be considered a minimum. This location was not directly covered by the MBES or MAG datasets, however a broad MAG anomaly, with an amplitude of 33 nT, is visible on the closest line (44 m north west) and may be a halo response. In the UKHO record, the steam ship is described as having dimensions of 73.5 m x 10.7 m x 6.1 m and carried a cargo of wood. The wreck was last surveyed in 2011, where only the stern section and two boilers were visible in the data, with geophysical dimensions of 58.0 m x 19.0 m x 5.0 m, all of which suggests the wreck extends considerably beyond the SSS data extents.

One other recorded wreck (**70970** (KP422)) has been discriminated as A3 (historic record of possible archaeological interest with no corresponding geophysical anomaly). Record **70970** is the position of an unknown, but previously reported steamship that was first reported in 1980 (UKHO 6161). In 2002 the UKHO record states that the wreck was known locally as 'Winch', was dived over 10 years ago, the bell was recovered with no name and elements of the wreck were identifiable, situated in sand. The wreck was not located in MBES data during a 2016 geophysical survey, and as such the record was amended to 'Dead'. This location was covered by the 2021 SSS, MBES and MAG datasets and no remains were identified. However, this area of seabed has frequent mounds visible in the MBES data, which have been interpreted as natural features. The record has been retained as a precaution as the location of a potential archaeological site, which may be buried at present

The remaining 205 anomalies have an A2 discrimination, which is defined as features of uncertain origin, but of possible archaeological interest (see Appendix G of Appendix 12.1: Marine Archaeology Technical Report for full list of anomalies).

12.5.1.3 Maritime Recorded Losses

Recorded Losses can be considered as an indication of the potential for archaeological maritime remains to exist within the archaeological study area and the type and number of wrecks that could be present. These records relate to vessels reportedly lost or for which no physical wreck remains have ever been identified. Table 12-5 shows the distribution of these documented losses according to the

date of loss for those records whose position fall within the archaeological study area. Details regarding these losses are presented in Appendix H of Appendix 12.1: Marine Archaeology Technical Report.

Table 12-5: Recorded Losses Based on NRHE and HER Data

Period	Number of Losses
Post-medieval	2
19 th century	12
Modern	3
Unknown	nil
Total	17

12.5.1.4 Seabed Features: Aviation

There are no known aircraft crash sites within the ASA. Nonetheless, there is the potential for aircraft or aircraft-related debris to exist on the seafloor within the Marine Scheme. Given the identified potential of the area for military aircraft crashes, particularly relating to the Second World War, the likelihood would be for any aircraft crash to be of military origin, which would be protected under PMRA 1986 and therefore would be of high value. This would include both Allied and Axis aircraft and would relate to both complete aircraft wrecks and debris scatters.

A number of recorded losses are located within the wider area; at least 45 recorded aircraft crash sites have been identified at sea within the English 12 NM limit, including one that lies within 1 km of the ASA, as recorded in the HER's for the area. The record (NRHE_1341161) consists of a Halifax MKIII MZ286 British bomber from 1944.

12.5.1.5 Intertidal Heritage Assets

There is only one record (**1004**) relating to archaeological sites, artefacts, material and standing remains located within the intertidal zone (to MHWS) of the proposed English landfall. Full details are available in Appendix I in Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-7 in Appendix 12.1: Marine Archaeology Technical Report.

Generally coastal areas, particularly soft sandy coasts, may contain an array of isolated finds from a wide range of archaeological periods. A specific note is made here with reference to the concentration of military defence features present within the wider (intertidal) area of the English landfall. This clearly indicates the historic importance of this stretch of coastline during past conflicts, especially naval actions (and more recently aerial combat in the Second World War).

12.6 Appraisal of Potential Impacts

This section describes the effects on marine archaeology and cultural heritage, which has the potential to occur during the Installation, Operation and Maintenance, and Decommissioning Phases of the Marine Scheme. This appraisal considered the activities described within Chapter 2: Project Description, and the worst-case scenario in terms of areas of impacts to seabed and depth of sediment disturbance. The Marine Scheme has the potential to physically and adversely impact known and potential archaeological receptors within the Marine Installation Corridor. The Marine Scheme could also impact receptors in the area within which indirect physical effects may occur, such as changes to local hydrodynamic and sedimentary regimes due to sediment redistribution, relying on the outputs of the appraisal in Chapter 7: Physical Environment.

A summary of the impacts considered as part of this appraisal is provided in Table 12-6 below. Activities undertaken as part of Decommissioning Phase have the potential to affect marine archaeological and cultural heritage receptors directly and indirectly, similar to potential effects considered during Installation Phase. Therefore, these two have been presented together in Table 12-6.

Table 12-6: Impact Summary

Phase	Activities	Sub Activity	Potential Impact
Installation and Decommissioning	Pre-Installation Activities	Geotechnical survey	Direct disturbance to known and recorded maritime and aviation receptors (A1s) and geophysical anomalies of possible anthropogenic origin (A2s).
		Route Preparation, including: <ul style="list-style-type: none"> • Cable route clearance; • Pre-lay grapnel run; • Sandwave lowering by means of Mass Flow Excavator (MFE); • Sea trials; and • Pre-lay submarine intervention. 	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
	Submarine Cable Installation	Cable Laying and Burial, following the proposed methods: <ul style="list-style-type: none"> • Simultaneous cable lay and trenching; and • Surface cable lay followed by post-lay trenching of the cables. Cable burial methods may include: <ul style="list-style-type: none"> • Cable trenching ploughs; • Jet trenchers; • Mechanical trenchers; and • MFE. 	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
			Indirect disturbance to known and potential seabed prehistory receptors; maritime and aviation receptors, caused by increased exposure or burial from the dispersal and redistribution of suspended sediment during installation activities (see Chapter 7: Physical Environment).
		Cable Protection Measures, including rock placement and/or concrete mattresses.	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
			Indirect disturbance to known and potential seabed prehistory receptors; maritime and aviation receptors, caused by increased exposure or burial from the dispersal and redistribution of suspended sediment during installation activities (see Chapter 7: Physical Environment).
	Landfall Installation	HDD installation; HDD ducts; excavation of HDD pits and installation of cable	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
			Indirect disturbance to known and potential seabed prehistory receptors; maritime and aviation receptors, caused by increased exposure or burial from the dispersal and redistribution of suspended sediment during HDD activities (see Chapter 7: Physical Environment).

Phase	Activities	Sub Activity	Potential Impact
		Anchor deployment: Cable Lay Barge (CLB); jack-up rig/barge	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
Operation and Maintenance	In-situ cable; in service monitoring surveys; repairs	Cable Maintenance, Monitoring and Repairs	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts. Indirect disturbance to known and potential seabed prehistory receptors; maritime and aviation receptors, caused by changes in local scouring and sedimentation patterns (see Chapter 7: Physical Environment).
		Anchor deployment	Direct disturbance to known and potential seabed prehistory receptors; direct disturbance to known and recorded maritime and aviation receptors (A1s); direct disturbance to geophysical anomalies of possible anthropogenic origin (A2s); direct disturbance to unknown archaeological sites and artefacts.
Decommissioning	The activities, sub-activities and potential impacts are as per Installation Phase.		

12.6.1 Embedded Mitigation

With regards to the archaeological resource, international best practice and government policy favours preservation *in situ* as such, adequate and appropriate mitigation is required to ensure that the archaeological value of the baseline described within this chapter is maintained.

The Marine Scheme has been developed through an iterative process, where avoidance or reduction of potential environmental impacts has been taken into consideration. Avoidance of known wrecks was a consideration throughout the iterative process of routeing the Marine Installation Corridor and siting the landfalls.

Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design, see Chapter 2: Project Description) and that are relevant to marine archaeology and cultural heritage are presented in Table 12-7. These general measures apply to all parts of the Marine Scheme.

Table 12-7: Marine Archaeology Embedded Mitigation

Activity / Issue	Embedded mitigation commitment
Installation Phase	
Route selection	The Marine Installation Corridor has been selected to optimise the balance of environmental, technical, commercial and financial considerations, such as avoiding designated sites, known archaeological sites, recreational activities, key fishing grounds and third-party infrastructure as far as possible.

Activity / Issue	Embedded mitigation commitment
Pre-installation surveys	Pre-installation surveys will inform detailed engineering and cable installation planning. They will focus on collection of detailed information within the preferred route for each of the cables, all within the marine installation corridor. They will confirm the absence or presence of any new obstructions or significant changes to seabed conditions and bathymetry, and also help to inform detailed unexploded ordnance (UXO) assessment. Survey methods may include: Acoustic methods such as multibeam and single beam echo sounders, side scan sonar (SSS), and sub-bottom profiler. Magnetometer/gradiometer to identify magnetic anomalies and metallic targets. Visual methods including drop down video or remotely operated vehicle (ROV). Geophysical investigations such as vibrocore and cone penetration test (CPT).
Micro-routeing / detailed design post-consent	Detailed route development and micro-routeing will be undertaken within the Marine Installation Corridor, informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints. This will include minimising the footprint as much as possible; and Changes to the sedimentary and metocean environments will be minimised by careful route selection and the use of appropriate trenching techniques and cable protection methods such as fall pipes for the laying of rock placement.
Written Scheme of Investigation and Protocol for Archaeological Discoveries	A Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) will be in place for any archaeological discoveries. This will include any recommended Archaeological Exclusion Zones and a PAD for reporting and investigating unexpected archaeological discoveries encountered during installation activities, with a Retained Archaeologist providing guidance and advising industry staff on the implementation of the PAD. The PAD provides a mechanism to comply with the MSA 1995, including notification of the Receiver of Wreck, and accords with the Code of Practice for Seabed Developers (JNAPC, 2006). The PAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt archaeological advice, and, if necessary, for archaeological inspection of important features prior to further activities in the vicinity.
Landfall installation	Horizontal Directional Drilling (HDD) will be used at both landfalls for the installation of the cables in the transition zone between the Onshore Schemes and the Marine Scheme which avoids any works in the intertidal environment.

