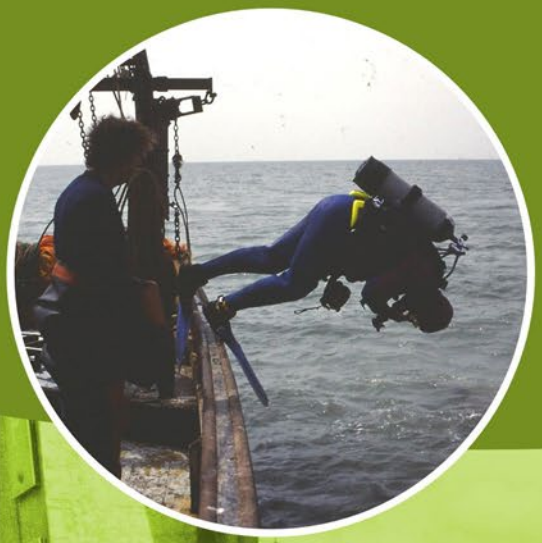
Coracle Archaeology



MaresConnect Interconnector

Marine archaeological written scheme of investigation and protocol for archaeological discoveries for initial site investigations

for

Intertek Metoc

CA ref: 230604

January 2025

MaresConnect Interconnector

Marine archaeological written scheme of investigation and protocol for archaeological discoveries for initial site investigations

Coracle project no.: 230604

Coracle report no.: 230604.3

prepared by	Dr Kieran Westley, Principal marine archaeologist
date	January 2025
checked and approved by	Dr Darren Glazier, Principal archaeologist
date	January 2025
issue	1.1

SUMMARY

Project name: MaresConnect Interconnector

Coracle Archaeology were commissioned by Intertek Metoc to undertake marine archaeological environmental assessments, including this written scheme of investigation and protocol for archaeological discoveries for initial site investigations, for the MaresConnect Interconnector. This is a proposed 750 megawatt interconnector cable, linking the electricity transmission networks of Ireland and Great Britain, with proposed landfall locations in County Dublin and Abergele, north Wales. This written scheme of investigation and protocol for archaeological discoveries focuses solely on the route of the proposed development in UK waters, from mean high water springs at Abergele to the UK-Ireland median line.

This written scheme of investigation has been prepared for an initial programme of geophysical survey and geotechnical site investigations. A revised written scheme of investigation, encompassing all archaeological assessments, will be submitted for later marine licence applications, including installation works. The accompanying protocol for archaeological discoveries will apply to all works associated with the proposed project, from site investigations to installation.

Archaeological assessments conducted to date have identified no sites requiring temporary exclusion zones within the cable route survey corridor. Prior to the final selection of locations for geotechnical investigations, a rapid review of the marine geophysical survey data collected in proximity to the proposed locations is recommended, thus minimising the risk to previously unidentified cultural heritage assets. Should deposits of palaeo-environmental or geoarchaeological potential be identified during this review, sample locations will be micro-sited to ensure that the archaeological potential of the surveys is optimised. Geoarchaeological assessment of geotechnical data collected from the intertidal zone is also recommended.

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LIST OF ACRONYMS USED IN TEXT

AEZ	Archaeological exclusion zones
BAI	Bedded and Infill members
BGS	British Geological Survey
BIIS	British Irish Ice Sheet
BP	Before present
BPSL	Before present sea level
CA	Coracle Archaeology
CIfA	Chartered Institute for Archaeologists
CBF	Cardigan Bay Formation
CPT	Cone penetrometer test
CRSC	Cable route survey corridor
DBA	Desk-based assessment
ECC	Export cable corridor
EEZ	Exclusive Economic Zone
FBF	Caernarfon Bay Formation
FII	Incision Infill member
GI	Geotechnical investigations
GIA	Glacio-isostatic adjustment
GIS	Geographic Information System
GMSL	Global mean sea level
GPR	Ground penetrating radar
GPS	Global Positioning System
grt	Gross registered tonnage
HER	Historic Environment Record
ISB	Irish sea basin
ISIS	Irish Sea ice stream
ka	Kilo annum
LAT	Lowest astronomical tide
LGM	Last glacial maximum
LT	Lower Till unit (of the Cardigan Bay Formation)
LU	Lower Unstratified unit (of the Caernarfon Bay Formation)
MHWM	Mean high-water mark
MHWS	Mean high-water springs
MIS	Marine isotope stage
MLWM	Mean low-water mark
MLWS	Mean low-water springs
MoD	Ministry of Defence
MSGL	Mega scale glacial lineations
MSL	Mean sea level
MW	Megawatt
nm	Nautical miles
NMW	National Museum of Wales
NMRW	National Monuments Record of Wales
NPRN	National primary record number
NRW	Natural Resources Wales
OWF	Offshore wind farm
PAD	Protocol for archaeological discoveries
PMRA	Protection of Military Remains Act
PRN	Primary record number

RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RoW	Receiver of Wreck
RSL	Relative sea-level
RTK	Real-time kinematic
SBP	Sub-bottom profiler
SSS	Side scan sonar
STG	St George's Channel Formation
TEZ	Temporary exclusion zone
UAV	Uncrewed aerial vehicle
UKHO	United Kingdom Hydrographic Office
UT	Upper Till
VC	Vibrocores
WCPP	West Coast Palaeo-landscapes project
WIS	Western Irish Sea Formation
WSA	Wider study area
WSI	Written scheme of investigation

GLOSSARY

AEZ – Archaeological Exclusion Zone imposed for the in-situ protection of known archaeological sites or geophysical anomalies of high or medium archaeological potential

Archaeological consultant – the nominated archaeological consultant is Coracle Archaeology, who drafted this document

Bathymetric survey – a non-intrusive, remote-sensing investigative survey, using a multibeam echosounder, which measures the depth of a water body and the topography of the seabed

Client – Intertek Metoc

Dead wreck – a wreck that has not been detected, by repeated surveys, and is therefore not considered to exist in its recorded location is recorded by the UKHO as 'dead'

Designated wreck – a restricted area placed around a wreck to prevent uncontrolled interference in accordance with the Protection of Wrecks Act 1973. These protected areas are likely to contain the remains of a vessel or its contents, which are of historical, artistic or archaeological importance

Developer – MCL, a subsidiary of Mares Interconnector Holdings Limited, an Irish Limited company

Geophysical survey – a non-intrusive, remote-sensing investigative survey to detect or measure features on and below the seabed

Geotechnical investigations – activities performed by geotechnical engineers or engineering geologists to obtain information on the physical properties of soil earthworks and foundations for proposed structures

Heneb – the Trust for Welsh Archaeology. Heneb was formed following the merger of the four regional Welsh archaeological trusts in April 2024

Heritage assets – elements of the historic environment that have local, regional or national significance, such as protected wrecks or submerged palaeo-landscapes

Lift – a wreck that has been recovered (salvaged) from the seabed is recorded by the UKHO as 'lift'

Live wreck – a wreck that has been detected, by recent surveys, in its recorded location is recorded by the UKHO as 'live'

Local curatorial body - Heneb, the Trust for Welsh Archaeology, is the local curatorial body with responsibility for the historic environment

Nominated contact – the shore-based representative from the **Developer** who will be responsible for liaison between the **Archaeological consultant** and the vessel-based **Site champion**

PAD – the protocol for archaeological discoveries sets out the procedures that must be followed in the event of unexpected archaeological discoveries either on the seabed or on the deck of working vessels and identifies the personnel with responsibility for ensuring that the PAD is followed

Palaeo-environment – an environment at a period in the geological past

Peat – an organic material formed by decayed vegetation matter that can preserve important environmental and archaeological evidence

Project – the MaresConnect Interconnector is a proposed 750 megawatt interconnector cable, linking the electricity transmission networks of Ireland and Great Britain, with potential landfall locations in County Dublin, Ireland, and Abergele, Wales

Receiver of Wreck (RoW) - the Receiver of Wreck, the wreck administration within the Maritime and Coastguard Agency (MCA), deals with all reports of wreckage from around the UK including Northern Ireland. It is based in the MCA headquarters in Southampton, with assistance from coastguard personnel around the coast

Receptor - any environmental or other defined feature that is sensitive to, or has the potential to be affected by, an impact

Relevant local and national curatorial authorities - the relevant local and national curators for this project are Heneb, the Trust for Welsh Archaeology and the Royal Commission on the Ancient and Historical Monuments of Wales respectively

Royal Commission on the Ancient and Historical Monuments of Wales – the national curatorial body that provides guidance and advice to the regulator pre- and post-consent

Site – the assessment area extends from mean high water springs at Abergele to the UK-Ireland median line

Site champion - the site champion is usually the most senior representative on board the works vessel (the **client representative**)

Study area – a cable route survey corridor used to gather data to provide sufficient contextual information about the proposed route and its environs from which to assess known and potential impacts on the cultural heritage resource

The Crown Estate (TCE) – the body responsible for managing the seabed and foreshore in England, Wales and Northern Ireland, including offshore energy, aggregates, and cables and pipelines

WSI - the written scheme of investigation sets out the roles and respective responsibilities of the project team, contractors, the retained archaeologist and archaeological contractors and sets out formal lines of communication between the parties and with archaeological curator(s). It outlines the known and potential receptors that could be impacted by the scheme; outlines the agreed mitigation and archaeological actions that are to take place in various circumstances; and provides detailed methodologies for these archaeological actions

1. INTRODUCTION

Outline

1.1. Coracle Archaeology (CA) was commissioned by Intertek Metoc in June 2023 to undertake marine archaeological environmental assessments, including this written scheme of investigation (WSI) and protocol for archaeological discoveries (PAD) for the MaresConnect Interconnector (henceforth 'the proposed development'). This is a proposed 750 megawatt (MW) interconnector cable connecting the electricity transmission networks of Ireland and Great Britain, with landfall locations in County (Co.) Dublin and north Wales. Two locations are under consideration for the Welsh landfall - Llandulas beach and Pensarn beach – both located in the vicinity of Abergele.

1.2. The WSI has been prepared in support of the initial programme of geophysical survey and geotechnical site investigations. These surveys will be used for subsequent route planning, design and engineering purposes. A revised WSI will be submitted for later marine licence applications, including installation works. The accompanying PAD will apply to all works associated with the proposed project, from site investigations through to installation.

1.3. This document has been prepared to fulfil licence condition **3.18** of Marine Licence **CML2331**, issued by Natural Resources Wales (NRW), which states:

- **3.18.1** the Licence Holder must submit a WSI to the Licensing Authority for written approval at least six weeks prior to the commencement of the Licensed Activities. No Licensed Activities may be undertaken prior to written approval from the Licensing Authority;
- **3.18.2** the Licence Holder must ensure that any actions outlined in the documents detailed in condition 3.18.1 are implemented as approved in writing by the Licensing Authority. Any proposed changes to the actions outlined in the documents must be submitted to, and approved in writing by the Licensing Authority prior to any changes being enacted.

1.4. Both the WSI and the PAD focus solely on the route of the proposed development in UK waters, from mean high water springs (MHWS) at the prospective Welsh landfalls

to the UK-Ireland median line (Figure 1). The proposed development above MHWS and beyond the UK exclusive economic zone (EEZ) is beyond the remit of these reports. It should be noted that the marine licence applies to all activities associated with geotechnical investigations and environmental sampling in UK waters, to the edge of the EEZ.

1.5. The WSI and PAD are live documents that will be updated, if new evidence comes to light as the project progresses, for the benefit of works crews. They are based on the closest appropriate professional guidance including CIfA (2014a-c), Welsh Government (2017, 2019), Cadw (2011), COWRIE (2011), NRW and the RCAHMW (2022) and the Crown Estate & Wessex Archaeology (2014 & 2021). Though the latter was written primarily for offshore renewable energy infrastructure projects, in the absence of more specific guidance for WSIs it is accepted as industry standard.

1.6. The WSI is based on a rapid desk-based assessment (DBA) undertaken by Coracle Archaeology (2024), which focused on known heritage assets located in proximity to the proposed development in both UK and Irish waters. Records located within the study area were assigned a unique Coracle Archaeology number (CA) for ease of identification**:** **CA1ff** in Irish waters and **CA500ff** in UK waters. This WSI includes only records located within the c. 500m wide cable route survey corridor (CRSC), the 450-1800m wide cable route funnels at the landfall locations and a wider study area (WSA), extending 750m either side of the survey areas, from MHWS at Abergele to the UK-Ireland median line (Figures 1 and 2)

Location and landscape context

1.7. The proposed development will run for approximately 120-122 km in the Irish Sea, from the prospective landfall locations at Abergele to the UK-Ireland median line. This includes c. 86-88-km within the UK 12 nautical mile (nm) limit, (Figures 1-2).

Palaeo-environment

The global climate has fluctuated significantly throughout the last 2.5 million years (the Quaternary period, encompassing the Pleistocene and Holocene epochs). In northwest Europe, this was typified by transitions between long cold glacial periods, characterised by extensive ice sheets and low sea level, and warm interglacial periods, characterised by high sea level and small or absent ice sheets.

