



Mona Offshore Wind Project

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Mona Offshore Wind Ltd.

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Mona Offshore Wind Project

Intertidal UAV and Walkover Survey

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Glossary

Term	Meaning
Groyne	A low wall or sturdy barrier built out into the sea from a beach to check erosion and drifting.

Acronyms

Acronym	Description
AHEF	Archaeology and Heritage Engagement Forum
CPAT	Clwyd-Powys Archaeological Trust
DCO	Development Consent Order
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NGR	National Grid Reference
NPAAW	National Panel for Archaeological Archives for Wales
OA	Oxford Archaeology
PEIR	Preliminary Environmental Information Report
RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RTK	Real-time kinematic
SSSI	Site of Special Scientific Interest
UAV	Unmanned Aerial Vehicle
WSI	Written Scheme of Investigation

Units

Unit	Description
km	Kilometres
m	Metres

Summary

Oxford Archaeology (OA) North was commissioned by RPS to undertake an Unmanned Aerial Vehicle (UAV) and walkover survey of the site of the proposed landfall of the Mona Offshore Cable Corridor, between Llanddulas Beach (NGR: SH 9159 7858) and Pensarn Beach, Abergele (NGR: SH 9471 7901).

A survey of the intertidal area was undertaken due to the potential for encountering significant peat deposits. RPS produced a Written Scheme of Investigation (WSI) (see Appendix A) for the UAV and walkover survey of the intertidal area, and subsequently, commissioned OA North to undertake the necessary fieldwork, which was completed in three days between 18 and 20 October 2022. The results of the survey support the Preliminary Environmental Information Report (PEIR) and are used to characterise the baseline environment in volume 3, chapter 19: Historic environment of the PEIR.

The survey area was fully recorded by UAV and on foot during the three-day survey, revealing no evidence of significant archaeological remains or deposits on the surface of the intertidal area. The presence of an unstratified lump of clayey peat suggests that there is survival of peat in the vicinity.

Acknowledgements

Oxford Archaeology (OA) North would like to thank RPS for commissioning this survey. Thanks are also extended to the Development Control Archaeologist for Clwyd-Powys Archaeological Trust (CPAT), who monitored the work.

The project was managed for OA North by Paul Dunn. The fieldwork was directed by Andy Phelps, who was supported by Debbie Lewis. The survey and digitising were carried out by Debbie Lewis and Mark Tidmarsh.

1 INTRODUCTION

1.1 Scope of work

- 1.1.1 Oxford Archaeology (OA) North was commissioned by RPS to undertake an Unmanned Aerial Vehicle (UAV) and walkover survey of the site of the proposed Mona Landfall between Llanddulas Beach (at national grid reference (NGR): SH 9159 7858; see Figure 1) and Pensarn Beach, Abergele (NGR: SH 9471 7901; see Figure 1).
- 1.1.2 In discussion with the archaeological consultant for the Mona Offshore Wind Project, a survey of the intertidal area was designed due to the potential for encountering significant peat deposits.
- 1.1.3 A survey of the intertidal area was undertaken due to the potential for encountering significant peat deposits. RPS produced a Written Scheme of Investigation (WSI) (see Appendix A) for the UAV and walkover survey of the intertidal area, and subsequently, commissioned OA North to undertake the necessary fieldwork, which was completed in three days between 18 and 20 October 2022. The results of the survey support the Preliminary Environmental Information Report (PEIR) and are used to characterise the baseline environment in volume 3, chapter 19: Historic environment of the PEIR.

1.2 Location, topography and geology

- 1.2.1 The site is located on the intertidal area between Llanddulas, specifically Llanddulas Beach (NGR: SH 9159 7858; Figure 1) and Pensarn Beach, Abergele (NGR: SH9471 7901; Figures
- 1.2.2). Traeth Pensarn Site of Special Scientific Interest (SSSI) is located within the central and eastern part of the survey area (Figure 1) and is designated for its vegetated shingle beach plant communities.
- 1.2.3 The solid geology in the western half of the area is mapped as limestone, of the Clwyd Limestone Group, formed in the Carboniferous Period, whilst in the eastern half of the area it is mapped as mudstone, siltstone and sandstone, of the Warwickshire Group, formed in the Carboniferous and Permian Periods (BGS, 2023). The overlying superficial geology of the site is mapped as sand, marine beach deposits, formed during the Quaternary Period (BGS, 2023).