12.6.2 Installation Phase

12.6.2.1 Damage to Known and Unknown Assets from Direct Impacts

All seabed assets have the potential to be damaged or destroyed if they are directly impacted during the Installation Phase of the Marine Scheme. Furthermore, all damage to archaeological sites or material is permanent and recovery is limited to stabilisation or re-burial, to limit further impact. There is no potential for the recoverability of any seabed assets if they are affected following a direct impact. As such, all wrecks, aircraft, associated material and debris and seabed prehistory should be regarded as having high sensitivity.

If direct impacts were to occur upon the archaeological receptors that have been identified in Section 12.5 of this chapter and any potential archaeology within the Marine Scheme, these are most likely to occur during the Installation Phase. Impacts resulting in negative effects upon archaeological assets as part of Installation Phase are those involving contact with the seabed and/or the removal of seabed sediments. Marine archaeological receptors with height, such as shipwrecks, may also be impacted by activities that occur within the water column, including pre-installation activities and cable installation activities

Installation Phase activities that involve contact with the seabed and/or the removal of seabed sediments may lead to direct physical impacts to known and unknown assets include:

- Pre-installation surveys and sea trials;
- Cable installation, including route clearance, cable laying and burial, and cable protection;

- Landfall installation activities, including Horizontal Directional Drilling (HDD), HDD duct installation, and cable installation; and
- Seabed contact by jack-up vessel, and / or anchors of other vessels.

Magnitude of Impact

The magnitude of direct impacts on known maritime and aviation receptors, and potential seabed features as part of Installation Phase, if they were to occur, would be high.

All A1 receptors and currently unknown archaeological sites are considered as high sensitivity receptors.

For all A2 anomalies, there is insufficient data to assess the value of each individual anomaly at this point. As such, all A2 anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle are considered as high sensitivity receptors.

Impacts on known and potential seabed prehistory receptors, such as potential *in situ* prehistoric sites and submerged landscape features (P1 and P2 features), are considered as high value assets. For the majority of the Marine Installation Corridor, depths of lowering are anticipated to be between approximately 0.6 m and 1.5 m (see Table 2-1 in Chapter 2: Project Description), whilst HDD duct installation will reach trenching depths of between 1 m to 3 m (see Table 2-12 in Chapter 2: Project Description), and therefore these are too shallow to penetrate the depths within the sediment at which submerged landscapes may be present. In addition, should potential seabed prehistoric features be impacted, the footprint of a linear installation such as the Marine Scheme on these extensive submerged landscape features would be minimal, and therefore the magnitude of direct impacts on such resources would be **low**.

Significance of Effects

If appropriate mitigation is not applied, both the sensitivity and the magnitude of direct impacts on known maritime and aviation receptors, and potential seabed features would result in **major negative effects** considered to be **significant**. However, for known and potential seabed prehistory receptors the low magnitude of impact results in **moderate effects** which is **not significant**.

12.6.2.2 Damage to Known and Unknown Assets from Indirect Impacts

The indirect effects upon the known and potential marine archaeological assets considered here are those which occur because of changes to hydrodynamic and sediment transport regimes, where these changes have occurred because of activities and structures associated with the Installation Phase of the Marine Scheme. These impacts may occur from the clearance of areas of sandwaves during route preparation but may also occur through sediment dispersal / deposition or the placement of external cable protection such as rock berms on the seabed. Installation activities that could potentially create indirect physical impacts may include:

- Lowering of areas of sandwaves using MFE (during route preparation), potentially resulting in changes to local hydrodynamics; and
- Dispersal of suspended sediment (during installation of cables and excavation of HDD entry/exit pits) potentially resulting in increased sediment transport regimes.

Indirect impacts may affect marine archaeological baseline conditions where they result in the increased exposure or burial of marine archaeological assets. The increased exposure of marine archaeological assets has the potential to cause erosion and deterioration to the assets. Conversely, should assets be subject to increased sedimentation and burial, they may, in turn, benefit from conditions which afford higher levels of preservation.

Magnitude of Impact

The magnitude of indirect impacts to marine archaeology and cultural heritage during the Installation Phase of the Marine Scheme is expected to be **negligible**.

Following an appraisal of the local hydrodynamic and sediment transport regime, a review of data available from similar projects and preliminary calculations, Chapter 7: Physical Environment concludes that the significance of the effect on the sediment transport regime in deeper water depths (>10 m) from

installation will be minor/negligible. This is because seabed disturbance will be temporary and highly localised, and furthermore, it is anticipated that the seabed will recover via natural sediment transport processes. Similarly, within shallower water depths (<10 m), the effect on the sediment transport regime will be low as seabed disturbance will be temporary and localised, and therefore the significance of effect is assessed to be minor within the Marine Installation Corridor.

For nearshore installation activities (<10 m) at both landfall sites, the worst-case scenario assessed within Chapter 7: Physical Environment is anchor deployment, excavation of HDD pits and cable installation activities. Seabed disturbance due to excavated pits will impact a relatively small area and therefore the significance of the impact is assessed to be negligible. Nearshore, the dynamic nature of sediment transport regime driven by natural wave and tidal action will evenly disperse any suspended sediment and return the bed to equilibrium conditions. Therefore, the impact is considered to be of minor significance within the Marine Installation Corridor.

Significance of Effect

The high sensitivity and negligible magnitude of indirect impacts on such assets would result in **negligible** effects, considered to be **not significant**. No further mitigation is recommended, and the residual significance is **not significant**.

12.6.3 Operation and Maintenance Phase

Activities undertaken as part of Operation and Maintenance Phase have the potential to impact marine archaeology directly and indirectly, located on or under the seabed, resulting in their loss or the disruption of relationships between receptors and their wider surroundings.

12.6.3.1 Damage to Known and Unknown Assets from Direct Impacts

Direct Operation and Maintenance Phase effects will be limited to those arising from cable repair / replacement, cable protection repair / replacement, and maintenance or any monitoring that may be required. Potential direct impacts on marine archaeology during the operation of the Marine Scheme could include:

- Remedial and / or maintenance activities;
- Submarine cable repairs; and
- Anchors or jack-ups being used for any maintenance activities (although these are likely to be minimal).

Magnitude of Impact

The magnitude of direct impacts on known maritime and aviation receptors, and potential seabed features as part of maintenance and repair activities, if they were to occur, would be **high**. Any impact upon marine archaeology, including A1 anomalies and any unknown archaeology would be permanent and irreversible.

Significance of Effect

In areas where impact has already occurred during the Installation Phase, there is unlikely to be further effect and therefore this is considered **negligible** and **not significant**.

However, in areas that have not yet been impacted, without mitigation, the effects on marine archaeology could be **major adverse** which is **significant**.

12.6.3.2 Damage to Known and Unknown Assets from Indirect Impacts

The effects upon the known and potential marine archaeology considered here are those which occur as a result of changes to hydrodynamic and sediment transport, where these changes have occurred as a result of the presence of cable protection associated with the Marine Scheme. These include:

- Changes to hydrodynamic and sediment transport, where these changes have occurred as a result of the presence of cable protection associated with the Marine Scheme; and
- Scour associated with installation structures.

Magnitude of Impact

The magnitude of change of indirect impacts to marine archaeological assets during Operation and Maintenance Phase is predicted to be **negligible**.

Following an appraisal of the local hydrodynamic and sediment transport regime, review of data available from similar projects and a numerical modelling (based on a realistic worst-case scenario) assessment, Chapter 7: Physical Environment concluded that the significance of potential impacts caused by Operation and Maintenance Phase activities would be the same as those for the Installation Phase, but on a much smaller scale.

Therefore, the magnitude of the impacts associated with repair works and surveys carried out during the Operation and Maintenance Phase on the sediment transport regime, for both nearshore and offshore environments would be low on these high value features.

Significance of Effect

The high sensitivity and the negligible magnitude of indirect impacts on such resources would result in **negligible** effects, considered to be **not significant**. No further mitigation is recommended, and the residual significance of impact is **not significant**.

12.6.4 Decommissioning Phase

As with the Installation Phase, decommissioning activities have the potential to affect archaeological assets either directly or indirectly. Cables in UK territorial waters are installed on The Crown Estate and Crown Estate Scotland seabed and therefore a lease or licence is generally entered into for a set term, in this case, 40 years. What infrastructure will be decommissioned and the methodology for doing so is not currently known but will be agreed prior to the commencement of decommissioning works and will be based upon current best regulations/practices and available technology, as described in Chapter 2: Project Description.

If the cables are left in-situ any likely significant effects from decommissioning will be avoided. If the submarine cables are to be removed at decommissioning this appraisal assumes that impacts from Decommissioning Phase activities are of a similar nature to Installation Phase activities and would be of a similar or lesser scale, and therefore not likely to be significant.