LEGEND:

- UK-Ireland EEZ boundary
- UK 12 nm limit
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

GEODETIC INFORMATION:

0 20 Kilometers

N

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

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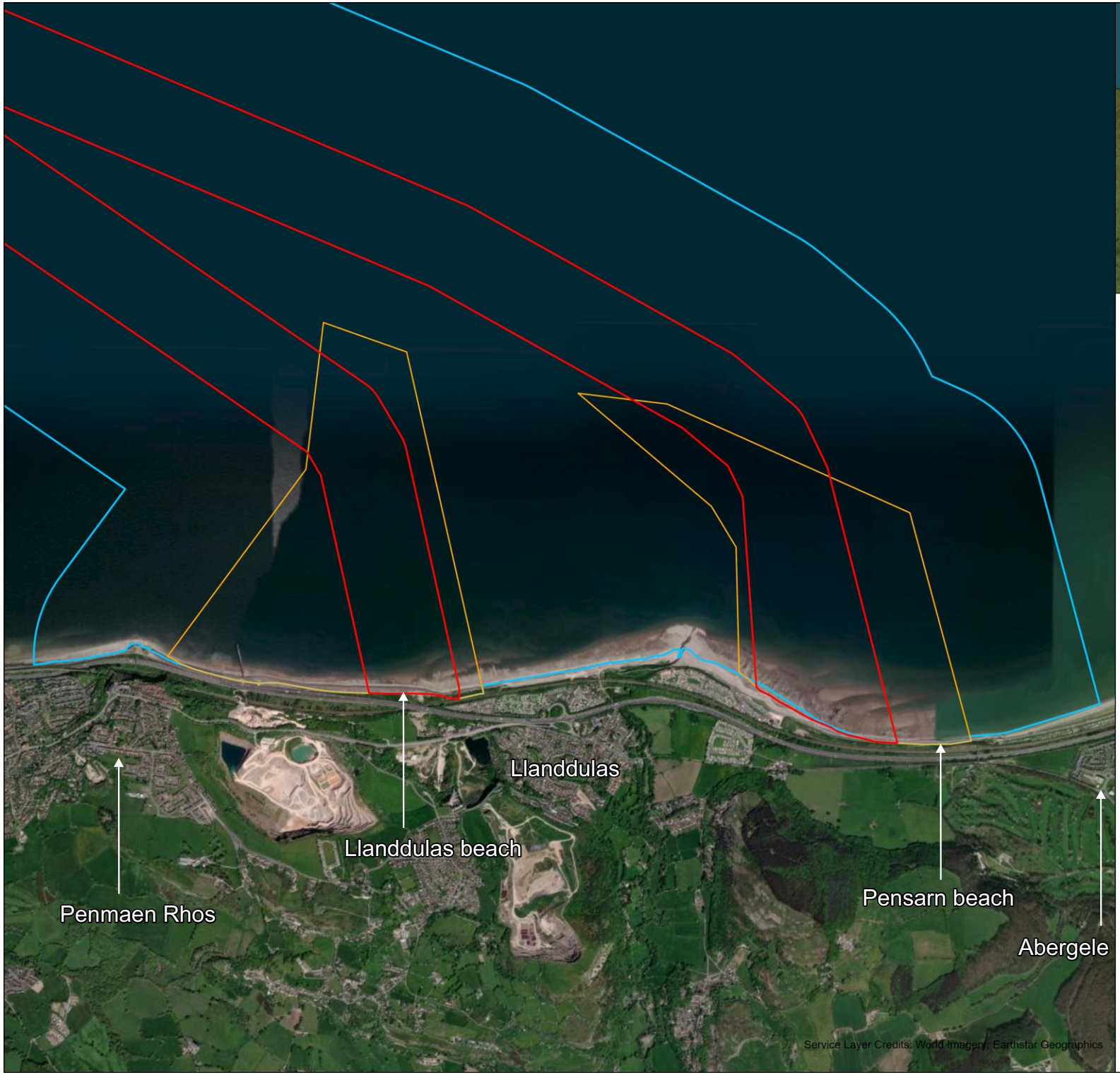
PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Overview of the study area

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	1
APPROVED BY:	MW		



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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Prospective landfall locations, Abergele, Wales

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APPROVED BY:	MW		

1.8. In the British Quaternary terminology, the most recent glacial period is referred to as the Devensian. This ran from c. 115,000-11,500 years before present (BP), corresponding to Marine Isotope Stage (MIS) 5d to MIS2, before transitioning into the comparatively warm climate of the present interglacial: the Holocene, or MIS1. The peak, or maxima, of the Devensian glaciation took place between c. 25-18,000 BP, an interval commonly referred to as the Last Glacial Maximum (LGM).

1.9. This section provides an overview of the Quaternary palaeo-environment in the Irish Sea Basin (ISB) in proximity to the proposed development (the study area). It focuses first on the fragmentary evidence that predates the LGM, then discusses the regional effects of the Devensian glaciation and its aftermath.

Pre-LGM (MIS12 to 3)

1.10. The precise timing and extent of pre-MIS2 glaciation and accompanying changes in relative sea level (RSL) are unclear for the eastern ISB, owing primarily to a lack of evidence. The relevant geological units for these older periods are often deeply buried and thus difficult to access, or have been removed by the erosive effects of the most recent glaciation.

1.11. It is likely, however, that the majority of the ISB was ice-covered during the pre-LGM glacial maxima, which occurred during MIS12 (Anglian glaciation) and MIS6 (Wolstonian glaciation). Indeed, most of Ireland and central and northern Britain were glaciated during these periods (Knight *et al.* 2004; Sejrup *et al.* 2005).

1.12. Key geological deposits linked to pre-LGM ice advance within the ISB include the Cardigan Bay Formation (CBF) Lower Till (LT) member and the Caernarfon Bay Formation (FBF) Lower Unstratified (LU) member, both of which are interpreted as subglacial diamicton and tentatively correlated with the MIS6 and MIS12 glaciations respectively. A series of deep incisions cut into the CBF-LT and FBF-LU are thought to have been produced by glacial processes post-dating initial ice advance and deposition of subglacial sediment. Overlying and sometimes infilling these incisions are sediments likely deposited during deglaciation. These comprise the St George's Channel Formation (STG), glaciomarine muds that lie between the FBF and CBF, and other members within the CBF and FBF, including the CBF Bedded and Infill members (BAI), and the FBF Incision Infill (FII) member (Jackson *et al.* 1995; Mellet *et al.* 2015).

1.13. These pre-LGM glacial deposits appear to be thicker and more prevalent to the south and northeast of the area traversed by the proposed development (BGS and GSI 1990; Jackson *et al.* 1995). The seabed between north Wales and the UK-Ireland median line comprises mainly Devensian deposits (e.g. Western Irish Sea Formation (WIS), CBF Upper Till (UT)), with older sediments limited to a zone of outcropping CBF-LT to the west of Anglesey (see BGS and GSI 1990: Section 1).

1.14. It is also possible that periods of ice expansion took place during shorter cold intervals (stadials) between the main glacial maxima, such as MIS4 (c. 71-57,000 BP), a stadial intervening between the warm MIS5e interglacial (c. 125-115,000 BP) and the MIS2 glacial maxima. Indeed, it has been hypothesised that MIS4 could have seen significant glaciation in western Britain, with ice as far south as Lundy Island in the Bristol Channel and thick ice cover over the Welsh mountains (Scourse 2024).

1.15. Evidence of habitable palaeo-landscapes from the temperate phases between glacials and stadials is relatively sparse around the ISB. Even on land, such deposits are rare owing to the erosive effects of the last glaciation. In north Wales, pre-MIS2 palaeontological material has been found in multiple cave sites in the Vale of Clwyd, which lies several kilometres east of the proposed cable landfall. It is notable that this includes two cave sites with archaeological material which predate the MIS2 glaciation; Pontnewydd cave, which has Neanderthal remains and stone tools from MIS7 (c. 225,000 BP), and the adjoining caves of Ffynnon Beuno and Cae Gwyn, which have Neanderthal and early modern human lithics dating from MIS3 (c. 35-45,000 BP; Dinnis and Ebbs 2013).

1.16. The existence of remnants of pre-MIS2 submerged palaeo-landscapes within the study area is, however, unclear. No temperate phase organic deposits or clearly subaerially deposited sediments predating MIS2 have been sampled within, or close to, the area traversed by the proposed development. In addition to preservation issues, the existence of such palaeo-landscapes would have been contingent on land exposure during the restricted time window after deglaciation, but before RSL rose to its interglacial maxima.

1.17. That such palaeo-landscapes existed somewhere in the ISB is highly likely; MIS4 and MIS3 palaeontological evidence from Ireland demonstrates multiple mammal species which were also present in Britain (Woodman *et al.* 1997; Monaghan 2017),

thus suggesting a terrestrial connection between the two landmasses prior to the MIS2 glaciation. Whether remnants of these palaeo-landscapes have survived the MIS2 glaciation and subsequent RSL rise is uncertain.

LGM to Holocene (MIS2 to 1)

1.18. Renewed ice sheet growth around the ISB is believed to have begun at c. 30,000 BP with the southwards expansion of ice from Scotland and northeast Ireland, and by c. 29,000 BP, from ice originating in north Wales (Clark *et al.* 2022: optimum ice model). By c. 28,000 BP, most of the northern part of the ISB is likely to have been ice covered, with complete coverage by c. 27,000 BP.

1.19. Ice in this area is considered to be part of the Irish Sea Ice Stream (ISIS); a tongue of ice which rapidly flowed southwest from the main accumulation centres over northern Britain and Ireland and eventually reached the Celtic Sea shelf edge by c. 26,000 BP. This extension was relatively short lived; by c. 24,000 BP, ice had retreated from the shelf edge back into the ISB, where retreat continued at a slower rate. It is likely that the study area was deglaciated between c. 21-20,000 BP. Thereafter, the ice margin remained predominantly north of the Isle of Man, with minor oscillations (Chiverrell *et al.* 2018; Scourse *et al.* 2021).

1.20. Evidence of ice cover in the ISB during this period is extensive, and includes both glacial landforms and sediments. Landforms within the study area are best represented by a zone between Anglesey and the Isle of Man, traversed by the proposed development. A range of buried and exposed landforms, including drumlins, mega-scale glacial lineations (MSGL), moraines, flutes, subglacial channels, iceberg scour marks and eskers are present here and provide evidence for the growth, development and retreat of the ISIS (Van Landeghem *et al.* 2009; Van Landeghem and Chiverrell 2020).

1.21. The widespread presence of the ISIS is evident in the glacigenic sediments that form the majority of the Quaternary sequence in the ISB. Key Devensian deposits are the WIS, which includes multiple facies evidencing glaciomarine, glaciolacustrine and proglacial sedimentation, and the Cardigan Bay Formation Upper Till member (CBF-UT). The latter is composed of subglacial diamicton (Jackson *et al.* 1995; Mellet *et al.* 2015) and outcrops or subcrops over large parts of the Welsh shelf (Mellet *et al.* 2015).

1.22. In general, the lowest units of the MIS2 / Devensian glacial deposits (e.g. CBF-UT) and landforms represent initial ice expansion and deposition of subglacial sediments. In many cases, these appear to lie directly over the pre-Quaternary bedrock (BGS and GSI 1990: Section 1;, Van Landeghen and Chiverrell 2020; Wessex Archaeology 2021). Subsequent units of glacial sediment (e.g. WIS) then record deglaciation. It is notable that the majority of the evidence from the study area is suggestive of deglaciation in a watery (i.e. marine, lacustrine) setting. This implies that areas that became ice-free were initially water-covered and not subaerially exposed (Mellet *et al.* 2015; Michel *et al.* 2023, Van Landeghen and Chiverrell 2020).

1.23. The LGM was also the lowest point in an interval of lower-than-present global mean sea-level (GMSL), which ran from the last interglacial (MIS 5e, correlated with the Ipswichian Interglacial in Britain (Scourse 2024)) to the start of the Holocene at c. 11,500 BP. Throughout this interval (MIS5d-MIS2), GMSL was generally at 20-40m below present sea level (bpsl), reaching as low as 120-135m bpsl during the LGM (Siddall *et al*. 2008; Lambeck *et al*. 2014). This exposed large tracts of present-day seabed as land available for human occupation (Bailey and Flemming 2008). During the latter half of MIS2, a warming climate resulted in significant ice melt, causing GMSL to rise rapidly from c. 16,500 BP onwards, flooding the exposed continental shelf (Lambeck *et al*. 2014).

1.24. In glaciated regions, such as the ISB, local RSL was controlled by both the changing volume of ocean water and glacio-isostatic adjustment (GIA): the vertical movement of the Earth's crust in response to changing ice and water loads. The net effect was a regional modification of the GMSL signal. Strongly glaciated areas were isostatically depressed below contemporary RSL by the weight of ice, resulting in high RSL and no or reduced land exposure. Conversely, areas towards the ice margins experienced a shorter interval of glaciation and reduced isostatic depression enabling longer, deeper RSL lowstands and greater land exposure (Bradley *et al*. 2011; Edwards and Craven 2017; Shennan *et al*. 2018).

1.25. Regional RSL and concomitant palaeo-geographic changes for MIS2 have been derived using models of GIA (Brooks *et al*. 2008; Bradley *et al*. 2011). The most recent published model (Bradley *et al.* 2023) suggests that the deepest RSL lowstand and maximal land exposure around the ISB occurred before the LGM at c. 36-30,000 BP (Figure 3a). Sea-level was roughly c. 70m bpsl, resulting in extensive shelf

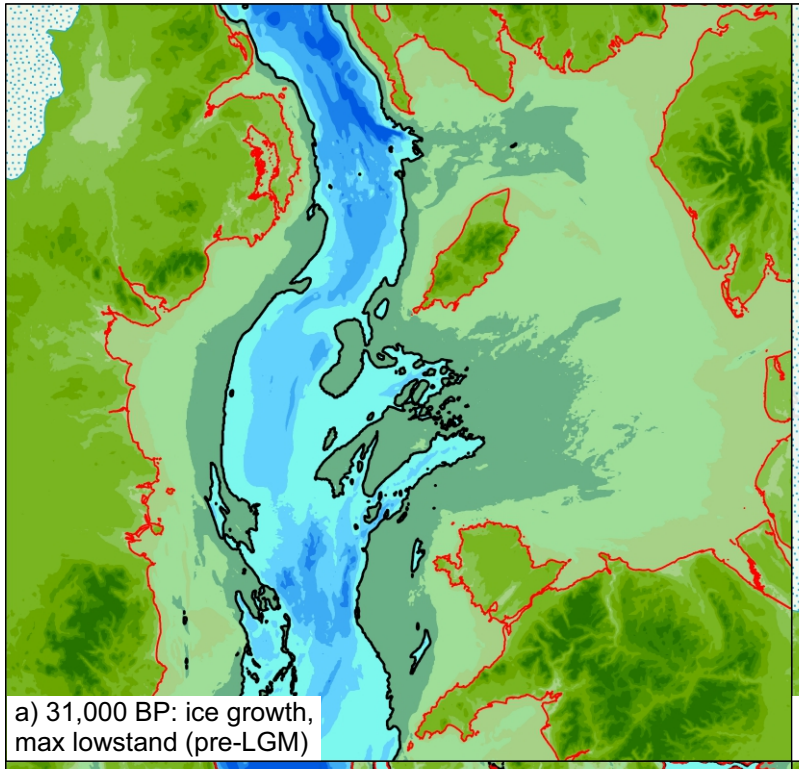
exposure, particularly on the eastern side of the ISB due to its large shallow gradient platform (Clark *et al*. 2022; Bradley *et al.* 2023).

1.26. The palaeo-shoreline is predicted to have been relatively stable until c. 30,000 BP, whereupon high RSL flooded the landscape. This is likely to have been caused by isostatic depression from the growing British-Irish ice sheet (BIIS). Between c. 29-26,000 BP, the palaeo-shoreline is modelled to have been close to its present-day equivalent, and eventually rose to a highstand above present.