1.3 Archaeological and historical background

- 1.3.1 The archaeological and historical background of the site is taken from the WSI (Appendix A), which was summarised from volume 7, annex 19.1: Historic environment desk-based assessment of the PEIR.
- 1.3.2 The general area of the Vale of Clwyd has a long history of human occupation. Excavation in several of the caves has produced evidence of early prehistoric habitation, in some cases dating as far back as the Lower Palaeolithic. At Pontnewydd Cave near St Asaph, the early Neanderthal material represents the oldest hominin remains in Wales (recently dated to c. 230,000BP), whilst other important material has been recovered from the Brasgyll, Galltfaenan, Cefn and Cae Gronw caves (*cf.* Aldhouse-Green *et al.*, 1996). The location of the Vale of Clwyd Cave Sites is shown on Figures
- 1.3.3 .
- 1.3.4 This very early material has survived within the caves and rock shelters in the higher parts of the limestone uplands. Subsequent advances and retreats of ice sheets have changed the lower lying parts of the landscape on numerous occasions through to the ending of the most recent glacial episode at about 12,000BP. As the ice sheet diminished, sea levels in the area started to rise quickly and much of what is currently

dry land would have been inundated. Studies in the Liverpool Bay area indicate that the sea level reached a high stand (maximum peak) at about 2,300BP before beginning to fall back again (Tooley 1978; 1985).

- 1.3.5 Sea level rise and fall was not a constant process; there would have been many periods of marine transgression and regression. During more stable times, land surfaces would have developed, only to be inundated and covered (and possibly eroded through subsequent regressive stages). Evidence for these sequences is in the form of Holocene peat deposits that have been found at depths of 10m and 13m below current ground level close to the mouth of the River Clwyd.
- 1.3.6 Most of the material found on the foreshore is broadly attributable to the Neolithic and Bronze Age periods. However, an antler mattock from here has been recently dated to c. 4,560BC and it is increasingly clear that there was a considerable amount of activity in the area during the Mesolithic period (c. 8,500–4,000BC) (Murphy 2002). The higher ground at Abergele is set on a ridge of Clwyd Limestone and would have remained above the sea level high stands; it probably represents the most seaward habitable land at such times.
- 1.3.7 Shell middens have been identified at Prestatyn, where consumption of mussels in the Mesolithic period suggest a rocky coastline and a subsequent change to a largely cockle based consumption in the Neolithic indicates the development of sandy beaches.

2 AIMS AND METHODOLOGY

2.1 Aims and objectives

2.1.1 The principal objective of the UAV and walkover survey were to establish whether any archaeological material and deposits of palaeoenvironmental interest survives within the proposed landfall locations. The survey was to aim to determine, as far as is reasonably possible, the location, form, extent, date, character, condition, significance and quality of any surviving archaeological remains and deposits of palaeoenvironmental interest, irrespective of period, that could be impacted by the Mona Offshore Wind Project. The survey also aimed to record the nature and extent of any existing disturbance and intrusion that may have the potential to affect the survival of buried archaeological deposits or remains.

2.2 Methodology

2.2.1 The full methodology was outlined in the WSI (Appendix A) which was adhered to in full and was fully compliant with prevailing guidelines and established industry best practice (CIfA 2020; 2022; Historic England 2015; 2017). A programme of field observation accurately recorded the form and character of all features of archaeological interest.

2.2.2 The area to be surveyed was set out and control established utilising a real-time kinematic (RTK) global navigation satellite system (GNSS) accurate to within 0.02 – 0.03m. The UAV survey was undertaken through the use of a *DJI Inspire 2* UAV piloted by trained, experienced and licensed pilots, in a systematic fashion to take photographs from multiple angles. The photographs were then processed in specialist photogrammetric software, (*Agisoft Metashape Professional*), to produce an accurate scaled model of the intertidal area to assist in the identification of peat outcroppings.

2.2.3 The walkover survey consisted of close field walking, on individual parallel transects based at 50m intervals between Mean Low Water Springs (MLWS) and Mean High Water Springs (MHWS). This was dependent on visibility and safety considerations. If any features or deposits of archaeological interest were identified, they were to be recorded both photographically and described on conventional *pro forma* sheets.

2.2.4 The photographic archive was generated through landscape and detailed photography. Detailed photographs were taken of all sites using a scale bar, with all photographs being recorded on photographic *pro-forma* sheets which include a description of the subject, orientation and date.