12.7 Mitigation and Monitoring

Adequate and appropriate mitigation is required to ensure that the archaeological value of the baseline as described in Section 12.5 is maintained. International best practice and government policy favours preservation *in situ* of the archaeological resource.

The mitigation measures are secured through a Written Scheme of Investigation (WSI) and measures will be required to be agreed and in place, but the exact mitigation design will not be finalised until pre-installation surveys are undertaken following appointment of the Contractor post-consent determination.

12.7.1.1 Archaeological Exclusion Zones (AEZs)

The primary mitigation for the protection of known archaeological assets is avoidance. This is achieved through the implementation and monitoring of Archaeological Exclusion Zones (AEZs), which are proposed for identified high value seabed features of anthropogenic origin (i.e., A1 classified geophysical anomalies).

Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (JNAPC, 2006) states that AEZs are formed by establishing a buffer around the known extents of sites for which the available evidence suggests that there could be archaeological material present on the seabed. The mitigation will establish appropriately sized AEZs around assets that are of high archaeological potential, in consultation with the Archaeological Curators (HE and HES). These areas would be out of bounds for activities involving physical interactions with the seabed. Monitoring of any AEZs to ensure there is no disturbance to them will be part of this mitigation.

Although AEZs are fixed, provision should be made for them to be either refined or removed (with agreement of the Archaeological Curators) as the project progresses, subject to additional

archaeological assessment of subsequent surveys that may be required. Surveys could include further geophysical, Remotely Operated Vehicle (ROV), or diver inspections. In addition, to maximise the potential benefits of any further surveys, archaeological advice should be sought during the planning stages.

The recommended AEZs all have the potential to be amended or removed at a later date, should further information become available that proves their associated features are not of archaeological potential or represent more widely dispersed sites. This appraisal is intended to inform the decision-making process for identifying the AEZs, using the information which is currently available.

The following sections list all the AEZs recommended within the Marine Installation Corridor and illustrated in Figures 12-2i - viii.

Scottish Territorial Waters

For features of high archaeological potential, AEZs are implemented around the 15 A1 features listed in Table 12-8. For wrecks and features that appear to be more contained (70086, 70089, 70278, 70317), an AEZ of 50 m around the extents is recommended. Where features were identified as small defined debris fields (70073, 70284, 70320), an AEZ of 25 m around the extents is recommended. For recorded wreck 70301 a precautionary 100 m AEZ has been recommended as this position was not covered by the geophysical data.

Table 12-8: Recommended AEZs around 15 A1 Features Identified within Scottish Territorial Waters

ID Number	Classification	Position (ETRS89 UTM30N)		Nearest KP	Exclusion Zone
		Easting	Northing		
70073	Debris field	574542	6372145	3	25 m buffer around features extent
70086	Magnetic	574654	6372556	3	50 m buffer around recorded position
70089	Magnetic	574674	6372378	3	50 m buffer around recorded position
70278	Wreck	583806	6366053	14	50 m buffer around features extent
70280	Debris field	583827	6366072	14	Within 70278 AEZ
70281	Debris field	583852	6366041	14	Within 70278 AEZ
70282	Debris	583858	6366027	14	Within 70278 AEZ
70283	Debris field	583864	6366068	14	Within 70278 AEZ
70284	Debris field	583895	6366065	14	25 m buffer around features extent
70301	Recorded wreck	585516	6363341	17	100 m buffer around recorded position
70316	Debris	588119	6356058	25	Within 70317 AEZ
70317	Wreck	588121	6356046	25	50 m buffer around features extents
70318	Debris	588121	6356078	25	Within 70317 AEZ
70319	Debris	588126	6356065	25	Within 70317 AEZ
70320	Debris field	588130	6356119	25	25 m buffer around features extent

Scottish Offshore Waters

As features of high archaeological potential, it is recommended that AEZs are implemented around the 10 A1 features listed in Table 12-9. For wreck 70394 and magnetic features 70327 which appear to be more contained, AEZ of 50 m around the extents is recommended. Where features were identified as small defined debris fields (70395, 70396, 70397, 70399, 70400, 70401, 70402), an AEZ of 25 m around the extents is recommended. For recorded wreck 70441 a precautionary 100 m AEZ has been recommended as this position was not covered by the geophysical data.

Table 12-9: Recommended AEZs within the Scottish Offshore Waters

ID Number	Classification	Position (ETRS89 UTM30N)		Nearest KP	Exclusion Zone
		Easting	Northing		
70327	Magnetic	590692	6352156	30	50 m buffer around recorded position
70394	Wreck	607131	6305403	80	50 m buffer around features extents
70395	Debris	607151	6305410	80	25 m buffer around features position. Covered by larger wreck AEZ.
70396	Debris	607109	6305392	80	25 m buffer around features position. Covered by larger wreck AEZ.
70397	Debris	607094	6305409	80	25 m buffer around features position. Covered by larger wreck AEZ.
70399	Debris	607120	6305368	80	25 m buffer around features position. Covered by larger wreck AEZ.
70400	Debris	607140	6305435	80	25 m buffer around features position. Covered by larger wreck AEZ.
70401	Debris	607142	6305388	80	25 m buffer around features position. Covered by larger wreck AEZ.
70402	Debris	607123	6305363	80	25 m buffer around features position. Covered by larger wreck AEZ.
70441	Recorded wreck	609117	6293115	93	100 m buffer around recorded position

English Offshore Waters

As features of high archaeological potential, it is recommended that AEZs are implemented around the two A1 features listed in Table 12-10. Where features were identified as small defined debris fields (70672), an AEZ of 25 m around the extents is recommended. For recorded wreck 70675 a precautionary 100 m AEZ has been recommended as this position was not covered by the geophysical data.

Table 12-10: Recommended AEZs within the English Offshore Waters

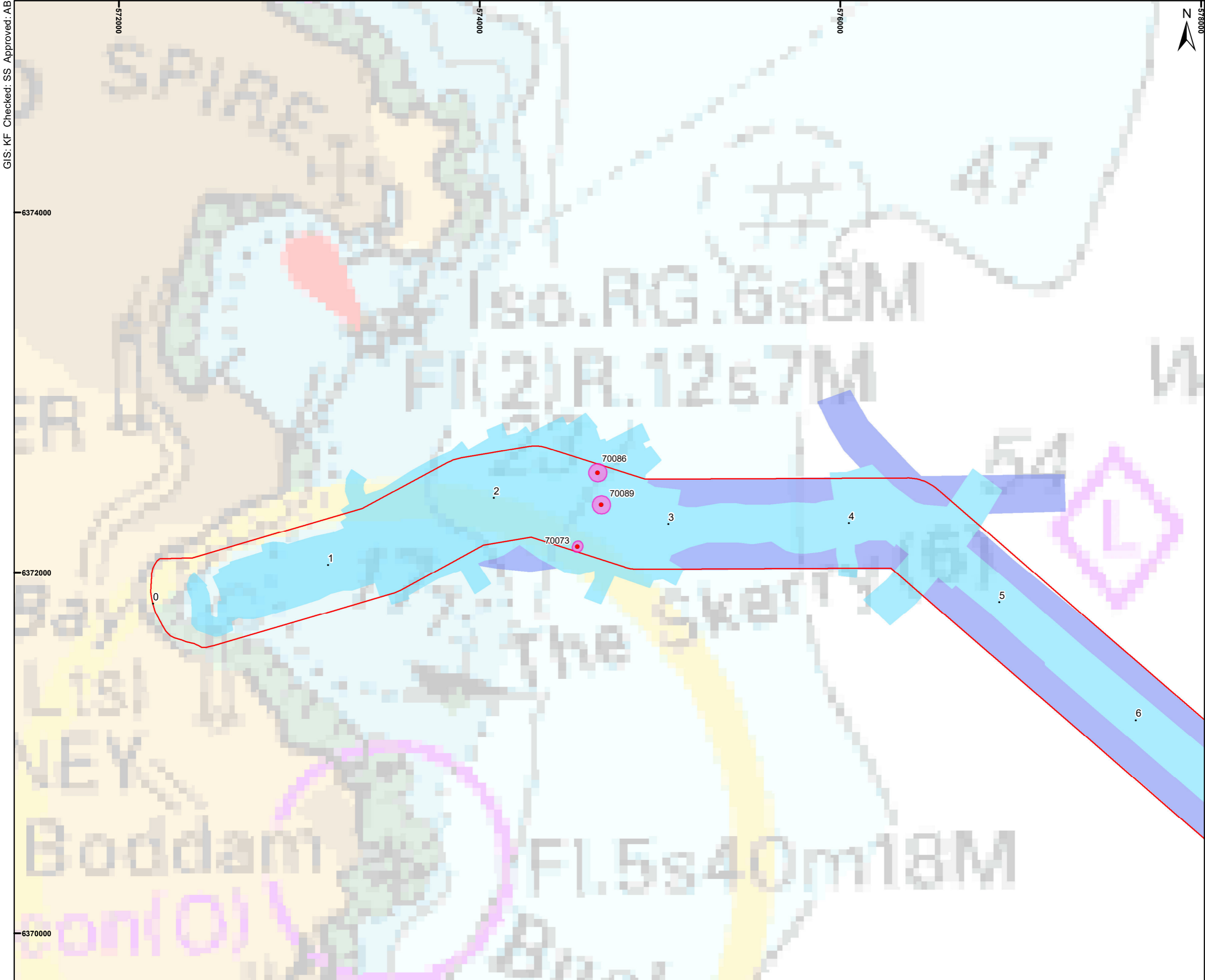
		Position			
		Easting	Northing		
70672	Debris field	668789	6090144	309	25 m buffer around features extents
70675	Recorded wreck	669510	6089942	309	100 m buffer around recorded position

English Territorial Waters

As features of high archaeological potential, it is recommended that AEZs are implemented around the three A1 features listed in Table 12-11. For wrecks 71021 and 70931 an AEZ of 50 m around the extents is recommended. For recorded wreck 70970 a precautionary 100 m AEZ has been recommended as this position was not covered by the geophysical data.