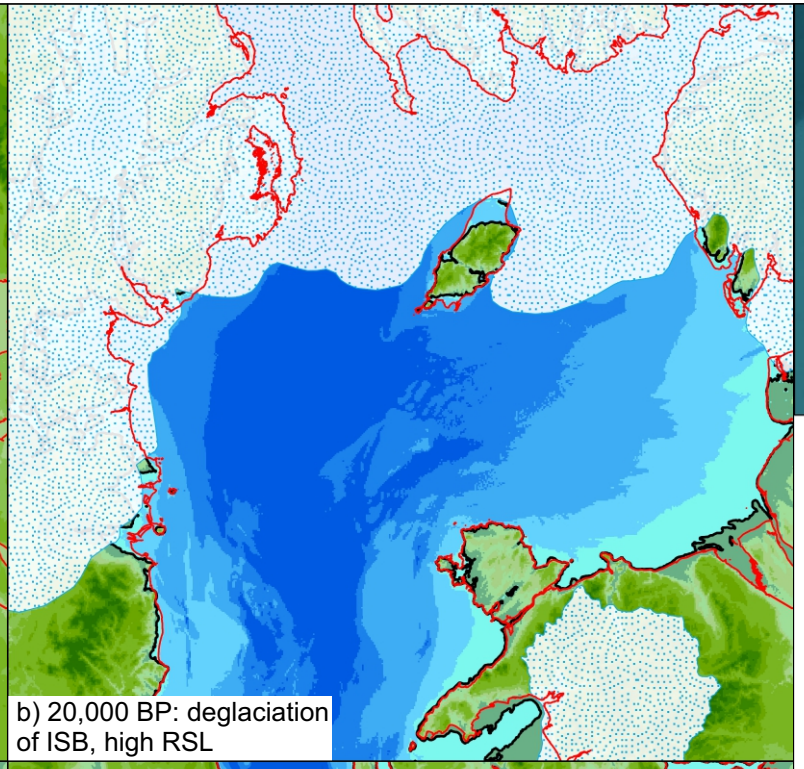
1.27. After c. 22,000 BP, rapid and continued ice retreat resulted in isostatic rebound and a pattern of falling RSL around the ISB (Figure 3b). Variations in the rate of retreat and mass of the ice at a given point caused regional variations in palaeo-shoreline elevation. At c. 19,000 BP, RSL is modelled to have been below present at the proposed Welsh landfall locations, placing the palaeo-shoreline several kilometres seaward of the modern coast. RSL fall continued through the final part of MIS2 until it reached the maximum post-LGM lowstand at c. 15,000 BP (Figure 3c).

1.28. It should be noted that GIA models vary in their predictions of depth depending on input parameters, including ice sheet extents, thickness and the properties of the Earth's mantle and crust (Edwards and Craven 2017). For north Wales, precise values of the post-LGM lowstand have not been published for older models; Brooks *et al.* (2008) suggest that the lowstand was below 30m bpsl, while Bradley *et al.* (2023) postulate a more precise maximum lowstand of c. 30-32m bpsl.

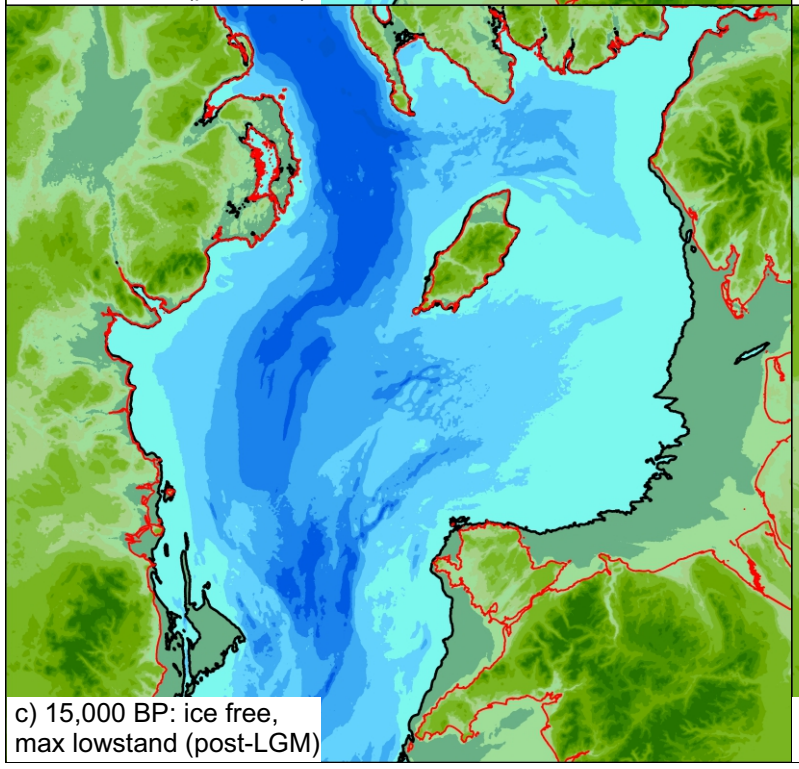
1.29. Even the reduced values suggested by Bradley *et al.* (2023) are sufficient to result in significant seabed exposure during late MIS2 and into the early Holocene. At the Welsh landfall, up to c. 20km or more of seabed was potentially exposed beyond the present-day coast at the maximal lowstand, owing primarily to the shallower gradient. Thereafter, rising RSL caused by reduced isostatic rebound coupled with rising GMSL resulted in rapid flooding of the exposed coastal landscapes. By c. 6,000 BP, RSL in north Wales is modelled to have been close to modern sea level (Figure 3d) (Bradley *et al.* 2023).



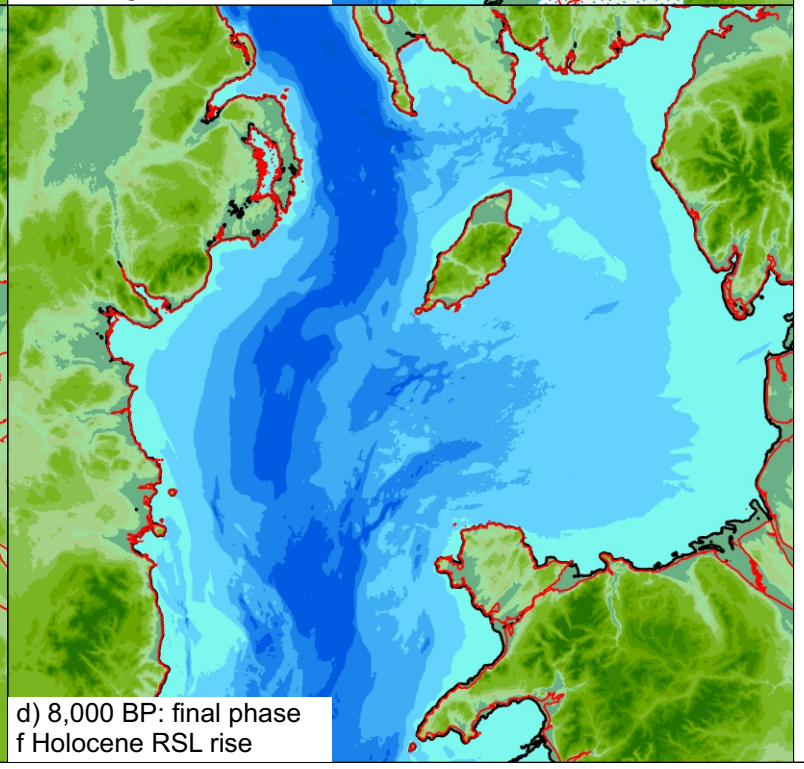
a) 31,000 BP: ice growth, max lowstand (pre-LGM)



b) 20,000 BP: deglaciation of ISB, high RSL



c) 15,000 BP: ice free, max lowstand (post-LGM)



d) 8,000 BP: final phase f Holocene RSL rise

LEGEND:

Elevation to palaeo-MSL (m)

- > -500
- -500 - -200
- -200 - -100
- -100 - -75
- -75 - -50
- -50 - -25
- -25 - 0
- 0 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 200
- 200 - 300
- 300 - 400
- 400 - 500
- >500

- Modern coast
- GIA modelled palaeoshoreline
- Ice

GEODETIC INFORMATION:

0 — 100 Kilometers

N

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Palaeo-geographic reconstructions of the Irish Sea at selected timesteps (from GIA model: Clark *et al.* 2022; Bradley *et al.* 2023)

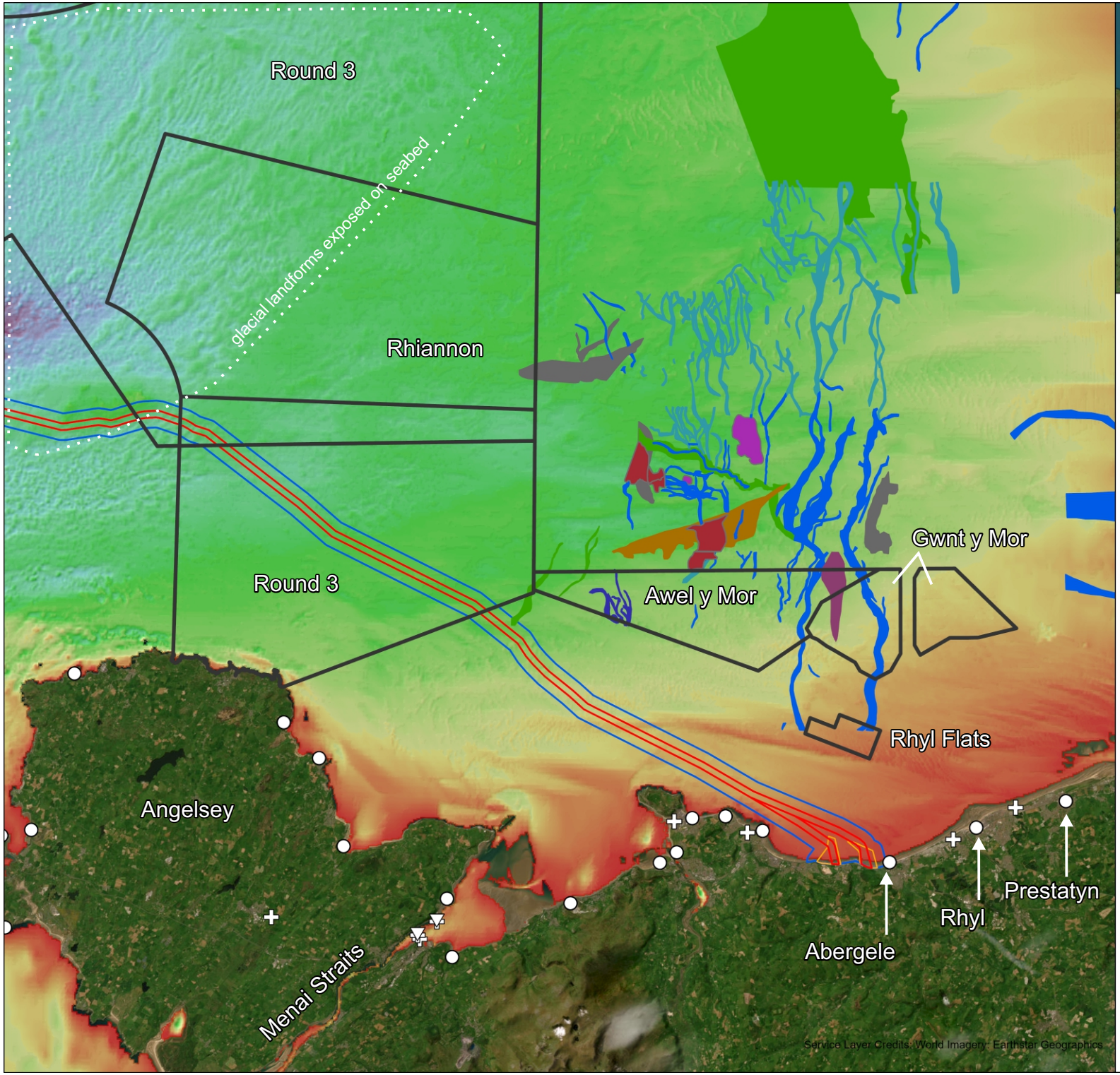
		PROJECT NO.	FIGURE NO.
DRAWN BY:	KW	23064	3
CHECKED BY:	DG		
APPROVED BY:	MW		

1.30. The GIA-modelled trend of steadily rising RSL during late MIS2 and the early Holocene in north Wales is supported by empirical evidence. A series of limiting dates from the north Welsh coast suggest that RSL was lower than c. 29m below modern mean sea level (MSL) at 12,600 BP. An additional 19 sea-level index points (SLIPs) track a rise in RSL from c. 24m below MSL at c. 11,200 BP to c. 1.6m below MSL by c. 5500 BP (Shennan *et al.* 2018). It is notable that several of these deeper samples come from buried peat and organic deposits submerged in the Menai Straits (Roberts *et al*. 2011).

1.31. Indeed, there is an apparent mismatch between the predictions of the most recent GIA models and empirical data. Data from Wales suggests that RSL was at least c. 29m below MSL at c. 12,600 BP, whilst Bradley *et al.* (2023) model it to have been between 18-24m below MSL at 14-12,000 BP. This raises the possibility that although the general GIA and RSL trends modelled by Bradley *et al.* (2023) are likely to be reasonably accurate, the modelled duration and depth of the late MIS2-early Holocene lowstand may be slightly shorter and shallower than in actuality.

1.32. Notwithstanding these potential misfits, evidence of palaeo-landscapes which formed during the MIS2-early Holocene lowstand has been found in proximity to the proposed development in north Wales (Figure 4). Using three-dimensional (3D) seismic profiling to map buried deposits, the West Coast Palaeo-landscapes Project (WCPP) identified a preserved palaeo-coastline and associated estuary, aligned approximately on the 40m lowest astronomical tide (LAT) contour, and located c. 8km northeast of the proposed development (Fitch and Gaffney 2011). Additional palaeo-landscape features identified within 10km of the proposed development include a series of north-south aligned palaeo-channels, a small delta and possible floodplain deposits (Fitch and Gaffney 2011). One of these latter floodplain deposits is mapped as intersecting the WSA of the proposed cable.

1.33. None of these palaeo-landscape features has been dated directly, though Fitch and Gaffney (2011) assigned generalised Late Glacial and Holocene ages; the palaeo-coastline, estuary, floodplains and delta are considered to be Holocene, while the large north-south running palaeo-channels are regarded as Late Glacial. It is important to note, however, that in the absence of geochronological data or palaeo-environmental assessment of geotechnical samples, these interpretations and dating remain somewhat speculative. It is noteworthy that the assignation to the Holocene



LEGEND:

- MaresConnect WSA
- MaresConnect landfall funnels
- MaresConnect CRSC
- Submerged forests, coastal peats (Bell 2007)

Sea level data (Shennan et al. 2018)

- Sea-level index point
- Terrestrial limiting date

EMODNET bathymetry (m MSL)

0

-100

WCPP (Fitch & Gaffney 2011)

- Basin
- Channel
- Channel and floodplain
- Coastline
- Delta
- Estuary
- Floodplain
- High ground
- Tunnel valley

GEODETIC INFORMATION:

0 — 20 Kilometers

N

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Documented palaeo-landscape features and key sites, Wales

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	4
APPROVED BY:	MW		

of the palaeo-coastline and estuary located at c. 40m bpsl does not fit with the extant empirical data from north Wales, which suggests that RSL was c. 25m bpsl at the onset of the Holocene (Roberts *et al.* 2011; Shennan *et al.* 2018).

1.34. Palaeo-channel features have also been identified from geophysical investigations in support of the proposed Awel y Môr offshore wind farm (OWF), which lies c. 1.5km northeast of the licensed area in UK waters. Seismic profiles from this area show a complex array of small, cross-cutting channel features with relatively well-defined basal reflectors and acoustically transparent fills that cannot be traced laterally between neighbouring seismic lines (Unit 4: Wessex Archaeology 2021); these coincide with the deltaic system mapped by the WCPP.