2.2.5 A full professional archive was compiled in accordance with the WSI (Appendix A), and in accordance with current professional guidelines (CIfA 2020b; Historic England 2015). The archive will be deposited with the National Monuments Record of Wales, Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and National Panel for Archaeological Archives for Wales (NPAAW) following their standards and guidance (RCAHMW 2015; NPAAW 2019). The results of the RCAHMW are part of the Archaeology and Heritage Engagement Forum (AHEF) for the Mona Offshore Wind Project. The scope and results of this survey have been shared with the AHEF (see volume 3, chapter 19: Historic environment of the PEIR).

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 The results of the survey are presented below, and a description of the survey area provided. The light and weather conditions were adequate during the hours the site could be accessed. The UAV (Plate 1, Plate 2 and Plate 3) and walkover survey (Figure 2 to Figure 4) were fully completed during the three days on site.



Plate 1: Photogrammetric plan of the west of the survey area.



Plate 2: Photogrammetric plan of the central part of the survey area.



Plate 3: Photogrammetric plan of the east of the survey area.

3.2 Survey results

3.2.1 The UAV and walkover survey identified no significant archaeological remains within the survey area. Several groynes were identified interspersed throughout the survey area, primarily of timber construction, although one survived only as stone foundations (Figures 2, 3 and 4 and Plates 4 and 5); all probably of late 19th or early 20th century date.



Plate 4: Stone groyne foundations looking northwest, scale 1m.



Plate 5: Timber groyne with stone foundations, looking southeast, scale 1m.

3.2.2 The survey was also unable to find any evidence of peat outcroppings that were to be specifically targeted. Although an unstratified lump of clayey peat (Plate 6 and Plate 7) was identified, indicating the presence of peat in the vicinity, there was no evidence of where this peat had been washed-out from; it had clearly been *ex-situ* for a period of time due to the presence of sea-mollusc within the peat.



Plate 6: Unstratified clayey peat lump with 1m scale.



Plate 7: Close up view of peat lump.

4 CONCLUSIONS

4.1 Discussion

- 4.1.1 The present investigation identified no significant archaeological remains or deposits within the intertidal available for inspection at the time of the survey. There was no evidence of any peat outcroppings within the survey area; however, an unstratified lump of clayey peat was identified within the survey area, suggesting that there are peat deposits in the vicinity of the survey area.

FIGURES

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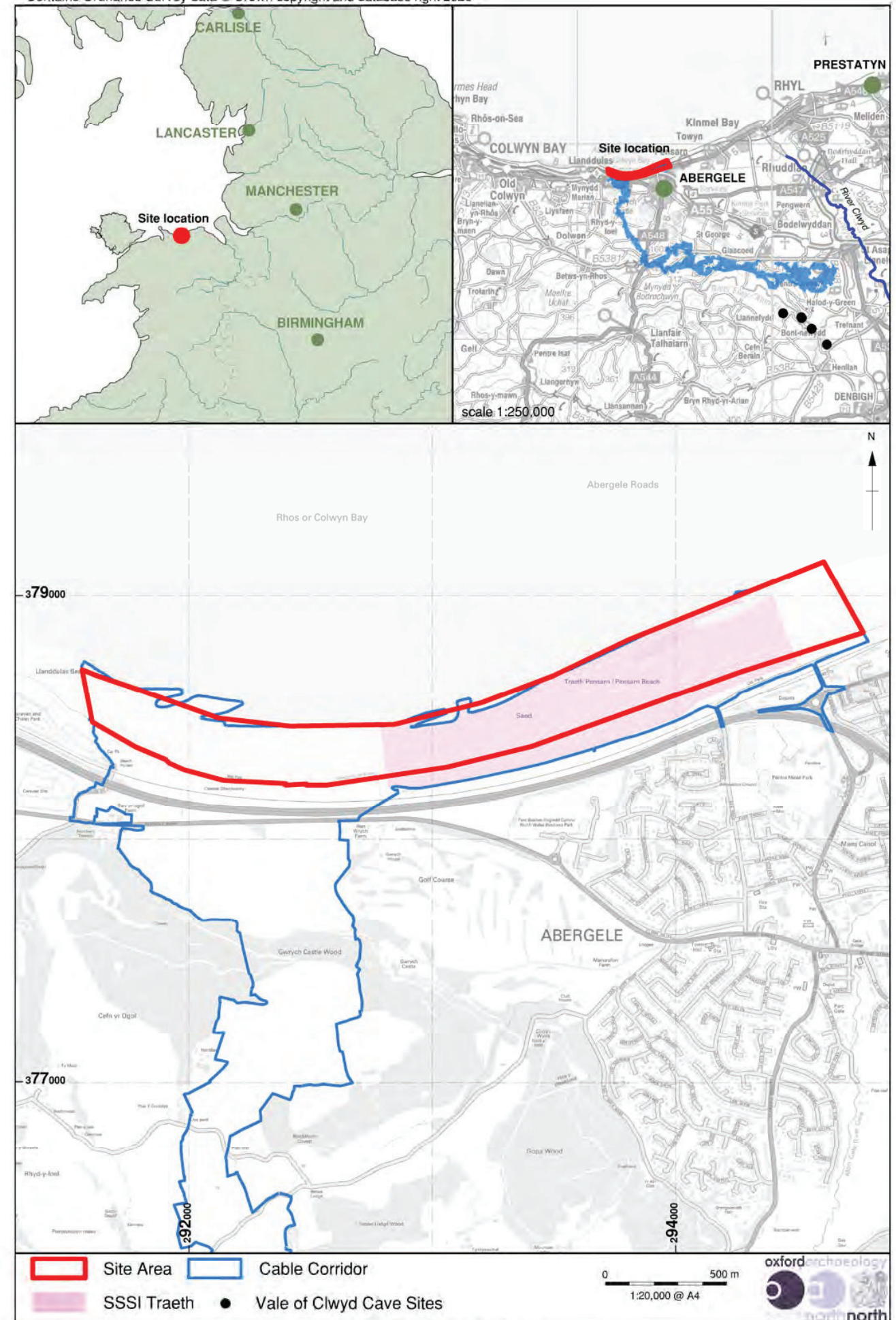