Table 12-11: Recommended AEZs within English Territorial Waters

Number	Classification	Position (ETRS89 UTM31N)		Nearest KP	Exclusion Zone
		Easting	Northing		
70931	Wreck	699178	5997464	418	50 m buffer around features extent
70970	Recorded Wreck	695256	5995704	422	100 m buffer around position
71021	Wreck	690003	5993981	428	50 m buffer around features extent



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Geophysical Study Area 2012 Data
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest

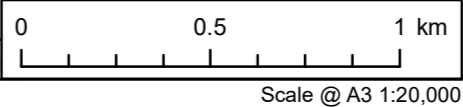


TITLE
**Figure 12-2i
Recommended AEZs within the
Marine Installation Corridor**

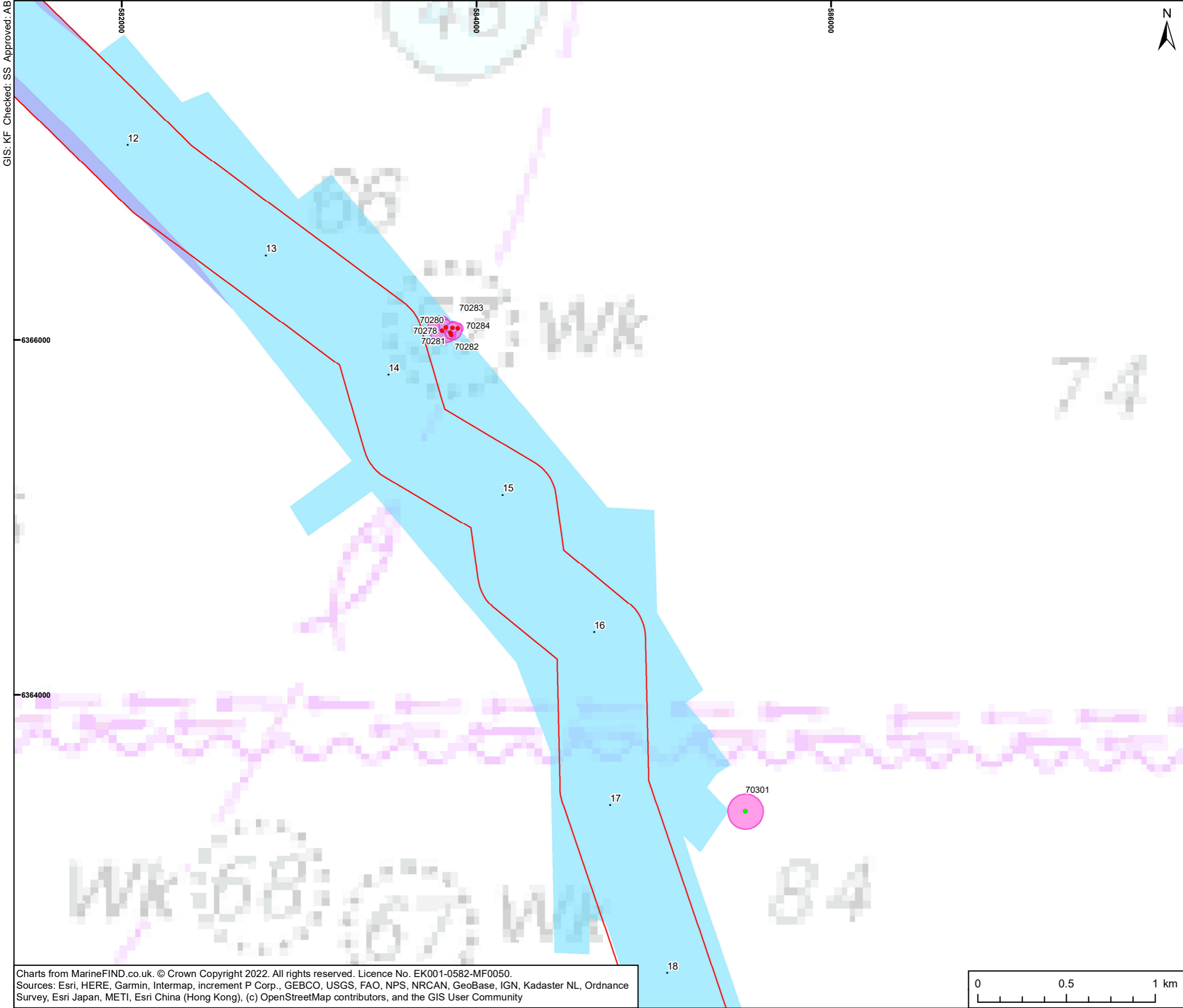
REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER
1 of 8

DATE
21/06/2022



GIS: KF Checked: SS Approved: AB



Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: ETRS1989 UTM Zone 30N



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Geophysical Study Area 2012 Data
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly

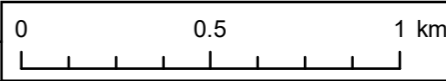


TITLE
**Figure 12-2ii
Recommended AEZs within the
Marine Installation Corridor**

REFERENCE
SEGL2_M_SR_1_v1_20220621

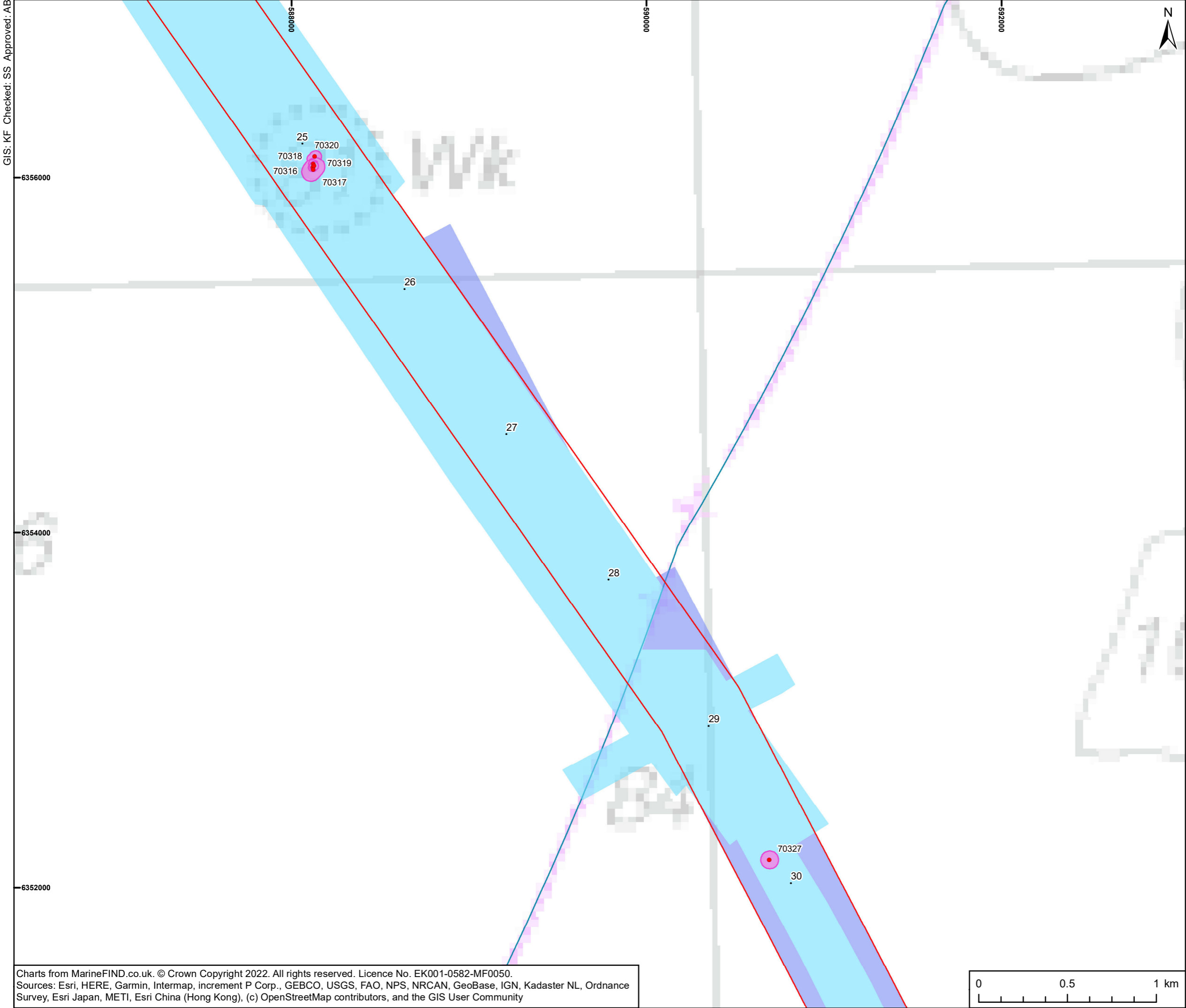
SHEET NUMBER
2 of 8

DATE
21/06/2022



Scale @ A3 1:20,000

GIS: KF Checked: SS Approved: AB



PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Geophysical Study Area 2012 Data
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest



TITLE
**Figure 12-2iii
Recommended AEZs within the
Marine Installation Corridor**

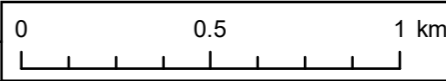
REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER
3 of 8

DATE
21/06/2022

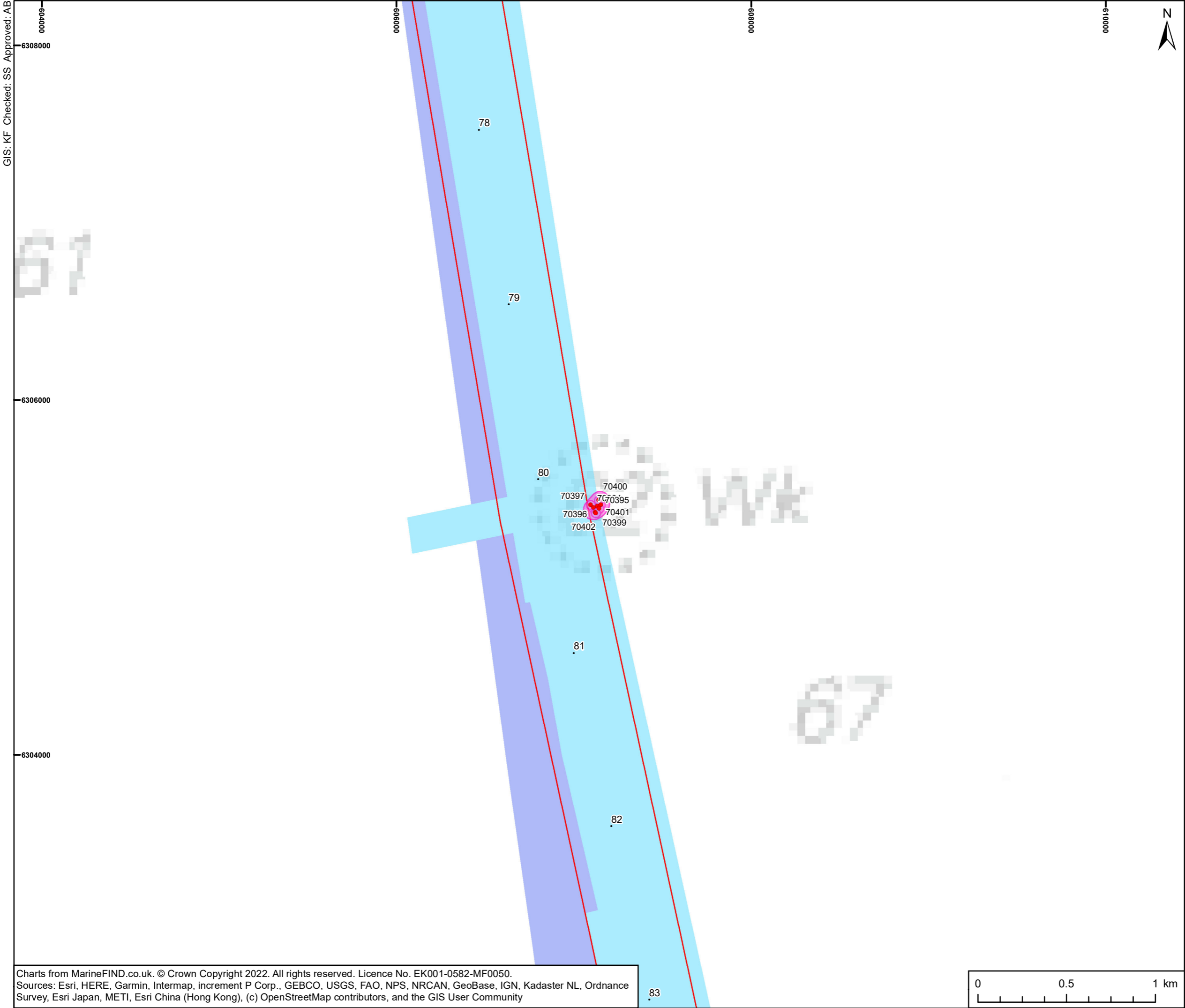
Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: ETRS1989 UTM Zone 30N



Scale @ A3 1:20,000

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



PROJECT
Eastern Green Link 2

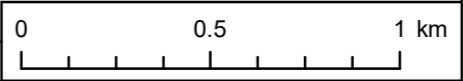
- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Geophysical Study Area 2012 Data
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest



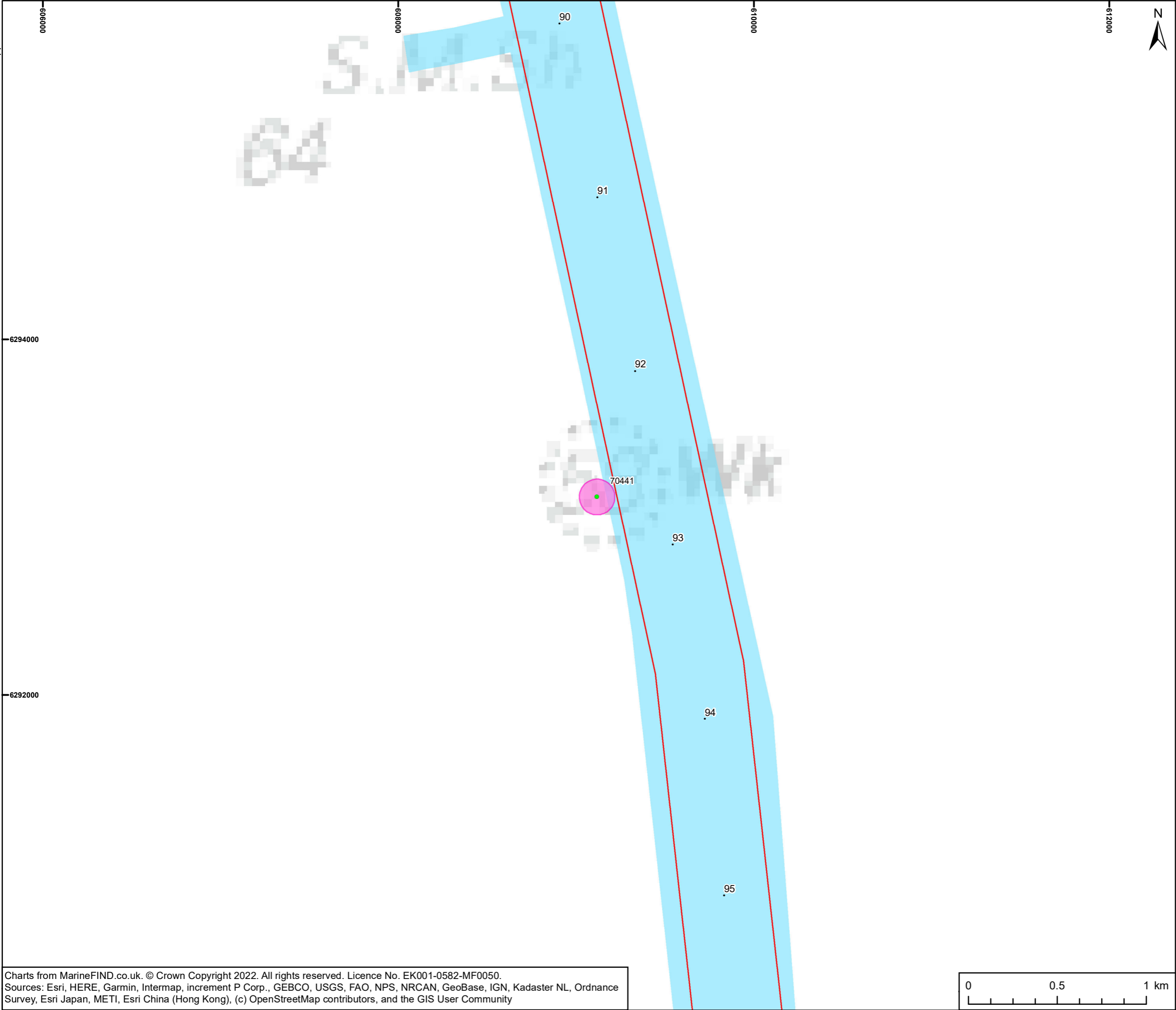
TITLE
Figure 12-2iv
Recommended AEZs within the
Marine Installation Corridor

REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER 4 of 8
DATE 21/06/2022

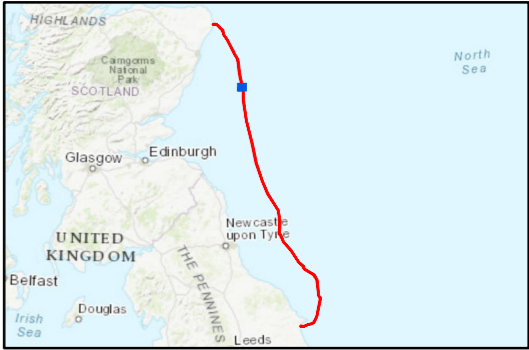


This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Recommended archaeological exclusion zones
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly



TITLE
**Figure 12-2v
Recommended AEZs within the
Marine Installation Corridor**

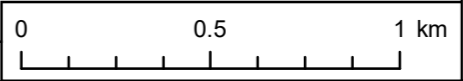
REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER
5 of 8

DATE
21/06/2022

Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: ETRS1989 UTM Zone 30N



Scale @ A3 1:20,000

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

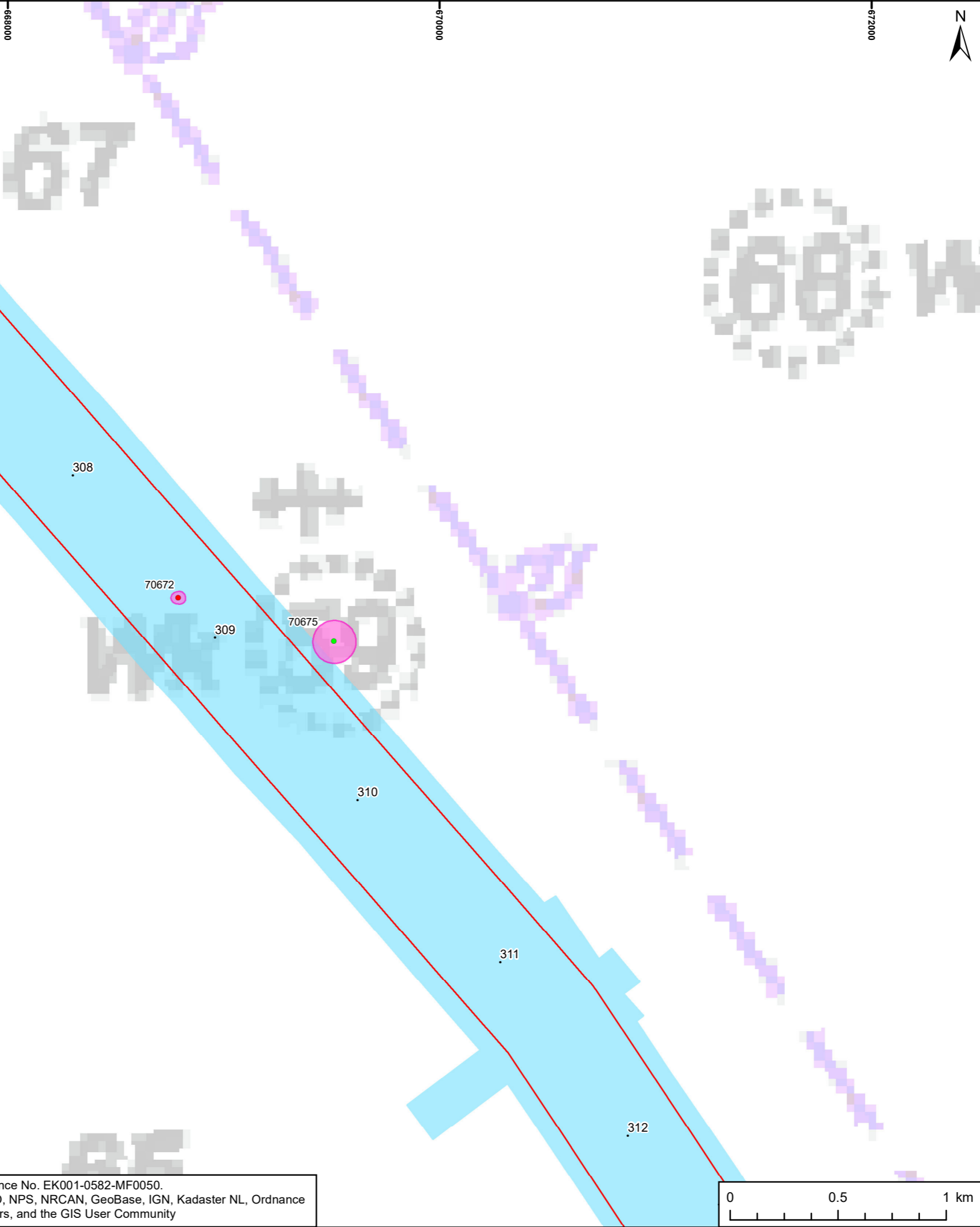
6092000

6090000

6088000

Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: ETRS1989 UTM Zone 30N



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest
 - A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly



TITLE
**Figure 12-2vi
Recommended AEZs within the
Marine Installation Corridor**

REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER
6 of 8

DATE
21/06/2022

Scale @ A3 1:20,000

KEY

-

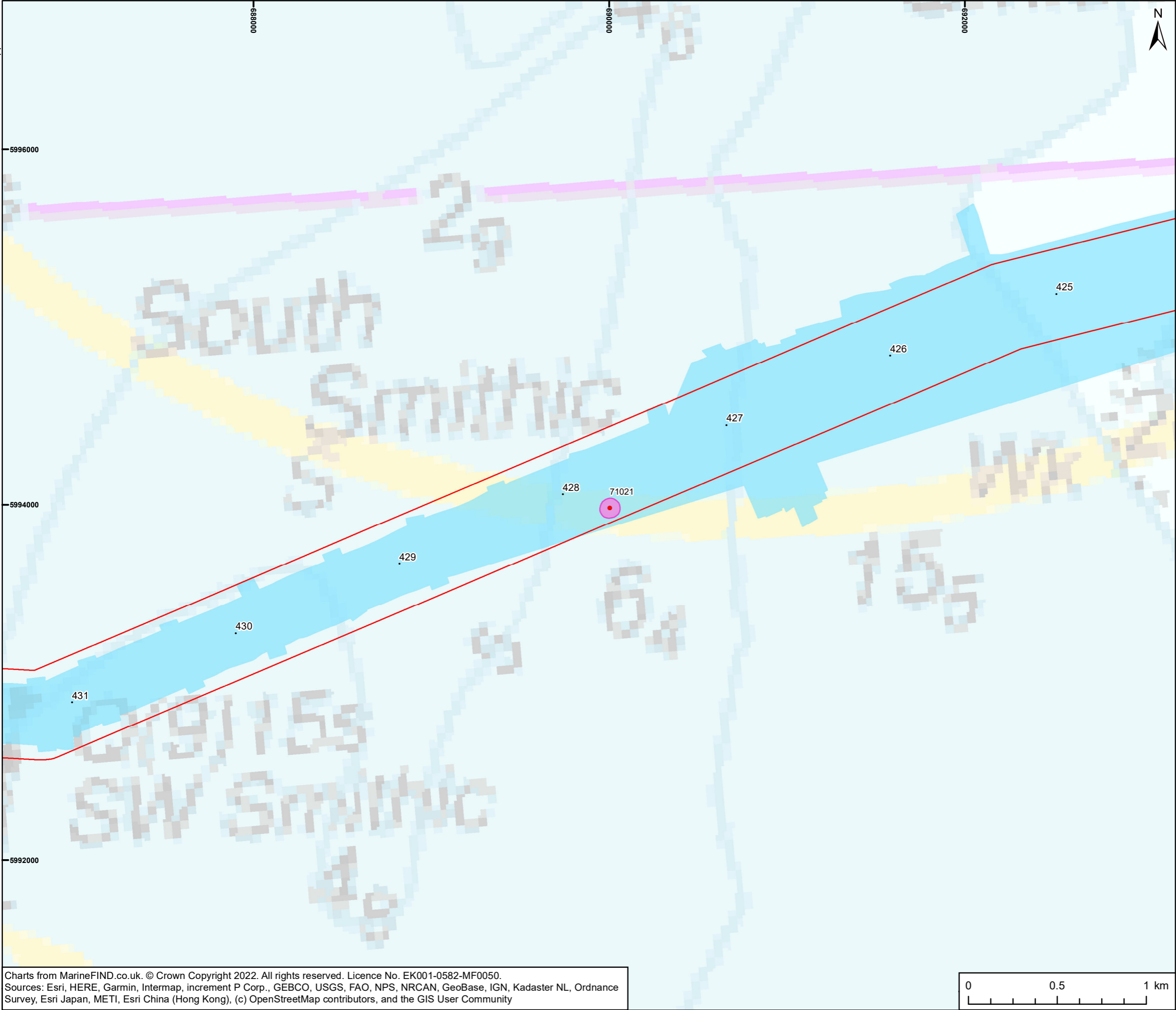
Figure 12-2vii
Recommended AEZs within the
Marine Installation Corridor

SEGL2_M_SR_1_v1_20220621

Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

0 0.5 1 km
Scale @ A3 1:20,000

GIS: KF Checked: SS Approved: AB



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.