1.35. This channel complex appears to lie above, and cuts into, a unit interpreted as glacial in origin, thus supporting the interpretation that it is late MIS2-early Holocene in age. Based on the north-south alignment of this system as mapped by the WCPP (see Fitch and Gaffney 2011), there is the possibility that associated tributaries could extend south to intersect the proposed development. Geotechnical site investigations conducted for Awel y Môr in summer 2022 should provide samples from these channel systems to establish their geoarchaeological potential.

1.36. Large palaeo-channels were also identified in the proposed export cable corridor (ECC) for Awel y Môr (Unit 5: Wessex Archaeology 2021). These may be the same, or part of, the large channel system identified by the WCPP which runs north-south from the Rhyl Flats OWF and also intersects the eastern part of the Awel y Môr array area and the Gwynt-y-Môr OWF. These palaeo-channels are thought to date to between the LGM and the Holocene marine transgression (Wessex Archaeology 2021) and, if their alignment continues, they could extend further south to intersect the proposed development.

1.37. Secure evidence of submerged palaeo-landscapes comes from the coast and intertidal zone of north Wales. Multiple sites in this area have intertidal peats / submerged forests exposed on the foreshore (Bell 2007; Figure 4), including at Abergele and Rhos-on-Sea, respectively 2.6km east and 5.2km west of the closest landfall sites.

1.38. Detailed published research is lacking for the Rhos-on-Sea submerged forest. The only reported work on the Abergele submerged forest was undertaken by Bibby (1940), who suggested that it contained a peat bed with large quantities of *Phragmites australis* (common reed). The poorly preserved pollen assemblage also indicated a reed and sedge community with *Nymphaeaceae* (water lillies), indicative of standing open water, and *Chenopodiaceae* (goosefoots) suggesting local brackish communities. Woodland components included *Alnus* (alder), *Quercus* (oak), *Tilia cordata* (small-leaved lime) and *Corylus* (hazel), typical of a mid-Holocene sequence and comparable to pollen obtained from similar submerged forests at Rhyl (Bibby 1940) and Prestatyn (Armour-Chelu *et al.* 2007), c. 6km and 10km to the east respectively. The Rhyl submerged forest also contains an antler mattock which has been dated to 7590-7310 BP, while dates ranging from c. 6350-2150 BP have been obtained from coastal peat deposits buried slightly inland of the present shoreline at Prestatyn. Evidence of Mesolithic occupation has also been identified at Prestatyn, c. 400m inland of the peats and dating to c. 10,150-9490 BP (Armour-Chelu *et al.* 2007).

1.39. In contrast, there is no definitive evidence of submerged palaeo-landscapes in proximity to the proposed development, seaward of c. 40m water depth in Welsh waters. The licensed area running north of Anglesey overlaps with areas investigated previously for the Round 3 Rhiannon / Celtic Array OWF, prior to its cancellation. Assessment of seismic profile and borehole data from this project identified two units of potential archaeological interest; Units 5b and 6, interpreted as glaciofluvial alluvium and glacial outwash sands respectively (Wessex Archaeology 2014a). Stage 3 geoarchaeological assessment of recovered samples, however, identified only sparse micro-palaeontological evidence, which suggested a high degree of reworking (Wessex Archaeology 2014b).

1.40. Moreover, the geophysical and geotechnical evidence from this area is suggestive of the presence of a well-preserved but predominantly glacial landscape, documenting expansion and development of the ISIS and, subsequently, deglaciation in a marine setting. This is evidenced by geomorphological features, including iceberg scours (Van Landeghem and Chiverrell 2020). Large parts of this area were unlikely therefore to have been subaerially exposed post-deglaciation.

Potential for palaeo-landscape discovery

1.41. It is possible to make some observations regarding the potential for the identification of palaeo-landscape features during works associated with the proposed development, based on the extant data from the ISB. Now-submerged parts of the ISB were almost certainly subaerially exposed at times before and after the last (MIS2) glaciation. The erosive effects of glaciation suggest nevertheless that preservation of palaeo-landscape deposits predating the last glaciation is likely to be very limited, except perhaps in exceptional, localised circumstances. It is notable that, for much of the study area, the deepest Quaternary deposits are often subglacial tills associated with the last glaciation, laid down directly over bedrock (e.g. CBF-UT). Even where pre-MIS2 sediments have been preserved, these are of glacial origin (e.g. CBF-LT). On land, pre-MIS2 deposits close to the north Wales coast have only been identified in caves. Though the preservation of pre-MIS2 deposits on the continental shelf within the study area cannot therefore be discounted entirely, the potential is considered very low.

1.42. Preservation of palaeo-landscapes that formed after the LGM is, however, more likely. This has been confirmed for the inshore area (i.e. shallower than c. 40m below MSL) in the form of intertidal peats / submerged forests and buried landforms. The latter include palaeo-channels and possible palaeo-shorelines, deltas and estuaries.

1.43. It is noteworthy, however, that preservation potential is not uniform across the study area. The central and deepest parts of the seabed straddling the UK-Ireland median line (deeper than c. 50m bpsl) are unlikely to have been subaerially exposed post-LGM; much of the geological evidence from this zone shows deglaciation in a marine environment, followed by fully marine sedimentation. The likelihood of encountering post-LGM palaeo-landscapes suitable for past human occupation in this area is considered therefore to be very low.

1.44. The bathymetry of the ISB, combined with the spatial pattern of RSL change, means that large areas of the Welsh inshore region were subaerially exposed in late MIS2 and into the early Holocene. This area is shallower in gradient and is considered to have experienced a deeper lowstand compared to the western side of the ISB.

1.45. The presence of known palaeo-landscape sites and features adjacent to the study area at the proposed Welsh landfall locations further suggests that the potential to

encounter post-LGM palaeo-landscapes suitable for past human occupation in the Welsh inshore area is high. Geophysical and geotechnical data acquired by the proposed development may contribute to the wider mapping of these palaeo-landscapes, and provide further details and insights into patterns of palaeo-environmental change on the north Wales coast.

1.46. The identification and investigation of any submerged forest deposits at Abergele during works associated with the proposed development would also enable the age and palaeo-environment of the site to be established. This may confirm whether known deposits are contemporary with Prestatyn, where Mesolithic activity (including middens) are found within the wetland sequence associated with peat beds and a palaeo-channel (Armour-Chelu *et al*. 2007), or Rhyl, where Mesolithic finds (e.g. the antler mattock) are known from the submerged forest. The proposed development therefore has the scope to enhance knowledge of the marine historic environment in its immediate vicinity; this is explicitly encouraged within Policy SOC_05 (Historic Assets) of the Welsh National Marine Plan (Welsh Government 2019).

Scope of survey works

1.47. This document has been prepared in support of initial marine survey and site investigations for the proposed development. These include a number of non-marine licensable remote sensing (geophysical) surveys, including multibeam echosounder (MBES), side-scan sonar (SSS), marine magnetometer and sub-bottom profiler (SBP).

1.48. MBES, SSS, SBP and marine magnetometer survey data will be collected within the 500m wide CRSC and two 450-1800m wide landfall funnels, in both the offshore (>15m water depth) and nearshore (0-15m water depth) areas. Baseline geophysical data collected during these preliminary surveys will be used for project design and engineering purposes, and for the selection of potential locations for geotechnical investigations (GI) and environmental sampling surveys. These geophysical data will also be used as the basis for subsequent marine archaeological assessments.

Geotechnical investigations

1.49. Following the completion of the marine geophysical surveys, GI and benthic sampling surveys will be undertaken to assist in route design and engineering. Intrusive sampling will comprise:

- up to ten boreholes at the proposed landfall locations. This includes two planned and two contingency boreholes in the intertidal zone or terrestrial area plus one nearshore marine borehole at each landfall site, to a maximum depth of 25m below the land / seabed surface;
- up to 150 cone penetrometer tests (CPTs), to a maximum depth 9m;
- up to 150 vibrocores (VCs), to a target depth of 6m;
- up to 35 boxcores, in the event that areas of very soft sediment are encountered; and
- up to 30 grab sample stations, each with up to three individual grab sampling attempts.

1.50. GI and sampling surveys will be used to ground-truth the geophysical survey data and to evaluate the physical properties of the superficial sediments along the route of the proposed development. They will focus on the upper 6 metres of sediment, thus facilitating route design, installation and cable burial plans. The results of GI works will also assist in the identification of sub-surface deposits with palaeo-environmental and / or geoarchaeological potential.

1.51. Individual GI and sampling locations will be determined following the initial assessment of the geophysical survey data, including screening for potential hazards and seabed obstructions and possible cultural heritage assets. It is estimated that GI sample stations will be spaced approximately 1km apart. It should be noted that no samples will be recovered during the CPT process.

Landfall site investigations

1.52. A non-invasive topographical survey will be conducted at each landfall location. This may be done using either a real time kinematic (RTK) GPS measurements taken on foot or with vehicle traverses, laser scanning and / or photogrammetry from an uncrewed aerial vehicle (UAV). Investigation of sub-surface sediment at each landfall may include the use of ground penetrating radar (GPR) along the route of the proposed cable centrelines and offset lines.

Scope of the WSI and PAD

1.53. In line with Welsh National Marine Policies SOC_05 and SOC_07 (Welsh Government 2019), this WSI outlines how potential impacts on cultural heritage assets, will be avoided, minimised or mitigated during initial marine surveys and site investigations. It includes the results from the rapid DBA (Coracle Archaeology 2024), prepared in support of the proposed development.

1.54. Wrecks and obstructions discussed below are generally referred to as either 'live' or 'dead' following the definitions adopted by the United Kingdom Hydrographic Office (UKHO). 'Live' refers to those wrecks for which there is a known location, verified by recent surveys. 'Dead' refers generally to incidents that have been recorded in a given location, but no wreck associated with that incident has been detected by repeated, or most recent, surveys.

1.55. This WSI should be read in conjunction with the project-specific PAD (below), which clearly sets out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries whilst undertaking activities that disturb the seabed. The WSI and PAD incorporate all current and relevant guidance (The Crown Estate & Wessex Archaeology 2014 and 2021).

1.56. The Developer is responsible for the implementation of this WSI and the PAD.

1.57. Any additional relevant information received will be archaeologically assessed and reported by Coracle Archaeology and, if relevant, will be added to the WSI, including any revisions or additions, as deemed necessary, to any temporary exclusion zones (TEZs) or archaeological exclusion zones (AEZs) outlined below.

2. RECORDED MARITIME CULTURAL HERITAGE

2.1. The rapid DBA recorded a total of 132 sites of cultural heritage interest within the WSA in UK waters, including 100 wrecks, five aircraft, two submerged forests, two obstructions, one geophysical anomaly, one seascape / named maritime location, two anchorages, 12 findspots, and seven monuments. Of the 100 wrecks, 15 are considered live, six dead, and 11 have an unknown status. The remaining 68 wrecks are reported losses, the existence of which has not been verified (Coracle Archaeology 2024).

2.2. The initial rapid DBA was based on an earlier iteration of the proposed development, which included multiple potential CRSCs in UK waters. Refinement of the proposed cable route post-DBA preparation has reduced the number of potential CRSCs and landfall locations. Based on the current iteration of the proposed development (see Figures 1 & 2), 13 sites of cultural heritage interest are recorded in in the landfall funnels and CRSC to the edge of the UK EEZ, including 10 reported losses, one anchorage and two monuments.

2.3. An additional 68 sites are recorded in the revised WSA. Although these are located outside of the CRSC and therefore unlikely to be impacted by works associated with the proposed development, they are nevertheless included here: the majority of these are reported losses, which have yet to be located reliably. It is possible therefore that remains associated with these losses may be encountered during the initial programme of survey and site investigations.

2.4. Cultural heritage assets located within the CRSC and WSA are presented in Tables 1-2 and Figures 5-10. Only assets located within the refined iterations of the route of the proposed development are included here; for this reason, the given CA numbers do not necessarily run concurrently. Where there is a discrepancy between recorded locations in different source datasets, both are recorded.

Summary of designated and protected heritage assets

2.5. There are no designated or protected heritage assets recorded in the CRSC or WSA.

Summary of non-designated and potential heritage assets

2.6. There are 13 non-designated heritage assets within the CRSC (Table 1; Figures 5-7). These comprise 10 reported losses, one anchorage and two monuments.

2.7. There are ten reported losses located within the CRSC. These constitute general records of wreck events that have been assigned spatial coordinates within the relevant national and local databases, but which have not been reliably located. Their given locations should not therefore be interpreted as indicative of the presence (or absence) of physical remains. These records are included to highlight the potential for encountering wreck remains during works associated with the proposed development.