Figure 1: Site location

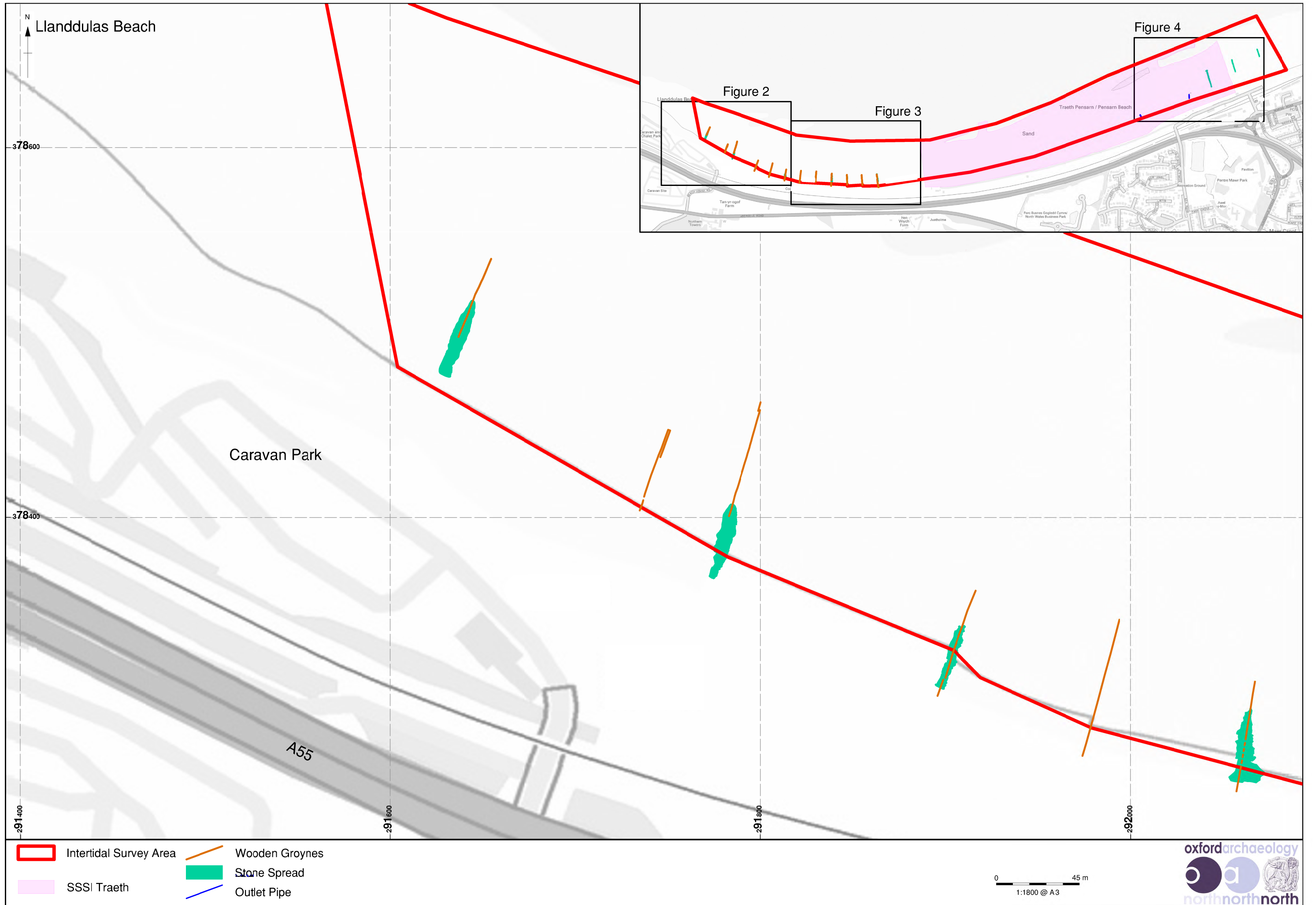


Figure 2: Results of the intertidal survey in the vicinity of Llanddulas Beach

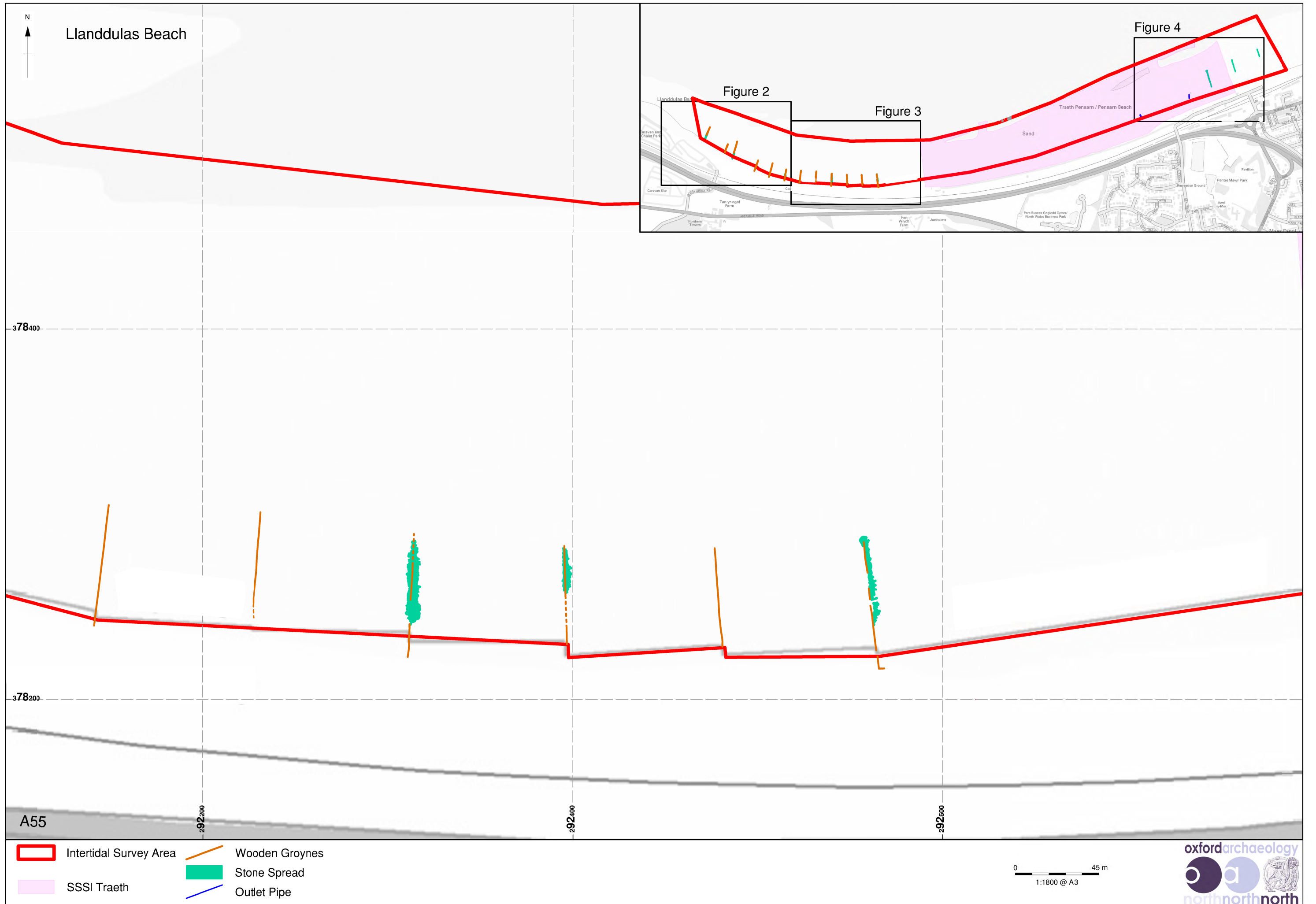


Figure 3: Results of the intertidal survey in the vicinity of Hen Wrych Farm

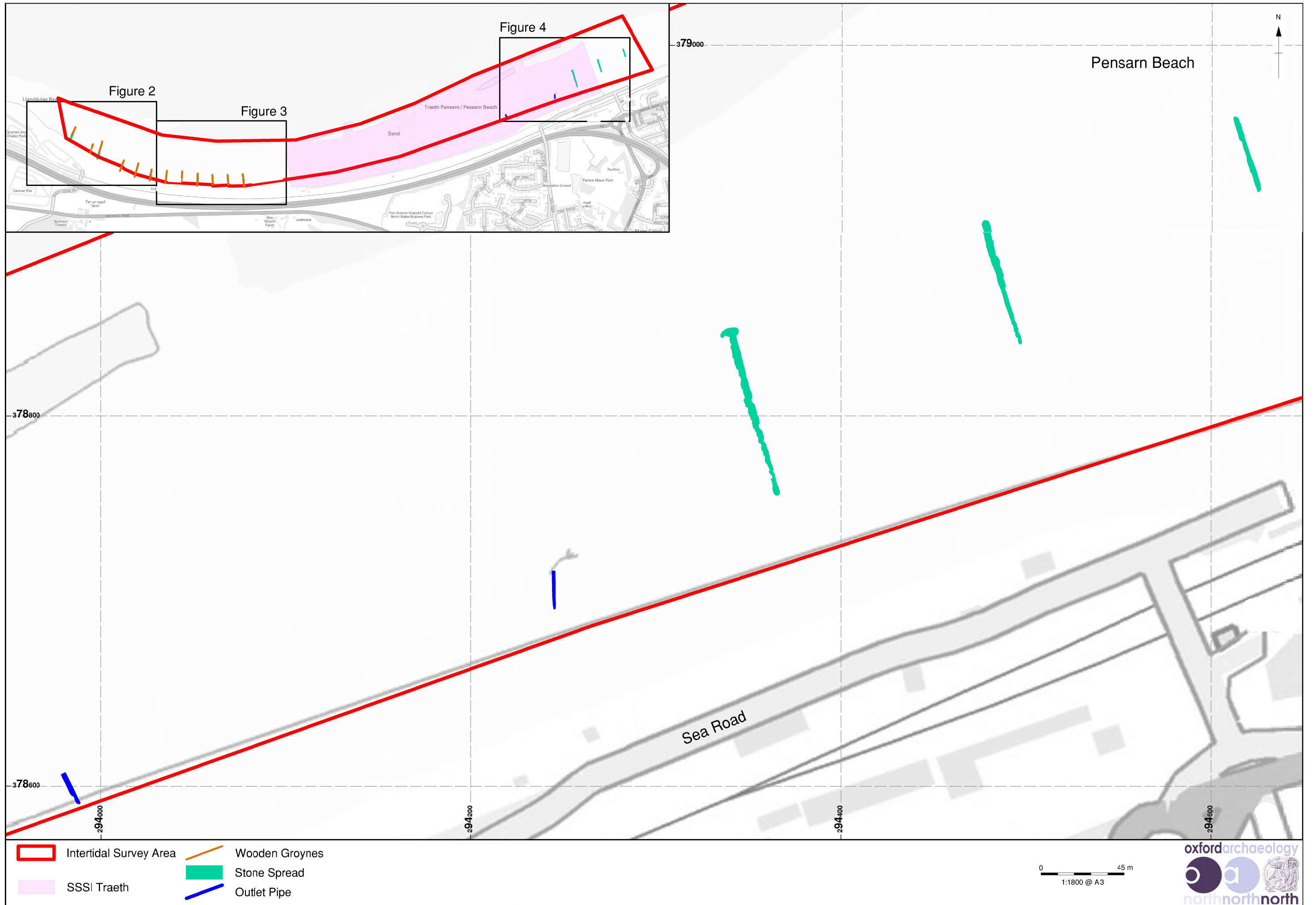


Figure 4: Results of the intertidal survey in the vicinity of Pensarn Beach

APPENDIX A **WRITTEN SCHEME OF INVESTIGATION**



MONA OFFSHORE WIND PROJECT ONSHORE CABLE ROUTE

Specification for an Intertidal Historic Environment Survey

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Mona Offshore Wind
Project Onshore Cable
Route
V3
March 2023

SPECIFICATION FOR AN INTERTIDAL HISTORIC ENVIRONMENT SURVEY

Document status

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9 March 2023

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Figure 1 Intertidal Survey Areas

1 INTRODUCTION

- 1.1 This Specification has been prepared by Chris Clarke, Senior Associate Director at RPS Group, on behalf of bp/EnBW. It details the methodology that will be used in order to facilitate an intertidal historic environment survey related with the potential landfall sites associated with the onshore cable routes, part of the proposed Mona Offshore Wind Project.
- 1.2 In general, the onshore elements of the proposed scheme are located in Conwy and Denbighshire (North Wales) and comprise:
- a single landfall site near Abergele;
 - potential substation locations to the west of St Asaph;