PROJECT
Eastern Green Link 2

- KEY
- Kilometre Point (KP)
 - Marine Installation Corridor
 - UK Territorial Sea Limit
 - Geophysical Study Area
 - Recommended archaeological exclusion zones
 - A1 – Anthropogenic origin of archaeological interest



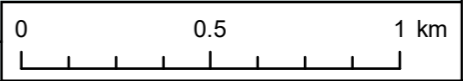
TITLE
**Figure 12-2viii
Recommended AEZs within the
Marine Installation Corridor**

REFERENCE
SEGL2_M_SR_1_v1_20220621

SHEET NUMBER
8 of 8

DATE
21/06/2022

Charts from MarineFIND.co.uk. © Crown Copyright 2022. All rights reserved. Licence No. EK001-0582-MF0050.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Coordinate System: ETRS1989 UTM Zone 30N Scale @ A3 1:20,000

12.7.1.2 A2 Anomalies

For features assigned A2 archaeological discrimination rating, no AEZs are proposed, however, avoidance of these features by micro-siting is recommended. If micro-siting is not possible, then further appraisal to ascertain the nature of the features may be required. Any further investigations will be clearly detailed in a WSI and informed by detailed routeing.

Reduction of impact can be achieved by means of appropriate mitigation identified through potential opportunities for further investigation of assets (e.g., during UXO survey and clearance). Further investigations mean that anomalies can either have their archaeological value removed, if they prove to be of non-anthropogenic nature or modern, or their value as archaeological assets confirmed. If their value is confirmed, mitigation in the form of either avoidance (which may be enacted by the implementation of an AEZ) or through remedying or offsetting measures as identified through a WSI which will include a Protocol for Archaeological Discoveries (PAD).

The WSI will detail the agreed mitigation that will be in place during the installation Marine Scheme. The implementation of a WSI is the mitigation, rather than the document itself. The WSI will be developed in line with standard guidance and The Crown Estate document *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (JNAPC, 2006), which sets out agreed archaeological methodologies. The WSI will be set out based on the mitigation measures in this chapter and will be subject to approval by the Archaeological Curators.

In cases where avoidance is either inappropriate or impossible, the damage to archaeological assets should be offset. Any additional mitigation to offset cases where avoidance of archaeological assets is inappropriate or impossible will be identified through a scheme wide WSI and any recommended methods will be covered by a specific Method Statement, approved by the Archaeological Curator, should they be implemented.

It is recommended that if further geophysical surveys are undertaken in advance of the development, such as an unexploded ordnance (UXO) survey that requires magnetometer data, that those data be assessed by a suitably qualified archaeological contractor. This will allow the identification of any additional ferrous features of archaeological potential within the Marine Installation Corridor, as well as to confirm the presence of ferrous material at the location of features identified during this assessment, particularly around identified wreck sites and debris fields.

12.7.1.3 Palaeogeography

The appraisal of the geophysical data within the Marine Installation Corridor resulted in the identification of a total of 33 features of palaeogeographical interest (full details can be found in Appendix 12.1: Marine Archaeology Technical Report and illustrated in Figure 12.1-3 and Figure 12.1-4). These are summarised as follows and listed in Table 12-12 and Table 12-13:

- A total of four channels and two channel complexes were assigned a P1 archaeological rating²; and
- A total of 13 channels, three complex cut and fills, eight simple cut and fills, two infilled depressions and an area of acoustic blanking were assigned an P2 archaeological rating³.

Table 12-12: Paleogeographic features assigned P1 archaeological rating

ID Number	Classification	Depth Range (m below seabed (mBSB))		Jurisdiction	Nearest KP
		From	To		
7910	Channel complex	0.5	3.8	Scottish Offshore Waters	98
7914	Channel complex	0.7	3.6	Scottish Offshore Waters	120
7915	Channel	0.6	5.8	Scottish Offshore Waters	123
7918	Channel	0.7	7.4	Scottish Offshore Waters	147

² As terrestrial features interpreted as being deposited during periods of likely human occupation, those features given a P1 archaeological rating are considered of high archaeological potential.

³ Those features with a P2 discrimination are considered of medium archaeological potential, partly due to the uncertainty of features formation and fill.

ID Number	Classification	Depth Range (m below seabed (mBSB))		Jurisdiction	Nearest KP
		From	To		
7922	Channel	0.5	9.1	English Offshore Waters	170/171
7923	Channel	0.8	11	English Offshore Waters	174

Table 12-13: Paleogeographic features assigned P2 archaeological rating

ID Number	Classification	Depth Range (mBSB)		Jurisdiction	Nearest KP
		From	To		
7900	Cut and fill	0.5	2.1	Scottish Territorial Waters	12
7901	Cut and fill	0.3	1.9	Scottish Territorial Waters	23
7902	Cut and fill	0.4	4.2	Scottish Offshore Waters	54
7903	Channel	0.3	7.3	Scottish Offshore Waters	76
7904	Channel	0.3	5.2	Scottish Offshore Waters	79
7905	Channel	0.6	9.1	Scottish Offshore Waters	86/87
7906	Cut and fill	0.7	2.8	Scottish Offshore Waters	94
7907	Cut and fill	0.6	3.2	Scottish Offshore Waters	95
7908	Cut and fill	0.5	3.8	Scottish Offshore Waters	95
7909	Cut and fill	0.5	1.3	Scottish Offshore Waters	97
7911	Channel	0.4	3.7	Scottish Offshore Waters	104/105
7912	Channel	0.6	6.8	Scottish Offshore Waters	109
7913	Channel	0.9	4.6	Scottish Offshore Waters	118
7916	Channel	0.5	3.8	Scottish Offshore Waters	124
7917	Channel	0.4	2	Scottish Offshore Waters	129
7919	Cut and fill	0.3	4.2	English Offshore Waters	155
7920	Channel	0.9	7.1	English Offshore Waters	162
7921	Channel	1.3	7.8	English Offshore Waters	163
7924	Cut and fill	1	2.6	English Offshore Waters	187
7925	Channel	0.5	3.1	English Offshore Waters	192
7926	Channel	0.5	7.6	English Offshore Waters	208
7927	Cut and fill	1	2.9	English Offshore Waters	233
7928	Infilled depression	1.6	2.8	English Offshore Waters	305
7929	Infilled depression	1.1	2.6	English Offshore Waters	316
7930	Acoustic blanking	1	2.2	English Offshore Waters	322
7931	Channel	0.9	7.7	English Offshore Waters	332
7932	Cut and fill	0.2	1.4	English Territorial Waters	419

As terrestrial features interpreted as being deposited during periods of likely human occupation, those features given a P1 archaeological rating are considered of high archaeological potential. Those features with a P2 discrimination are considered of medium archaeological potential, partly due to the uncertainty of features formation and fill.

Should further geotechnical survey work be undertaken within areas of paleogeographic interest of the Marine Installation Corridor, it is recommended that an archaeological contractor be consulted to advise on potential samples to be acquired for archaeological purposes and other identified units of archaeological interest identified within the data. It is also recommended that any geotechnical logs from within the Marine Installation Corridor be made available for geoarchaeological assessment, such as a stage one assessment of all the core logs or sampling and dating work. This would aid in refining the interpretation and therefore help determine the archaeological potential of the area. Any further investigations will be clearly detailed in a WSI and informed by detailed routeing

12.7.1.4 Protocol for Archaeological Discoveries

If previously unknown sites or material are encountered during the different phases of the Marine Scheme, measures will be taken to reduce the level of impact. In order to provide for these unexpected discoveries, as per the WSI, a PAD will be adopted. The PAD is a system for reporting and investigating unexpected archaeological discoveries encountered during installation activities, with a Retained

Archaeologist providing guidance and advising staff on the implementation of the PAD. The PAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt archaeological advice, and, if necessary, for archaeological inspection of important features prior to further activities in the vicinity. The PAD provides a mechanism to comply with the MSA 1995, including notification of the Receiver of Wreck, and accords with the Code of Practice for Seabed Developers (Joint Nautical Archaeology Policy Committee (JNAPC), 2006).

12.8 Residual Impacts

12.8.1 Installation and Decommissioning Phase

12.8.1.1 Damage to Known and Unknown Assets from Direct Impacts

During the Installation Phase, there is potential for significant effects on known maritime and aviation receptors and potential seabed features. Following the application of appropriate mitigation, as outlined in Section 12.7, including the implementation of AEZs to protect A1 anomalies, further appraisal of A2 anomalies and palaeogeography, and a PAD for unknown assets, the magnitude is considered to be negligible and the significance of the effect would therefore be **negligible**, which is **not significant** (see Table 12-14).

It should be noted that in some cases, the application of appropriate mitigation, such as an archaeological investigation of seabed anomalies prior to impact or reported through a PAD, could lead to effects of minor to moderate beneficial significance. For example, undertaking further geoarchaeological assessment of geotechnical samples and enhancing knowledge of the wider prehistoric landscape or discovery of a wreck of interest.

12.8.2 Operation and Maintenance Phase

12.8.2.1 Damage to Known and Unknown Assets from Direct Impacts

During the Operation and Maintenance Phase, there is potential for significant effects on known or unknown assets from direct impact if they are beyond the footprint of the Installation Phase activities. Should Operation and Maintenance Phase activities be required outside of the footprint of the Installation Phase activities then it is recommended that further archaeological mitigation is implemented in line with industry best practice and that this is based on the nature and location of the activities. Appropriate mitigation may include the retainment of the AEZs or implementation of a PAD. Following the application of this additional mitigation during the Operation and Maintenance Phase, the magnitude of impact would be reduced to **negligible**, which is considered to be **not significant**.