Table 1 Historic assets within the CRSC

CA No.	Name	Type	Date	Status	Easting (UTM30N)	Northing (UTM30N)	Source and ref. no.
CA541	*Conway's Pride*	Reported loss	Post Medieval	n/a	458454	5905102	NMRW NPRN 271450
CA542	*Eagle*	Reported loss	Post Medieval	n/a	458348	5905014	NMRW NPRN 240576
CA543	*Eagle*	Reported loss	Post Medieval	n/a	459044	5904916	NMRW NPRN 525143
CA553	*No.4 Pilot Boat*	Reported loss	Post Medieval	n/a	459240	5904928	NMRW NPRN 271731
CA554	*Ocean Queen*	Reported loss	Post Medieval	n/a	456389	5905098	NMRW NPRN 271362
CA556	*Pride of Liverpool*	Reported loss	Post Medieval	n/a	419693	5929366	NMRW NPRN 272059
CA558	*Richard*	Reported loss	Post Medieval	n/a	456241	5905077	NMRW NPRN 240577
CA560	*Speedwell*	Reported loss	Post Medieval	n/a	441558	5914503	NMRW NPRN 271502
CA561	*Thomas*	Reported loss	Post Medieval	n/a	459233	5904939	NMRW NPRN 271590
CA562	*Triton*	Reported loss	Post Medieval	n/a	454524	5907426	NMRW NPRN 271503
CA612	Pool off Penmaen Rhos	Anchorage	Post Medieval	n/a	456024	5905951	NMRW NPRN 518975
CA629	Llysfaen Quarry Jetty	Monument	Modern	Removed	456207	5905048	CPAT PRN 34206
CA631	Raynes Quarry Jetty	Monument	Modern	Extant	455207	5905084	CPAT PRN 34205

2.8. Reported losses include:

- *Conway's Pride* (**CA541**; National Primary Record Number (NPRN) 271450), a wooden ketch blown ashore near Abergele in June 1897;
- the *Eagle* (**CA542**; NPRN 240576), a pleasure boat wrecked at Llanddulas in 1876;
- a wooden sloop, also called the *Eagle* (**CA543**; NPRN 525143), lost in gales near Abergele in 1859;
- *No. 4 Pilot Boat* (**CA553**; NPRN 271731), wrecked near Abergele in December 1822;
- *Ocean Queen* (**CA554**; NPRN 271362), a wooden brig that foundered off of Llanddulas in heavy gales in November 1890;

LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Aircraft
- Anchorage
- Monument
- Named location
- Obstruction
- Reported loss
- Wreck

GEODETIC INFORMATION:

0 20 Kilometers

N

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Projection: Transverse Mercator
Datum: WGS 1984
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False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

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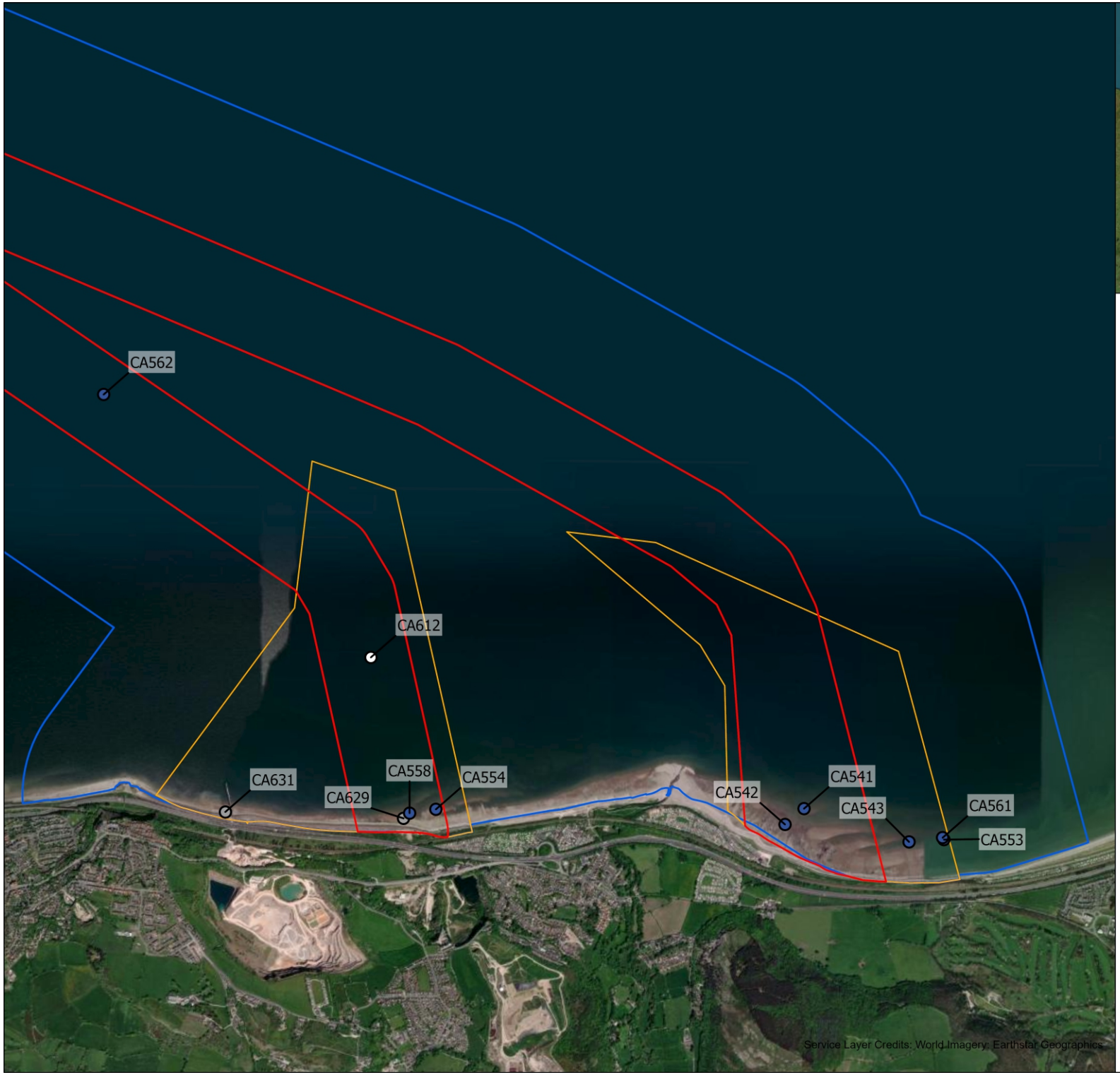
PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Overview of historic assets in the CRSC and WSA

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	5
APPROVED BY:	MW		



LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Anchorage
- Monument
- Reported loss

GEODETIC INFORMATION:

0 1 Kilometers

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
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Units: Meter

N

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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Historic assets in the CRSC (map 1 of 2)

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	6
APPROVED BY:	MW		

LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Monument
- Reported loss

GEODETIC INFORMATION:

0 6 Kilometers

N

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Units: Meter

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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Historic assets in the CRSC (map 2 of 2)

DRAWN BY: KW
CHECKED BY: DG
APPROVED BY: MW

PROJECT NO. 23064

FIGURE NO. 7

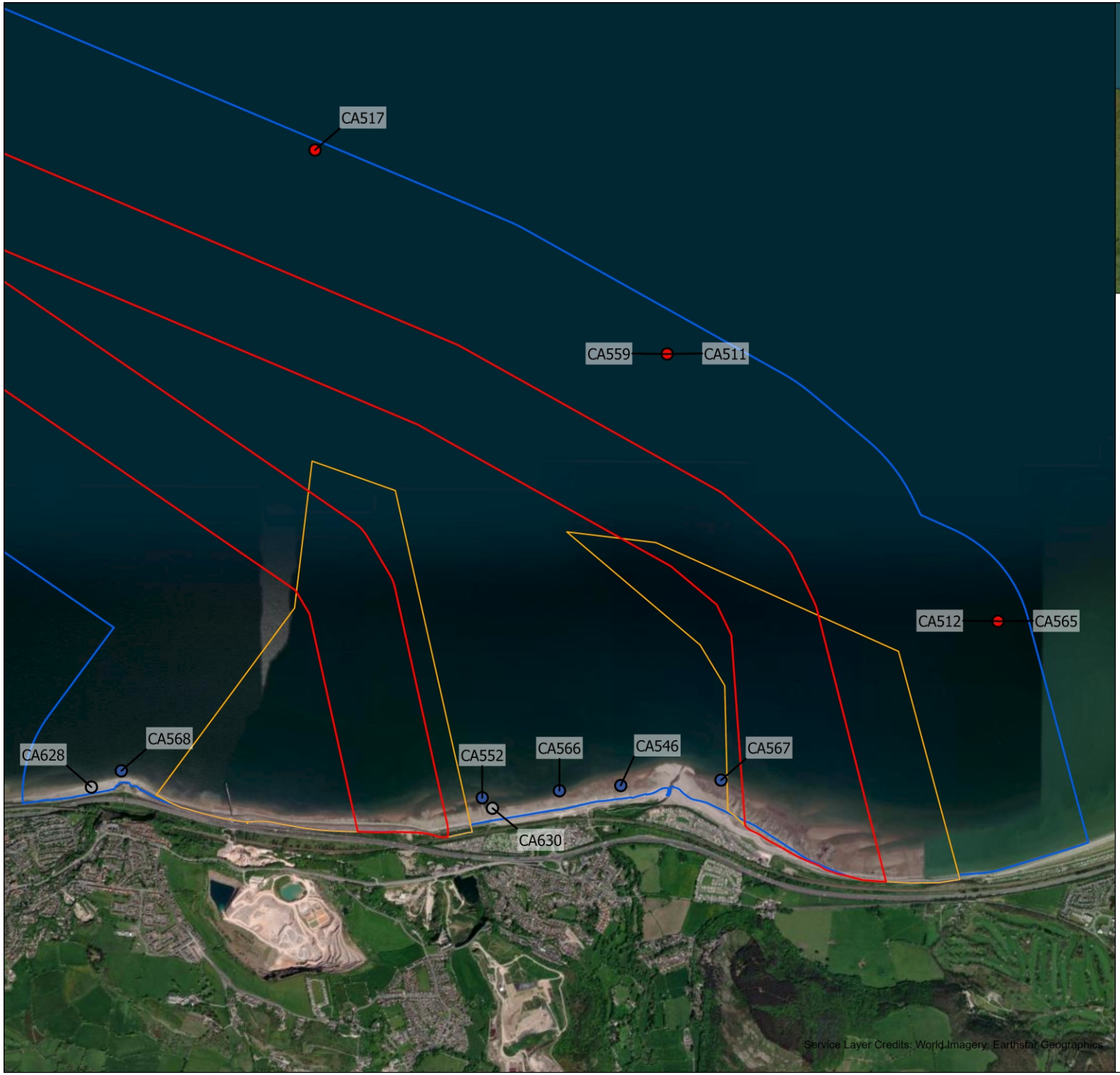
- the *Pride of Liverpool* (**CA556**; NPRN 272059), a wooden schooner that foundered 'six miles northeast of Port Lynas' in 1890;
- the *Richard* (**CA558**; NPRN 240577), stranded near the quarry pier at Llanddulas in 1845;
- the *Speedwell* (**CA560**; NPRN 271502), a wooden smack lost '2 miles north of Great Ormes Head' in 1875;
- the *Thomas* (**CA561**; NPRN 271590), a wooden sailing vessel lost onshore at 'Abergally' [sic] in 1784 while *en route* from Liverpool to Jamaica; and
- the *Triton* (**CA562**; NPRN 271503), a wooden schooner lost '4 miles east-southeast of Little Ormes Head' in 1876.

2.9. At present, no remains of these vessels have been identified at their recorded locations, and no specific mitigation is required. This will be reassessed following further archaeological assessments conducted in support of the proposed development, including the archaeological assessment of collected marine geophysical survey data. In the event that remains are detected during initial geophysical surveys or site investigations, they will be dealt with following the methodologies outlined in this WSI and the accompanying PAD.

2.10. One anchorage is recorded in the CRSC. This comprises a charted pool / area of slightly deeper water off Penmaen Rhos (**CA612**; NPRN 518975). Although no known wrecks are present at this location, the presence of anchorages, particularly charted or marked examples, are a good indication that the area was used by marine traffic. The potential to encounter associated archaeological material on the seabed in the vicinity is therefore high.

2.11. Two monuments are recorded within the CRSC, both post-medieval jetties relating to the quarrying industry. One of the jetties (**CA631**; Primary Record Number (PRN) 32405) is extant and comprises an intact structure, extending c. 200m out to sea. The other (**CA629**; PRN 34206) has been removed. Based on Google Earth imagery, this took place sometime between April 2011 and April 2015.

2.12. A further 68 sites are located in the revised WSA but outside the CRSC (Table 2; Figures 8-10). These comprise 17 wrecks, three aircraft, 43 reported losses, one



LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Monument
- Reported loss
- Wreck

GEODETIC INFORMATION:

0 1 Kilometers

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Units: Meter

N

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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Historic assets in the WSA (map 1 of 3)

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	8
APPROVED BY:	MW		

LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Aircraft
- Monument
- Named location
- Reported loss
- Wreck

GEODETIC INFORMATION:

0 6 Kilometers

N

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Central Meridian: -3.0000
Scale Factor: 0.9996
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Units: Meter

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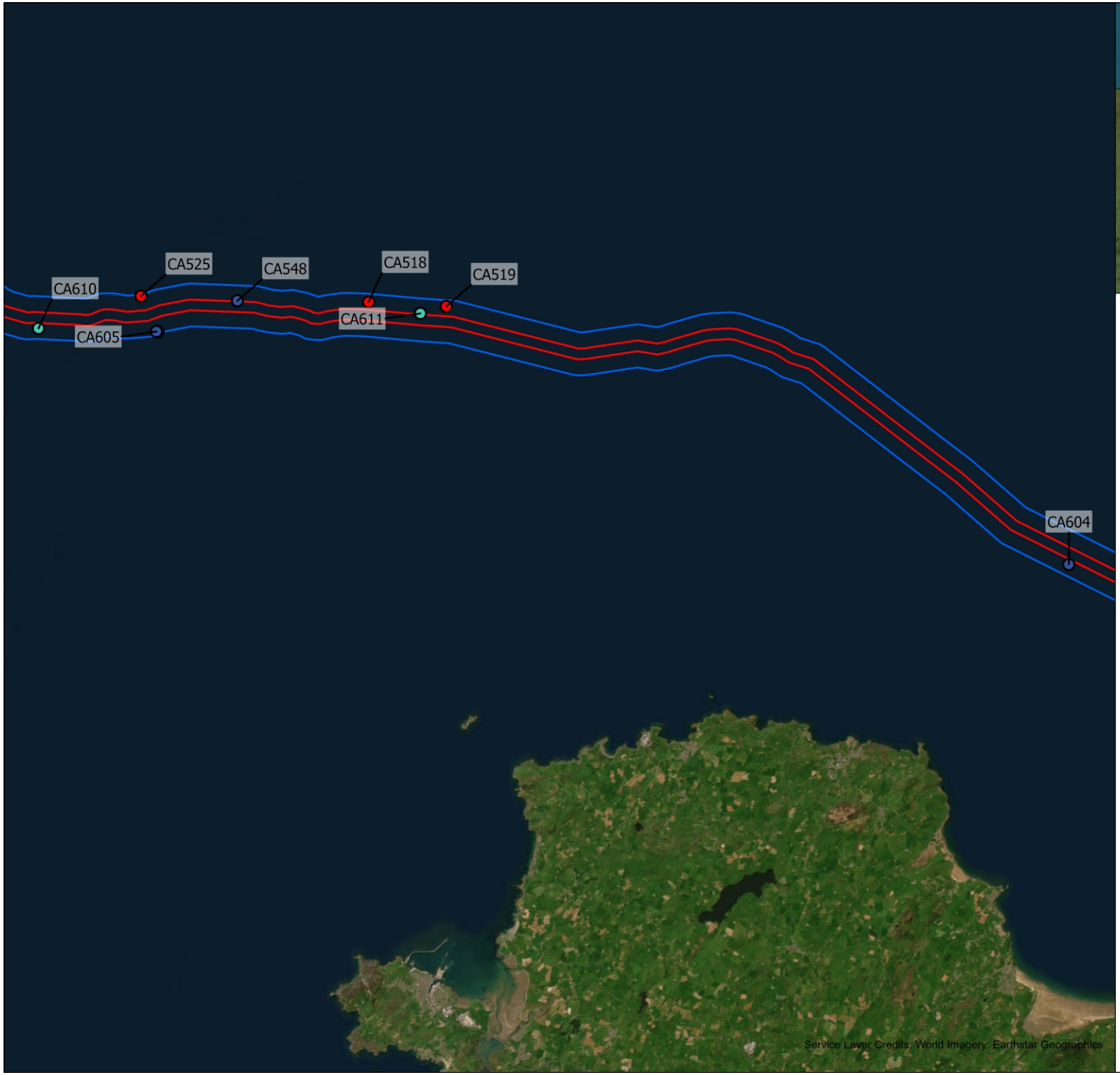
PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Historic assets in the WSA (map 2 of 3)

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	9
APPROVED BY:	MW		



LEGEND:

- UK-Ireland EEZ boundary
- MaresConnect CRSC
- MaresConnect landfall funnels
- MaresConnect WSA

Asset type

- Obstruction
- Reported loss
- Wreck

GEODETIC INFORMATION:

0 8 Kilometers

N

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
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Central Meridian: -3.0000
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PROJECT TITLE:
MaresConnect Interconnector

FIGURE TITLE:
Historic assets in the WSA (map 3 of 3)

DRAWN BY:	KW	PROJECT NO.	FIGURE NO.
CHECKED BY:	DG	23064	10
APPROVED BY:	MW		

maritime named location two obstructions and two monuments. More detailed descriptions of these assets can be found in the rapid DBA (Coracle Archaeology 2024).