 - an onshore cable route, approximately 12 km in length, that links the landfall site(s) to the potential substation locations; and
 - a shorter cable route that links the scheme substation to the National Grid Bodelwyddan substation.
- 1.3 The intertidal survey will focus on an area to the northwest of Abergele, located between National Grid Reference SH 9159 7858 and SH 9471 7901 (Figure 1). The route of the onshore cable corridor shown in Figure 1 is most likely that which will be taken forward to the Preliminary Environmental Information Report (PIER) review process, although there is potential for the route of the onshore cable corridor to be modified prior to this event.
- 1.4 It is intended that the intertidal survey will initially be used to support the Preliminary Environmental Information Report (PIER) consultation process. It will subsequently become an appendix to a Historic Environment chapter within an Environmental Statement (ES) which will accompany an application for a Development Consent Order (DCO).
- 1.5 This document details the methods and staffing required for the intertidal fieldwork and reporting, which will adhere to the relevant Standard and Guidance documents published by the Chartered Institute for Archaeologists (CIfA).

The Study Site

- 1.6 The extent of the survey area is indicated on Figure 1.
- 1.7 The underlying basal geology across the majority of the survey areas comprises Carboniferous limestone of the Clwyd Limestone Group, with the boundary with the Warwickshire Group mudstones likely to be present within the eastern survey area. In terms of superficial deposits, tidal clays, sands and silts of Holocene date are anticipated within the intertidal survey areas.
- 1.8 The Traeth Designated Site of Special Scientific Interest (SSSI) is present within the central and eastern part of the survey area.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 2.1 The following information is derived from the appropriate elements of the historic environment desk-based assessment for the project.
- 2.2 The general area of the Vale of Clwyd has a long history of human occupation. Excavation in several of the caves has produced evidence of early prehistoric habitation, in some cases dating as far back as the Lower Palaeolithic. At Pontnewydd Cave the early Neanderthal material represent the oldest hominin remains in Wales (recently dated to c. 230,000 BP), whilst other important material has been recovered from the Brasgyll, Galltfaenan, Cefn and Cae Gronw caves (cf. Aldhouse-Green *et al* 1996).
- 2.3 This very early material has survived within the caves and rock shelters in the higher parts of the limestone uplands. Subsequent advances and retreats of ice sheets have changed the lower-lying parts of the landscape on numerous occasions through to the ending of the most recent glacial episode at about 12,000 BP. As the ice sheet diminished, sea levels in the area started to rise quickly and much of what is currently dry land would have been inundated. Studies in the Liverpool Bay area indicate that the sea level reached a high stand (maximum peak) at about 2,300 BP before beginning to fall back again (Tooley 1978; 1985).
- 2.4 This process of sea level rise and fall was not a constant process; there would have been many periods of marine transgression and regression. During more stable times, land surfaces would have developed, only to be inundated and covered (and possibly eroded through subsequent regressive stages). Evidence for these sequences is in the form of Holocene peat deposits that have been found at depths of 10 m and 13 m below current ground level close to the mouth of the River Clwyd.
- 2.5 Most of the material found on the foreshore is broadly attributable to the Neolithic and Bronze Age periods. However, an antler mattock from here has been recently dated to c. 4,560 BC and it is increasingly clear that there was a considerable amount of activity in the area during the Mesolithic period (c. 8,500-4,000 BC) (Murphy 2002). The higher ground at Abergele is set on a ridge of Clwyd Limestone and would have remained above the sea level high stands; it probably represents the most seaward habitable land at such times.
- 2.6 Shell middens have been identified at Prestatyn, where consumption of mussels in the Mesolithic period suggest a rocky coastline and a subsequent change to a largely cockle-based consumption in the Neolithic indicates the development of sandy beaches.