12.9 Summary of Appraisal

Table 12-14: Summary of Environmental Appraisal

Project Phase	Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Significance of Effect	Project Specific Mitigation	Magnitude after Mitigation	Significance of Residual Effect
Installation & Decommissioning	Direct disturbance to seabed causing damage to receptors	Known and potential seabed prehistory receptors	High	Low	Moderate	Further investigation by means of geoarchaeological assessment of geotechnical samples	Negligible	Not significant
		Known and recorded maritime receptors and aviation receptors (A1s)	High	High	Major	Implementation of AEZs	Negligible	Not significant
		Geophysical anomalies of possible anthropogenic origin (A2s)	High	High	Major	Further investigation through potential opportunities, where possible, for diver or ROV survey; archaeological watching briefs during clearance of A2s	Negligible	Not significant
		Currently unknown archaeological sites and artefacts	High	High	Major	Implementation of AEZs	Negligible	Not significant
	Use of anchors by vessels (spread mooring anchoring systems or spud cans)	Direct impacts to known and potential seabed prehistory receptors; maritime and aviation receptors	High	Medium	Major	Implementation of AEZs	Negligible	Not significant
	Indirect disturbance to receptors	Known and potential seabed prehistory receptors; maritime and aviation receptors (caused by changes to the hydrodynamic and sedimentary regimes due to spoil removal and suspended sediment redistribution)	High	Negligible	Negligible	None required	Negligible	Not significant

Project Phase	Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Significance of Effect	Project Specific Mitigation	Magnitude after Mitigation	Significance of Residual Effect
Operation and Maintenance	Direct disturbance to previously not impacted seabed causing damage to receptors	Known and potential seabed prehistory receptors; maritime and aviation receptors	High	High	Major	Implementation of AEZs	Negligible	Not significant
	Use of anchors by vessels	Direct impacts to known and potential seabed prehistory receptors; maritime and aviation receptors	High	High	Major	Implementation of AEZs	Negligible	Not significant
	Indirect disturbance to receptors	Known and potential seabed prehistory receptors; maritime and aviation receptors (caused by potential scour and plume effects resulting in increased protection to, or deterioration through erosion)	High	Negligible	Negligible	None required	Negligible	Not significant
Decommissioning	Potential effects of decommissioning would be the same as Installation Phase if cables are to be removed.							

12.10 References

- ClfA. (2014a). Standard and Guidance for Archaeological Advice by Historic Environment Services. *October 2020*. Reading: Chartered Institute for Archaeologists.
- ClfA. (2014b). Code of Conduct. *October 2019*. Reading: ClfA.
- ClfA. (2014c). Standard and Guidance for Historic Environment Desk-based Assessment. *October 2020*. Reading: ClfA.
- ClfA. (2019). Regulations for professional conduct. Reading: Chartered Institute for Archaeologists.
- Council of Europe. (2000). *European Landscape Convention*. Florence: Council of Europe.
- COWRIE. (2011). *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector*. COWRIE.
- Defra. (2009). *Our Seas - A shared resource: High level marine objectives*. Department for Environment, Food and Rural Affairs.
- Defra. (2011). *The UK Marine Policy Statement*. Department for Environment, Food and Rural Affairs.
- Defra. (2011). *UK Marine Policy Statement*. Department for Environment, Food and Rural Affairs.
- Defra. (2011). *UK Marine Policy Statement*. Department for Environment, Food and Rural Affairs.
- Defra. (2014). *East inshore and East offshore Marine Plans*. London: Department for Environment, Food and Rural Affairs.
- English Heritage (now Historic England). (1998). *Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers*. English Heritage.
- English Heritage (now Historic England). (2002). *Military Aircraft Crash Sites – Archaeological Guidance on their Significance and Future Management*. English Heritage.
- English Heritage (now Historic England). (2008). *Conservation principles, policies and guidance for the sustainable management of the historic environment*. London: English Heritage.
- English Heritage (now Historic England). (2012). *Ships and Boats: Prehistory to Present - Designation Selection Guide*. English Heritage.
- English Heritage (now Historic England). (2013). *Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes*. English Heritage.
- English Heritage (now Historic England). (2015a). *Managing Significance in Decision-Taking in the Historic Environment*. English Heritage.
- English Heritage (now Historic England). (2015b). *Management of Research Projects in the Historic Environment: the MoRPHE Project Managers' Guide*. English Heritage.
- English Heritage (now Historic England). (2015c). *Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record*. English Heritage.
- English Heritage (now Historic England). (2016). *Preserving Archaeological Remains: Decision-Taking for Sites under Development*. English Heritage.
- Historic England. (2020). *Deposit Modelling and Archaeology. Guidance for Mapping Buried Deposits*. Swindon: Historic England.
- Historic England. (2021). *Commercial Renewable Energy Development and the Historic Environment*. Historic England.
- HM Government. (2021). *North East Inshore and North East Offshore Marine Plan: Draft for consultation*. Newcastle upon Tyne: Marine Management Organisation. Retrieved from <https://www.gov.uk/government/publications/the-north-east-marine-plans-documents>
- JNAPC. (2006). Code of Practice for Seabed Development. (J. N. Committee, Ed.) The Crown Estate.
- Marine Scotland. (2015). *Scotland's National Marine Plan; A Single Framework for Managing Our Seas*. Edinburgh: The Scottish Government. Retrieved from <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf>
- MMT. (2012). Integrated Geophysical and Geotechnical Report Anglo-Scottish Eastern HVDC Link. *100995-N2S-MMT-SUR-REP-SURVEY01*.
- MPS. (2011). *UK Marine Policy Statement*. HM Government.
- Natural England. (2012). *An Approach to Seascape Character Assessment*. Natural England.
- NEXT. (2020). Eastern Link LOT2 Marine Survey Project Execution Plan. (*P1719-000-PEP*). Next Geosolutions.
- NEXT. (2021). Eastern Link Marine Survey - Lot 2 Volume 4 - Integrated Geophysical and Geotechnical Survey Report. *P1719-009-004*.

- The Crown Estate. (2014). *Protocol for Archaeological Discoveries: Offshore Renewables Projects (ORPAD)*. The Crown Estate.
- The Crown Estate. (2021). *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects*. The Crown Estate.
- UK Government. (2020, October). *New Plans to Make UK World Leader in Green Energy*. Retrieved from Prime Minister's Office Press Release: <https://www.gov.uk/government/news/new-plans-to-make-uk-world-leader-in-green-energy>
- Wessex Archaeology. (2010). *Appendix III-IV: Technical Report: Archaeology. In ERM Thames Estuary Dredging Association, Marine Aggregate Regional Environmental Assessment*. Salisbury: unpubl report, ref: 66061.04.
- Wessex Archaeology. (2006). *On the importance of shipwrecks: final report*. York: Archaeology Data Service. Retrieved November 2020, from <https://doi.org/10.5284/1000313>
- Wessex Archaeology. (2007). *Historic Environment Guidance for the Offshore Renewable Energy Sector*. COWRIE (project reference: ARCH-11-05).
- Wessex Archaeology. (2008a). *Annex to the Protocol Guidance on the Use of the Protocol for Reporting Finds of Archaeological Interest in Relation to Aircraft Crash Sites at Sea*. BMAPA & English Heritage. Retrieved from <https://www.scribd.com/document/2174360/Annex-to-the-Protocol-Guidance-on-the-use-of-the-Protocol-for-Reporting-Finds-of-Archaeological-Interest-in-Relation-to-Aircraft-Crash-Sites-at-Sea>
- Wessex Archaeology. (2008b). *Marine Class Description and principles of selection for aggregate producing areas*. York: Archaeology Data Service. Retrieved November 2020, from <https://doi.org/10.5284/1000046>
- Wessex Archaeology. (2008c). *Marine Class Description and principles of selection for aggregate producing areas*. York: Archaeology Data Service. Retrieved from <http://doi.org/10.5284/1000046>
- Wessex Archaeology. (2011a). *Seabed Prehistory: Site Evaluation Techniques (Area 240)*. Salisbury: unpubl report, ref: 70754.04.
- Wessex Archaeology. (2011b). *Assessing Boats and Ships 1860 - 1950*. York: Archaeology Data Service. Retrieved from <https://doi.org/10.5284/1000145>
- Wessex Archaeology. (2013a). *Early Ships and Boats (Prehistory to 1840) EH 6440: Strategic Desk-based Assessment*. Salisbury: Wessex Archaeology.
- Wessex Archaeology. (2013b). *Audit of Current State of Knowledge of Submerged Palaeolandscapes and Sites*. Salisbury: unpubl report, ref: 84570.01.
- Wessex Archaeology. (2013c). *Palaeo-Yare Catchment Assessment*. Salisbury: unpubl report, ref: 83740.04.
- Wessex Archaeology. (2015). *Understanding submerged palaeo-environments in the southern North Sea: Pathways and timescales of hominin colonisation*. Salisbury: unpubl report, ref: 102771.02.
- Wessex Archaeology. (2020). *NO-UK Fibre Optic Cable System; Archaeological assessment of geophysical data*. Salisbury: unpubl report, ref: 235571.0.
- Wessex Archaeology. (2021). *South Bank Quay – Tees estuary; Stage 1 Geoarchaeological Review of Overwater Ground Investigation Logs*. Salisbury: unpubl report, ref: 235220.01.