Table 2 Historic assets within the WSA but outside the CRSC

CA No.	Name	Type	Date	Status	Easting (UTM30N)	Northing (UTM30N)	Source and ref. no.
CA505	*Delfina*	Wreck	1928	Live	428860	5924036	NMRW NPRN 272209
					428857	5924022	UKHO 7437
CA508	Unidentified (slate barge A)	Wreck	Post Medieval	Live	446861	5912491	NMRW NPRN 506955
					446874	5912504	UKHO 8139
CA511	Unidentified	Wreck	Unknown	Live	457687	5907654	UKHO 8142
CA512	Unidentified	Wreck	Unknown	Live	459543	5906154	UKHO 8143
CA513	Unidentified	Wreck	Post Medieval	Live	446222	5913208	NMRW NPRN 506956
					446221	5913202	UKHO 8144
CA514	Unidentified	Wreck	Unknown	Live	436249	5916669	UKHO 8244
CA515	Unidentified	Wreck	Post Medieval	Live	436204	5917442	NMRW NPRN 506854
							UKHO 8245
CA516	*Nicola Faith*	Wreck	Unknown	Unknown	453524	5909614	UKHO 96894
CA517	*Susie Mo II* (possibly)	Wreck	2015	Unknown	455710	5908798	UKHO 91489
CA518	Unidentified	Wreck	Unknown	Unknown	388483	5940129	UKHO 103658
CA519	Unidentified	Wreck	Unknown	Unknown	392118	5939923	UKHO 103661
CA521	Unidentified	Wreck	Post Medieval	Unknown	450120	5910695	NMRW NPRN 800925
							UKHO 91491
CA523	Unidentified	Wreck	Post Medieval	Unknown	440699	5914851	NMRW NPRN 800918
							UKHO 93358
CA524	Unidentified	Wreck	Post Medieval	Unknown	449229	5911741	NMRW NPRN 800924
							UKHO 93502
CA525	Unidentified	Wreck	Post Medieval	Unknown	377835	5940406	NMRW NPRN 800350
							UKHO 99045
CA530	Airspeed Oxford I L4656	Aircraft	Modern	Unknown	448463	5911909	NMRW NPRN 515454
CA532	Avro Anson I N9917	Aircraft	Modern	Unknown	442444	5913524	NMRW NPRN 515644
CA534	Avro Lancaster I Pb799	Aircraft	Modern	Unknown	442444	5913524	NMRW NPRN 506979

CA No.	Name	Type	Date	Status	Easting (UTM30N)	Northing (UTM30N)	Source and ref. no.
CA545	*Esther*	Reported loss	Post Medieval	n/a	447499	5912664	NMRW NPRN 271447
CA546	*Hecla*	Reported loss	Post Medieval	n/a	457426	5905232	NMRW NPRN 519089
CA548	*Kate*	Reported loss	Post Medieval	n/a	382350	5940187	NMRW NPRN 272077
CA549	*Maria*	Reported loss	Post Medieval	n/a	432991	5919890	NMRW NPRN 271404
CA551	*Mona*	Reported loss	Post Medieval	n/a	437507	5916023	NMRW NPRN 271166
CA552	*Newhaven*	Reported loss	Post Medieval	n/a	456649	5905163	NMRW NPRN 271555
CA559	*Rose*	Reported loss	Post Medieval	n/a	457687	5907653	NMRW NPRN 271629
CA564	Unnamed Wreck	Reported loss	Post Medieval	n/a	442548	5914369	NMRW NPRN 240917
CA565	*Vine*	Reported loss	Post Medieval	n/a	459544	5906154	NMRW NPRN 271446
CA566	*Doon*	Reported loss	20th Century	n/a	457082	5905203	NMRW NPRN 271453
CA567	*City of Verviers*	Reported loss	Modern	n/a	457989	5905262	NMRW NPRN 271454
CA568	*Flatfish*	Reported loss	Modern	n/a	454624	5905315	NMRW NPRN 271456
CA572	Off Orme Head Maritime Named Location	Named location	Multiperiod	n/a	442444	5913524	NMRW NPRN 240595
CA573	*Adela*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 240596
CA574	*Albion*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271675
CA575	*Alice*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271571
CA576	*Ann*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271725
CA577	*Britannia*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 524867
CA578	*Caroline*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 544233
CA579	*Catharine*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271740
CA580	*Catherine*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 544288
CA581	*Deborah*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 524881
CA582	*Elizabeth and Mary*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271694
CA583	*Fletcher*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 544276
CA584	*Glan Conway*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 525200
CA585	*Hero*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271739
CA586	HMS *Thistle IV*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271584
CA587	*James*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271695

CA No.	Name	Type	Date	Status	Easting (UTM30N)	Northing (UTM30N)	Source and ref. no.
CA588	*Lark*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271760
CA589	*Laura and Mary*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271728
CA590	*Lively*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 525166
CA591	*Lytham*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 525554
CA592	*Mersey*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 524791
CA593	*Nancy*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271392
CA594	*Skylark*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 525151
CA595	*Susanna*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 525177
CA596	*Trefriw Trader*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 240456
CA597	*Union*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271425
CA598	*Union*	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271473
CA599	Unnamed Wreck	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271292
CA600	Unnamed Wreck	Reported loss	Post Medieval	n/a	442444	5913524	NMRW NPRN 271741
CA601	*Jessie Sinclair*	Reported loss	20th Century	n/a	442444	5913524	NMRW NPRN 544534
CA602	*Europa*	Reported loss	Modern	n/a	442444	5913524	NMRW NPRN 525553
CA603	*Thistle*	Reported loss	Modern	n/a	442444	5913524	NMRW NPRN 507234
CA604	*Derbent* (possibly)	Wreck	1917	Dead	421233	5927865	UKHO 66762
CA605	*Djerv*	Wreck	20th Century	Dead	378635	5938727	NMRW NPRN 272249
		Wreck			378561	5938754	UKHO 7367
CA610	Unidentified	Obstruction	Unknown	Dead	373046	5938899	UKHO 7368
CA611	Unidentified	Obstruction	Unknown	Dead	390905	5939596	UKHO 7463
							NMRW NPRN 506745
CA628	Penmaenrhos Jetty	Monument	Post Medieval	Extant	454455	5905223	CPAT PRN 34203
					454556	5905249	Google Earth
CA630	Llysfaen Quarry Jetty II	Monument	Modern	Extant	456706	5905105	CPAT PRN 34279
					456657	5905095	Google Earth

3.1. No aviation remains were recorded in the CRSC during searches undertaken for the DBA (Coracle Archaeology 2024). Three aircraft were, however, recorded in the WSA (**CA530**; **CA532**; **CA534**). The ephemeral nature of aviation crash sites at sea means

that remains of aircraft are rarely found at their given locations, and these records should be seen as providing an indication that aviation remains may exist at, or in proximity to, the general area. As yet, no remains of these aircraft have been confirmed. If remains are identified during works associated with the proposed development, they would be designated automatically as Controlled Sites under the Protection of Military Remains Act (PMRA) 1986.

3.2. No deposits of palaeo-environmental interest were identified at the landfall locations within the CRSC or WSA. As noted above, two submerged forests are, however, located in proximity to the proposed development, at Rhos-on-Sea (**CA528**; NPRN 524772) and Abergele (**CA529**; NPRN 524722). These deposits are typically laterally extensive, and it is possible that recorded locations may represent exposed remnants of a much larger buried landscape. The possibility that they may be encountered within the CRSC cannot therefore be discounted. Any impact from landfall site investigations (boreholes) would nevertheless be localised and of low magnitude; this would be mitigated through the geoarchaeological assessment of geotechnical data collected at each landfall location (see below).

4. WRITTEN SCHEME OF INVESTIGATION

Aims and objectives

4.1. The primary aim of this WSI is to reduce the potential risks of impact from the proposed development on archaeological and cultural heritage assets, and to set out clearly the procedures that will be followed to avoid impacts and to protect such assets and deposits. This includes the use of AEZs.

4.2. The aim of an AEZ is to exclude all activities within the exclusion zone, thereby protecting archaeological and potential archaeological assets from accidental damage.

4.3. The potential risks to heritage assets will be mitigated through the use of site-specific AEZs, which specify the extent of each exclusion zone so as to avoid all known and potential cultural heritage receptors.

4.4. With reference to *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (The Crown Estate & Wessex Archaeology, 2021), the objectives of this WSI are:

- to set out the scope of works of the proposed project;
- to propose measures for mitigating effects upon any archaeological material that may be encountered during project operations; and
- to identify and establish the position and extent of any AEZs.

Methodology

4.5. The final route of the proposed development has not yet been selected. Route planning and engineering design will be informed by the results of the marine geophysical survey and site investigations, including the archaeological assessment of the project-specific marine geophysical survey datasets (MBES, SBP, SSS and magnetometer).

4.6. Geophysical data should be provided to the archaeological consultants in raw / minimally processed format for processing and assessment, in accordance with relevant professional standards and guidance (e.g. CIfA 2014a & 2014b; Plets *et al*. 2013). These data will be assessed for anomalies of archaeological potential, based on the presence of multiple lines of evidence (confirming datasets). Anomalies will be classified using the following criteria:

- **high potential** - identified typically by multiple geophysical datasets and can be identified positively as being an archaeological site (e.g. wreck) or of archaeological interest;
- **medium potential** - identified typically by multiple geophysical datasets, and strongly suggestive of the presence of anthropogenic feature(s) which may be of archaeological interest, but cannot be classified or identified visually (e.g. cannot be positively identified as a wreck);
- **low potential** - identified usually by a single geophysical dataset (typically magnetics and / or SSS) that suggest a possible anthropogenic feature that may have archaeological significance and that differs in character from those identified as having no potential; or
- **no potential** - geological features such as boulders or known (and often mapped) anthropogenic features such as cables, anchorages etc.

Archaeological exclusion zones

4.7. All anomalies of high or medium archaeological potential will be protected by the imposition of appropriately-sized AEZs. AEZs will apply to any activities that disturb the seabed, within which all development-related activities will be prohibited. Their locations and extent will be agreed in advance with curatorial authorities. The location and conditions of the AEZs will be conveyed to all teams involved in any such works.

4.8. AEZs will be defined following professional recommendations (Dix *et al*. 2007) and then converted into circular AEZs with a defined centre point to encapsulate the required AEZ. The extent of the suggested circular AEZ is therefore sufficiently large to encompass the area that would be defined by a polygon, following the procedures outlined in Dix *et al*. (2007).

4.9. The use of a centre point and set radius has been deemed the most robust method when attempting to incorporate AEZs into different vessel navigation systems. This reduces the risk of accidental incursions into AEZs, and possible impacts from site works on the potential asset within. In accordance with sections 5.1.1 and 5.2 of relevant guidance for WSIs (The Crown Estate & Wessex Archaeology 2021), which advocates preservation in situ with the aid of AEZs, the extent of the AEZ is based not only on the perceived archaeological potential of the asset, but also on its extent, if known.

4.10. The size of each AEZ will be designed to encompass all debris / structure visible on the seabed, with an added dimension to adequately protect both potentially buried remains and the potential for mobile debris associated with the direction (and extent) of the scour.

4.11. If the final cable route is impeded by the location of an AEZ, the anomaly within will be investigated to confirm its nature (i.e. whether it is of archaeological interest) and to assess the possibility of adapting, reducing or removing the AEZ. This investigation (ground-truthing) will be done by either archaeological assessment of remotely-operated vehicle (ROV)-acquired data or archaeological diver surveys. If this is not possible the cable will be re-routed around the AEZ through additional surveys. Should archaeological ground-truthing or further surveys be required, a detailed method statement for these works will be provided to the **Relevant Local and National Curatorial Authorities** for review and approval prior to commencement. In

the unlikely event that material associated with these recorded assets and anomalies should be encountered without the assigned AEZs during the course of the works, they will be dealt with in strict adherence to the terms of the PAD.

4.12. In the event that additional geophysical surveys are required to re-route the cable around an AEZ, supplied data will be assessed using the standard methodology employed by Coracle Archaeology for the archaeological review of marine geophysical survey datasets. All datasets will be examined to ensure that they are of sufficient quality to permit detailed archaeological assessments (see Plets *et al*. 2013) and will then be assessed for anomalies with archaeological potential, with selection based on the presence of multiple lines of evidence (confirming datasets).

Temporary exclusion zones

4.13. The location, extent and number of AEZs will be determined following the completion of the archaeological assessment of project-specific marine geophysical survey data. In the interim, temporary exclusion zones (TEZ) of 100m will be applied around all live wrecks and known heritage assets positively identified in the rapid marine archaeological desk-based assessment and located within the CRSC (Coracle Archaeology 2024). TEZs apply solely to ground-disturbance activities (i.e. GI and sampling surveys); it is possible to sail through them, and survey above them.

Location and extent of TEZs

4.14. Based on the rapid marine archaeological DBA (Coracle Archaeology 2024), no live wrecks are located within the CRSC. Of the two monuments at the prospective landfalls, one (**CA631**) is a large intact jetty which, based on Google Earth satellite imagery, appears to be still in use. This will be avoided as a matter of course by the GI work. The other (**CA629**) is no longer extant. No TEZs are therefore required. This will be reassessed as the project progresses.

Potential impact on AEZs and TEZs of the proposed development

4.15. A fundamental element of AEZs and TEZs is that they are not encroached by activities associated with the proposed development. All development activities that have the potential to impact the seabed must therefore occur outside of them. Additional geophysical surveys may be required to ensure that works associated with the proposed development do not encroach any exclusion zones. In the event that additional surveys are deemed necessary, a detailed method statement will be

prepared and submitted to the **Relevant Local and National Curatorial Authorities** for review and approval prior to commencement.

Monitoring of TEZs

4.16. No operations that disturb the seabed will be undertaken within a TEZ. If it becomes apparent that intrusive activities have taken place within a TEZ, the party responsible will cease all activities and will obtain advice from the **Archaeological Consultant** in accordance with their obligations with respect to the TEZ and the detail of this WSI.

4.17. In the event that there is an accidental incursion into a TEZ, the **Relevant Local and National Curatorial Authorities**, in this instance Heneb and the RCAHMW respectively, will be notified immediately. The incursion will be fully investigated by the **Archaeological Consultant**, which may include further geophysical, ROV or diver survey, to determine if any identifiable heritage asset has been impacted, damaged or destroyed. In the event that additional surveys are considered necessary, a detailed method statement will be provided to the **Relevant Local and National Curatorial Authorities** prior to commencement.

4.18. Assessment of new geophysical survey data will be undertaken by Coracle Archaeology, with anomalies assessed for their archaeological potential in accordance with the criteria outlined in this document. The results of any investigation will be fully reported in a technical report, which will be submitted within two months of the investigations.

4.19. An archaeological report will be prepared to review whether there are still archaeological grounds for maintaining the TEZ. Any archaeological report on the TEZ will include recommendations regarding amendment of the TEZ, which may include its extent, removal and / or creation of new TEZs or AEZs.

4.20. The effectiveness of any TEZ or AEZ will be subject to a structured monitoring programme by the **Archaeological Consultant** in consultation with the **Site Champion**, including the reporting timetable outlined in the accompanying PAD. If one or more incursions into a TEZ occur, or there are repeated finds of archaeological material without any agreed AEZs, the situation will be investigated immediately and re-evaluated, including visits to the vessel(s) by the **Archaeological Consultant**, if deemed necessary.

Establishing new TEZs

4.21. In the event that an unexpected archaeological discovery is made during the course of the GI and site surveys, either on the deck of a vessel or structure encountered on the seabed, all works will cease in the vicinity of the discovery and a new TEZ will be established. The TEZ will exclude all intrusive works in the vicinity of the find until further investigations have been concluded. Project-related work can, however, continue elsewhere.

4.22. At the earliest opportunity, any subsea gear should be lifted and examined for archaeological material. The occurrence will be recorded in the daily progress report or vessel log and a preliminary record should be completed, including the location of the vessel and the approximate location of the find (if different and known), together with photographs and / or sketches of the find(s). Following the guidelines outlined in Historic England (2018), any finds can be stored initially in seawater in a suitable container without cleaning or the removal of any material or marine growths, before being transferred to tap water as soon as practicable.

4.23. All related documentation should then be sent to the **Archaeological Consultant** who will provide advice on best practice. If deemed necessary, the **Archaeological Consultant** will notify, and will seek the advice of the **Relevant Local and National Curatorial Authorities**, in this case Heneb and the RCAHMW respectively. In the event that the finds are found to be of significant archaeological interest, prior to the recommencement of work in the area, further on-site investigations may be required, such as geophysical, ROV or diver surveys. Should further investigations be required, a detailed method statement will be provided to the **Relevant Local and National Curatorial Authorities** for review and approval prior to commencement.

4.24. Following consultation, the **Archaeological Consultant** will advise on the status of the TEZ which will be either:

- converted into a permanent AEZ;
- revised or relocated; or
- removed completely.

The outcome will be conveyed to all works crews and navigational software will be updated accordingly.

Assessment of GI locations

4.25. Prior to the final selection of locations for GIs and site investigations, a rapid review of the marine geophysical survey data collected in proximity to the proposed locations (<50m) will be completed. This will prevent impacts to previously unidentified cultural heritage assets. The assessment will be undertaken by a suitably qualified and experienced marine archaeologist. Any previously unknown heritage assets identified during this rapid review will be assigned a TEZ following the methodology outlined above.

4.26. This assessment will be submitted to the RCAHMW for review and approval prior to the onset of GI. Should deposits of geoarchaeological / palaeo-environmental interest be identified (e.g. infilled palaeo-channels), it will include proposed locations for geoarchaeological sampling. Potential sampling recommendations could include collection of cores specifically for geoarchaeological purposes (in the event that a deposit of particularly high geoarchaeological importance is identified) or specification of locations where individual cores would be suitable for both engineering and geoarchaeological analyses.

Geoarchaeological assessment

4.27. Following their review of the marine licence application for the initial phase of survey works and site investigations, the RCAHMW requested that geotechnical investigations be undertaken in the intertidal zone as well as the terrestrial and offshore areas. This will allow the archaeological potential of the proposed landfall locations to be better characterised.

4.28. Geotechnical data collected from boreholes in the intertidal zone should be supplied to the **Archaeological Consultant** for geoarchaeological assessment, following the staged approach outlined by COWRIE (2011). A toolbox talk will be prepared and presented to the client's geotechnical contractor prior to the onset of works, including strategies designed to ensure that the archaeological potential of the GIs is optimised.

4.29. Following completion of the offshore GIs, core logs and photographs should also be provided for geoarchaeological assessment. These data will be used to inform the baseline for future consent applications and assist in the development of appropriate mitigation strategies.

4.30. A report outlining the findings of the initial stage 1 and 2 assessments (review of core logs and geoarchaeological recording; COWRIE 2011) will be prepared and provided to the **Relevant Local and National Curatorial Authorities** (Heneb and RCAHMW) for review and comment. This will include recommendations and method statements for further assessments (Stage 3 and 4), should any be deemed necessary.

Further landfall surveys

4.31. Walkover, metal-detector and geophysical surveys will be undertaken on the foreshore and intertidal zone once the final landfall location has been selected. It is likely that geophysical survey will comprise the use of magnetometers in the intertidal zone, following recent successful trials of this method by the RCAHMW. Surveys will be conducted on the lowest spring tides, thus ensuring continuity between marine and terrestrial (below MHWS) surveys. These will be undertaken as part of the consenting process, and will be used to inform subsequent marine licence applications.

Reporting and deliverables

4.32. On completion of any operations that disturb the seabed, if deemed necessary as a result of an accidental incursion or any alterations or additions to the AEZs or TEZs, a report may be compiled on the effectiveness of the AEZ or TEZ, and the results of monitoring.

4.33. Reporting activities may include the results of archaeological assessment of serendipitous discoveries during works that impact the seabed, and the effectiveness, and implementation, of new exclusion zones. On completion of these works, an archaeological summary report may also be prepared to synthesise the results of any reports outlined above that may arise throughout the course of the works. If a final archaeological report is deemed necessary, it will be submitted to the RCAHMW within two months of the work and will address the following themes:

- maritime sites and finds; and
- palaeo-environmental and submerged prehistoric archaeology.

4.34. Reference to all archaeological assessment work will be made in any summary report completed by the **Archaeological Consultant**. This will consolidate the key results

of the archaeological assessments undertaken upon completion of any works. Should a summary report be required, it will be delivered to the **Relevant Local and National Curatorial Authorities**, in this instance Heneb and the RCAHMW.

4.35. Finds will be reported, as relevant, to the Ministry of Defence (MoD; for military remains) or the Receiver of Wreck (RoW; to facilitate the establishment of ownership), for consultation within two months of the completion of the works (see accompanying PAD). Under the terms of Section 236(1) of the Merchant Shipping Act 1995, it is a legal requirement to report any wreck material to the RoW as soon as possible. Unexpected discoveries will be reported as appropriate at the time of discovery in accordance with the terms of the accompanying PAD.

4.36. Depending on outcomes, for example the discovery of unexpected archaeology, or possible incursions into TEZs, each element of work may give rise to one or more reports, the provision of which will be the responsibility of the **Developer** through their appointed **Archaeological Consultant**. Any reports will be delivered to the RCAHMW within two months.

5. PROTOCOL FOR ARCHAEOLOGICAL DISCOVERIES

Scope

5.1. The PAD sets out best practice in the reporting of finds of archaeological interest (Appendix A). It is based on professional guidance for PADs (The Crown Estate & Wessex Archaeology, 2014). Specific guidance for subsea interconnector cables is not available; this PAD therefore draws on the closest appropriate professional guidance for offshore renewable energy infrastructure projects (The Crown Estate & Wessex Archaeology 2014). The principles that are set out here are intended to address archaeological mitigation measures identified during archaeological assessments, and the approach to any further finds of archaeological interest.

5.2. The PAD clearly sets out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries whilst undertaking any activities that disturb the seabed. This PAD incorporates all current and relevant guidance (The Crown Estate & Wessex Archaeology 2014 & 2021).

5.3. The **Developer** is responsible for the implementation of this PAD and the accompanying WSI.

5.4. Any additional relevant information received will be archaeologically assessed by Coracle Archaeology and, if relevant, will be added to the WSI and PAD, including the addition or revision of any archaeological exclusion zones (AEZs) as deemed necessary.

5.5. The objectives of the PAD are:

- to set out the respective responsibilities of the **Developer**, their **Contractors** (TBC), and the **Archaeological Consultant** (Coracle Archaeology) prior to and during any works that disturb the seabed, to include contact details and formal lines of communication between the parties and with archaeological curators;
- to clearly set out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries; and
- to ensure that, in the event of unexpected archaeological discoveries being made, appropriate archaeological input, review and recording is undertaken.

5.6. The responsibility for implementing this PAD rests with the **Developer**. This must include the engagement of the **Archaeological Consultant** to provide briefings prior to commencement to all relevant project contractors (and sub-contractors) in the use of the PAD and its implications.

Types of finds

5.7. 'Finds' here are considered to mean all forms of artefact that can be found on the seabed. To be an artefact, the item must have been made, modified, used or transported by humans; i.e. the artefact's presence on the seabed is 'artificial' or 'cultural' rather than 'natural'. For the avoidance of doubt, this includes aircraft wreckage. Owing to the potential sensitivities involved, discoveries that may be military must be reported immediately to the **Archaeological Consultant**. The **Archaeological Consultant** will need to inform the Ministry of Defence (MoD) and the Joint Casualty and Compassionate Centre (JCCC; for more information see www.gov.uk/guidance/joint-casualty-and-compassionatecentre-jccc).

5.8. In the unlikely event that human remains are encountered below mean high water, they must be reported immediately to the **Archaeological Consultant**. Under the terms of the Burial Act 1857, the remains must remain *in situ* until an exhumation

licence has been obtained. **This is a legal requirement**. Any finds of treasure (as defined by the Treasure Act of 1996 and its 2002 revision) must also be reported immediately to the **Archaeological Consultant**.

5.9. For legal purposes, finds from the seabed fall into two categories. 'Wreck' has a specific legal definition broadly encompassing all sorts of materials that come to be on the seabed as a direct result of once being aboard or part of a vessel. Statutory law relating to 'wreck' is set out principally in the Merchant Shipping Act 1995, applicable to territorial waters out to the 12 nautical mile (nm) limit. The common law relating to wreck is found in legal cases and commentaries.

5.10. All other finds are referred to as 'non-wreck'. 'Non-wreck' includes finds such as prehistoric flint artefacts that were lost on land that has since been inundated by rising sea level, or artefacts that have been eroded from sites on the shore (see Appendix A). The law applicable to 'non-wreck' is largely common law, to be found in legal cases and commentaries.

5.11. Any wreck recovered out-with UK territorial waters, but then brought into UK territorial waters, must be reported to the RoW under the terms of Section 236 (i) of the Merchant Shipping Act 1995.

Circumstances of discovery

5.12. This PAD addresses finds of archaeological interest made in the following circumstances:

- discoveries on the seabed during seabed inspections and investigations, seabed clearance or scheme recovery;
- an anomaly that has been encountered on the seabed such as possible wreck or cultural heritage features identified during geophysical, geotechnical, remotely-operated vehicle (ROV) or diver surveys; or
- a find of archaeological interest made on a works vessel, for example wreck or objects recovered to the deck during the course of geotechnical sampling or caught in equipment such as grapnels, anchors, or ploughs.

Terms of roles

5.13. This section defines the terms and roles with responsibility for ensuring compliance with the PAD (see below). The specific details of the individuals who will fill these roles will be confirmed and distributed in advance of the commencement of any project works that might disturb the seabed.

5.14. The **Developer** will draw the attention of the **Contractor** to the potential for archaeological material to be found in the course of their works and will inform them of the possible importance of such finds. Key operational staff will be identified and must be briefed by the **Archaeological Consultant** on the operation of the PAD prior to the commencement of such works.

5.15. This PAD anticipates discoveries being made by the **Contractor**, who reports to **the Site Champion** (client representative on board works vessel), who then reports to the **Nominated Contact** (shore-based representative of the Developer). The **Nominated Contact** will then liaise with the appointed **Archaeological Consultant** to provide details of a reported discovery.

5.16. The **Archaeological Consultant** will assess the nature of the appropriate actions to be taken, and whether to contact the **Relevant Local and National Curatorial Authorities**, in this case Heneb and the RCAHMW respectively. The **Archaeological Consultant** will also provide the **Nominated Contact**, **Site Champion** and representatives of all crews engaged in activities that disturb the seabed with a toolbox talk prior to works, during which they will be briefed on the types of archaeological finds and features that may be encountered. The responsibilities for each role are outlined below.

Nominated Contact

5.17. The **Nominated Contact** will be the contractor's shore-based point of contact for all communications regarding archaeological discoveries. The **Nominated Contact** will be issued with a copy of this document.

Site Champion

5.18. The **Nominated Contact** will identify a **Site Champion** (who will usually be the Client Representative of the **Developer**) to act as a first point of contact for staff, and to liaise with the **Nominated Contact** in respect of the implementation of the PAD. The **Site Champion** will be issued with a series of preliminary record sheets and flow

charts (see Appendix B) setting out the actions to be taken in the event that an archaeological discovery is made either on the seabed or on the deck of the vessel. The **Site Champion** will report to the **Archaeological Consultant** via the **Nominated Contact**; the **Archaeological Consultant** will check the necessary documentation before taking the appropriate action.

Archaeological Consultant

5.19. The **Archaeological Consultant** will be the initial point of contact for the **Nominated Contact**. They shall:

- brief the **Site Champion** on the nature of archaeological finds and features and appropriate measures for interim conservation and safe storage;
- advise on the identification of finds and features and, if possible, the character of their seabed locations;
- advise on material conservation of any recovered finds;
- agree appropriate actions to be taken; and
- where appropriate, pass on all details and records associated with any discoveries to the **Relevant Local and National Curatorial Authorities**.

Relevant local and national curatorial authorities

5.20. RCAHMW, Cadw and Heneb are the statutory bodies for archaeology and heritage in this part of Wales, including marine archaeology in territorial waters adjacent to the Welsh coast up to the mean high-water mark. Cadw have responsibility for scheduled / designated sites in the marine zone and are statutory consultees for works that might impact on any designated sites. In the event of an unexpected discovery of a find of archaeological significance, the **Archaeological Consultant** may consider it necessary to inform these authorities. Should this be necessary a representative from the RCAHMW, Cadw or Heneb will be asked to:

- liaise with other relevant archaeological authorities;
- advise and consult on proposals to further evaluate any finds; and
- advise and consult on proposals to mitigate the effects of work activities upon any finds.

Actions following discoveries on the seabed and on the deck of a works vessel

5.21. The following presents the actions to be taken in the event of an archaeological discovery during any project activities that disturb the seabed. The preliminary record sheets and flow charts illustrating the actions to be followed are presented in Appendix B.

Actions by the Contractor

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

Actions by the Site Champion

5.23. Where it is possible to identify the position from which the find originated, the **Site Champion** will impose a TEZ in the vicinity of the discovery within which intrusive works will cease until further investigations have been concluded. Works can, however, continue in alternative locations. The feedback and advice of the **Archaeological Consultant** will be sought through the **Nominated Contact** and will be available throughout ground-disturbance works to provide the necessary response required during any activity that disturbs the seabed.

5.24. The **Site Champion** shall record the occurrence as soon as possible in the daily progress report (DPR) or vessel log together with the time and exact vessel position. Where possible, the report entry should include a close approximation of the original position of the anomaly on the seabed. Additionally, the **Site Champion** shall ensure that the TEZ, is marked on navigational software, site drawings and survey charts. The **Site Champion** shall compile a preliminary record of the occurrence for discoveries both on the seabed and on the deck of the vessel.

5.25. The **Site Champion** shall inform the **Nominated Contact** of the occurrence as soon as possible and pass on all available information, including a copy of the preliminary record and copies of any photographs, drawings or other relevant records. If any finds have been recovered, the **Site Champion** shall arrange for them to be stored uncleaned in seawater in a suitable clean container, which should be covered. Any

rust, concretion or marine growth should not be removed. The flow charts in Appendix B present the procedures to be followed in the event of a discovery.

Actions by the Nominated Contact and Site Champion

5.26. Once informed of a find by the **Site Champion**, the **Nominated Contact** will confirm with the **Site Champion** that all the details set out in the preliminary record are comprehensive and correct. The **Nominated Contact** shall ensure that any find is appropriately assessed and documented for the **Archaeological Consultant** who will, if deemed necessary, report the find to the **Relevant Local and National Curatorial Authorities**.

5.27. The **Nominated Contact** (TBC) is:

Name_____

Position_____

Address_____

_____

Telephone_____

Email address_____

Contact the Archaeological Consultant

5.28. The **Nominated Contact** will approach the **Archaeological Consultant** who will offer advice on the nature of any discoveries and appropriate action to be taken. The feedback and advice of the **Archaeological Consultant** will be sought through the **Nominated Contact** and will be available throughout ground-disturbance works in order to provide the necessary response required.

5.29. The **Archaeological Consultant** is:

Dr Michael Walsh (MCIfA)
Lead Marine Consultant

Coracle Archaeology
Unit 1, 42 Corton
Warminster
BA12 0SZ

01985 620425
07737 825276
michael.walsh@coracle.co.uk

5.30. The **Archaeological Consultant** will discuss and agree the appropriate action to be taken, will process all records, and if deemed necessary will provide a summary report for any discoveries.

Contact the Relevant Local and National Curatorial Authorities

5.31. In the event that the **Archaeological Consultant** considers it necessary, the **Relevant Local and National Curatorial Authorities** will be consulted by the **Archaeological Consultant** for further advice. If necessary, all available information relating to the circumstances of the occurrence, including a copy of the preliminary record and copies of any photographs, drawings or other records that have been made will be passed on to the **Relevant Local and National Curatorial Authorities.**

5.32. The contact details for the **Relevant Local and National Curatorial Authorities** are:

Dr Julian Whitewright Senior Investigator (Maritime)	Mark Walters Senior planning archaeologist
RCAHMW Penglais Rd Aberystwyth SY23 3BU	Heneb (Clwyd-Powys) Y Swyddfeydd Coed y Dinas Welshpool Y Trallwng SY21 8RP
01970 621217 chc.cymru@cbhc.gov.uk	01938 553670 trust@cpat.org.uk

Advise other teams / vessels working on the site

5.33. In the event that a find of possible archaeological significance is reported to the **Archaeological Consultant**, they will use their professional experience and judgement, in consultation with the **Relevant Local and National Curatorial Authorities** (if required), to determine the archaeological potential of the recovered item, and whether or not the imposition of a TEZ is warranted. This will protect the

identified potential heritage asset while its significance is fully assessed. Significance of the asset will be determined by the **Relevant Local and National Curatorial Authorities**.

5.34. The imposition of a TEZ will serve to limit further disturbances on the seabed whilst archaeological investigations are conducted to determine if the recovered material is part of an *in situ* heritage asset. This may include, though is not limited to, additional geophysical, diver or ROV surveys within the TEZ as agreed by the **Relevant Local and National Curatorial Authorities**.

5.35. Where a TEZ has been imposed, the **Site Champion** shall inform other vessels working in the area. Such other vessels shall be advised by the **Nominated Contact** to keep a particular watch for anomalies and finds of archaeological potential.

Establishing new AEZs

5.36. Once a TEZ has been established and the significance of the historic asset it protects determined, it may be necessary to maintain this exclusion zone. If the historic asset is shown to be of archaeological significance the TEZ may be converted into a new AEZ. This decision will be taken by the **Archaeological Consultant** in consultation with the **Relevant Local and National Curatorial Authorities**.

Altering AEZs

5.37. If further archaeological material is discovered during the course of the works, then AEZs may be altered (enlarged, reduced, moved or removed) as a result. These discoveries might include material recovered on survey equipment or evidence from boreholes. Any alteration will be defined by the **Archaeological Consultant** in consultation with the **Relevant Local and National Curatorial Authorities** and will be issued to each works vessel by the **Nominated Contact** through the **Site Champion**.

Finds recovered within the UK twelve nautical mile limit

5.38. The **Nominated Contact** shall make any recovered finds available for inspection by the **Archaeological Consultant** who may consult the **Relevant Local and National Curatorial Authorities**. If the find is, or appears to be 'wreck', or associated material, the **Nominated Contact** shall give notice to the RoW as soon as possible that a find has been recovered in accordance with Section 236(1) of the Merchant Shipping Act 1995. Alternatively, the **Nominated Contact** can instruct the **Archaeological**

Consultant to notify the RoW. **Reporting a wreck to the RoW is a legal requirement**. This clause also applies to finds recovered beyond territorial waters that are subsequently brought into territorial waters. The remit of the RoW is set down in the Merchant Shipping Act 1995, Part IX.

5.39. The Receiver of Wreck can be contacted as follows:

Receiver of Wreck
Bay 1/05
Spring Place
105 Commercial Road
Southampton
SO15 1EG

020 381 72575
row@mcga.gov.uk

Interactions with cultural heritage assets that do not result in recovered finds

5.40. Not all interactions with potential heritage assets will necessarily result in recovered finds. A disturbance in the tension of equipment used during a pre-lay grapnel run (PLGR), for example, may be simply indicative of a change in seabed sediments and geology, but it may also suggest interaction with a cultural heritage asset. If such strikes are noted, the approximate position should be recorded by the **Site Champion**. The **Nominated Contact** will then inform the **Archaeological Consultant**, who will compare the position with known sites and geophysical anomalies in the vicinity to determine archaeological potential. If repeated strikes or interactions are recorded, the **Archaeological Consultant** will consult with the **Relevant Local and National Curatorial Authorities**, who may require further archaeological investigations**.**

Reporting and archiving

5.41. Archaeological reports produced as a result of this WSI and PAD, will be sent for review to Cadw (for scheduled / designated sites), RCAHMW and / or Heneb prior to finalisation. Similarly, any summary reports produced as a result of the agreed WSI, or through implementation of the PAD, will be sent as draft reports for agreement.

5.42. Reports will be produced in the following circumstances:

- if finds or features of archaeological potential are encountered;

- if there is an accidental incursion into an AEZ; or
- on completion of installation works (a post-construction report) to report on the successful implementation of the PAD (including a summary of the daily reports between the **Nominated Contact** and the **Archaeological Consultant**), and to confirm the outcome of any archaeological discoveries.

5.43. The latter report will be produced and submitted within two months, even if there are no finds of archaeological potential or accidental incursions into AEZs to report, to confirm the successful implementation of, and adherence to, the terms of this PAD.

5.44. The **Developer** will be responsible for ensuring that copies of any archaeological assessment or summary reports are deposited with the Welsh Trust for Archaeology Historic Environment Record (HER) and the National Monuments Record of Wales (NMRW), along with a digital copy of the report. Guidance for archiving digital outputs in Wales can be found on the RCAHMW website:

https://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHMW-Guidelines-for-Digital-Archives.pdf [rcahmw.gov.uk]

5.45. Any samples, finds or objects of cultural heritage interest that may be recovered during the project works will be handled and stored in the appropriate manner under the guidance of the **Archaeological Consultant**, in consultation with the curators and staff from the receiving institution. All subsequent decisions regarding the handling, transport and storage of retained finds will be agreed with the **Archaeological Consultant** in consultation with the **Relevant Local and National Curatorial Authorities** and the relevant staff from the allocated receiving institution. The relevant local and national curatorial bodies will receive the draft technical reports regarding discoveries to support determination of any subsequent action.

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APPENDIX A: GUIDELINES FOR IDENTIFYING FINDS OF ARCHAEOLOGICAL INTEREST (AFTER THE CROWN ESTATE & WESSEX ARCHAEOLOGY 2014)

Rubber, plastic etc

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

Iron and steel

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

Other metals

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

Bone

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

Wood

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

Stone

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

Pottery

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

Brick

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

Peat and clay deposits

Peat is black or brown fibrous soil that formed when sea level was so low that the seabed formed marshy land, on the banks of a river or estuary for example. The peat is made up of plant remains, and also contains microscopic remains that can provide information about the environment at the time it was formed. This information helps us to understand the kind of landscape that our predecessors inhabited, and about how their landscape changed. It can also provide information about rising sea-level and coastline change, which are important to understanding processes that are affecting us today. Prehistoric structures (such as wooden trackways) and artefacts are often found within or near peat, because our predecessors used

the many resources that these marshy areas contained. As these areas were waterlogged and have continued to be waterlogged because the sea has risen, ‘organic’ artefacts made of wood, leather, textiles and so on often survive together with the stone and pottery which are found on ‘dry’ sites.

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

APPENDIX B: PAD PROCEDURES TO BE FOLLOWED IN THE EVENT OF A DISCOVERY

Preliminary Record for discoveries on the seabed / on board / in the inter-tidal zone / on land

Company Name:

Vessel/Team Name:

Site/sea area Name:

Date:

Time of compiling information:

Name of compiler (Site Champion):

Name of finder (if different to above):

Time at which discovery was encountered:

Vessel position at time when anomaly was encountered:

a) Latitude

b) Longitude

c) Datum (if different from WGS84)

Original position of the anomaly on the seabed, if known:

Notes on likely accuracy of original position stated above:

a) How accurate is the position?

b) Is the position the original position or has the material been moved by operations?

c) Details of circumstances and activity that lead to the discovery

Description of the find/anomaly:

Apparent size/extent of the anomaly:

Details of any find(s) recovered:

Details of photographs, drawings or other records made of the find(s) (e.g. location figure):

Details of treatment or storage of find(s):

Date and time Nominated Contact informed:

General notes:

If discovered on the seabed:

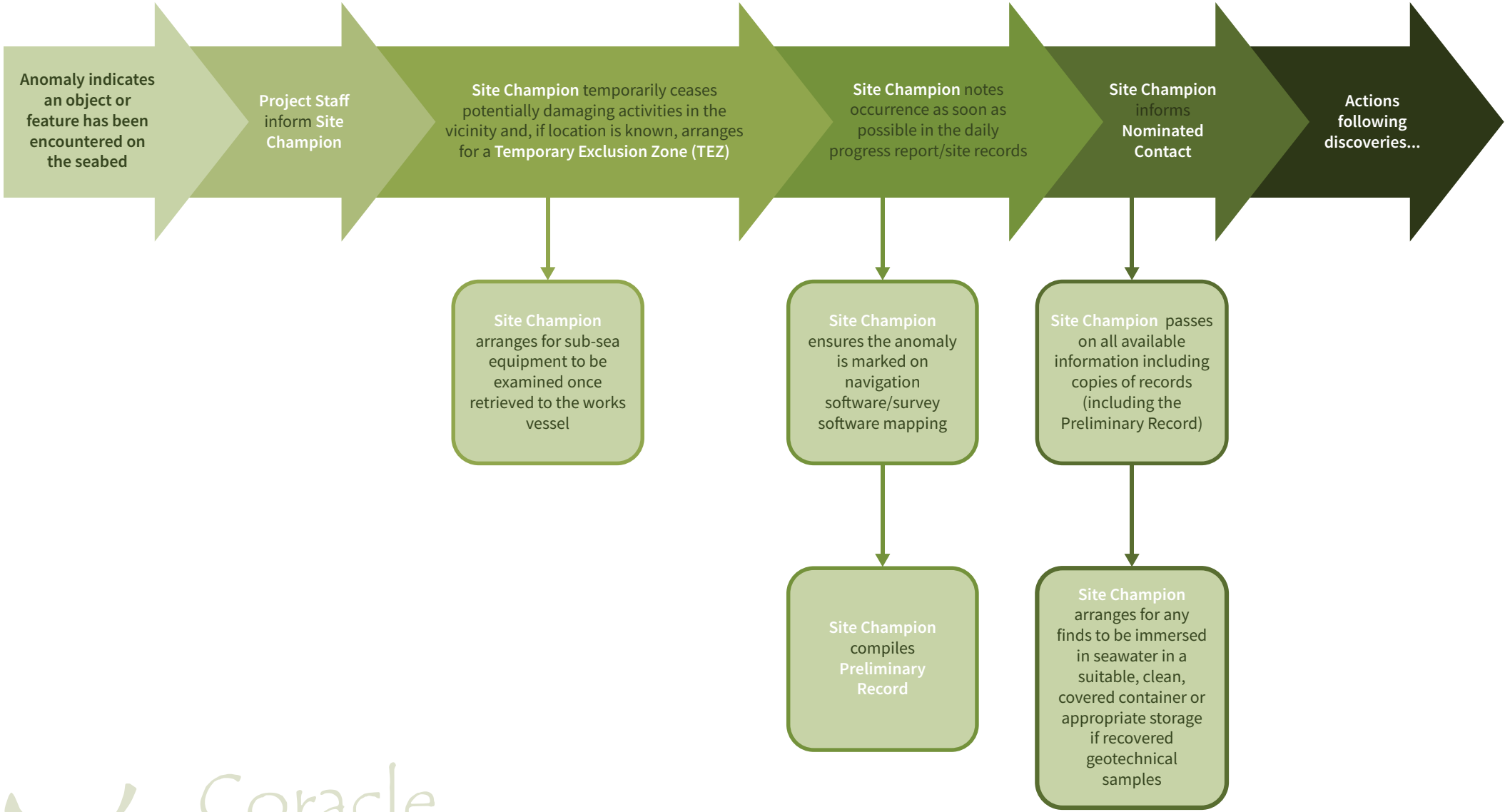
a) Derived from: e.g. Obstacle Avoidance Sonar, Cable Tensiometer?

b) Apparent size/extent of anomaly (length, width, height above seabed)

c) Extent of deviation/route development

Signed: Date:

Discoveries on the seabed and on-board



Actions following discoveries