3 OBJECTIVES AND RATIONALE OF THE INTERTIDAL HISTORIC ENVIRONMENT SURVEY

- 3.1 The principal objective of the intertidal historic environment survey is to establish whether any archaeological material and/or deposits of palaeoenvironmental interest survives within the two study areas at surface level.
- 3.2 The survey should aim to determine, as far as is reasonably possible, the location, form, extent, date, character, condition, significance and quality of any surviving archaeological remains and/or deposits of palaeoenvironmental interest, irrespective of period, that are liable to be threatened by the proposed development.
- 3.3 The survey should also record the nature and extent of any existing disturbance and intrusions that may have the potential to affect the degree of archaeological survival of buried deposits.

4 INTERTIDAL HISTORIC ENVIRONMENT SURVEY – SPECIFICATION

- 4.1 The overall objectives of the programme of intertidal survey are set out in Section 3. This section details the on-site methodologies, report format and other related details.
- 4.2 The area subject to the intertidal survey is set out in Figure 1.
- 4.3 The first stage of the survey would involve the use of an Unmanned Aerial Vehicle (UAV) to complete a photogrammetry survey of the of the two survey areas, piloted by a trained operative. The data collected would be processed in order to aid identification of any archaeological features of interest, including outcropping peat deposits.
- 4.4 Following the UAV survey, a walkover of the survey areas will be undertaken to more closely visually assess and record any features of interest identified by the UAV survey. The location, extent, and form of the features identified will be recorded through use of appropriate handheld cameras and GPS equipment.
- 4.5 Where possible peat outcrops are identified, subsequent testing of the peat deposits will be undertaken using a gouge auger in order for the depth of the peat to be recorded. Samples would also be taken of the peat to assess their level of preservation, with an associated assessment as to whether such samples would be suitable for further analysis. **No intrusive sampling or testing of deposits will occur within the area defined by the Traeth SSSI due to the protection offered by its designation.**
- 4.6 Human remains (if encountered) will not be disturbed. Such remains will be subject to a photographic record and their position recorded. The discovery of human remains will be reported to the local coroner.
- 4.7 Any finds covered by the provisions of the Treasure Act (1996, amended 2003) and Treasure (Designation) Order 2002, including gold and silver, will be moved to a safe place and reported to the coroner's office according to the procedures determined by the Act. They will also be reported to the local finds liaison officer from the Portable Antiquities Scheme. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the artefacts from theft or damage.
- 4.8 Within six weeks of completion of the work the archaeological contractor will produce a report, copies of which are to be provided to RPS for circulation to the Developer, Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), and the Clwyd-Powys Archaeological Trust (CPAT).

The report is to include, as a minimum, the following:

- a) HER search reference number;
- b) description of the methodology employed;
- c) a site location plan at an appropriate scale; a copy of the feature location plan at 1:1250 and more detailed plans as appropriate;
- d) a descriptive summary and interpretation of the archaeology within the survey areas;
- e) specialist assessment reports (if required);
- f) a table listing the features encountered;
- g) a consideration of the objectives and methodology used, including a confidence rating;
- h) appropriate photos of features encountered;

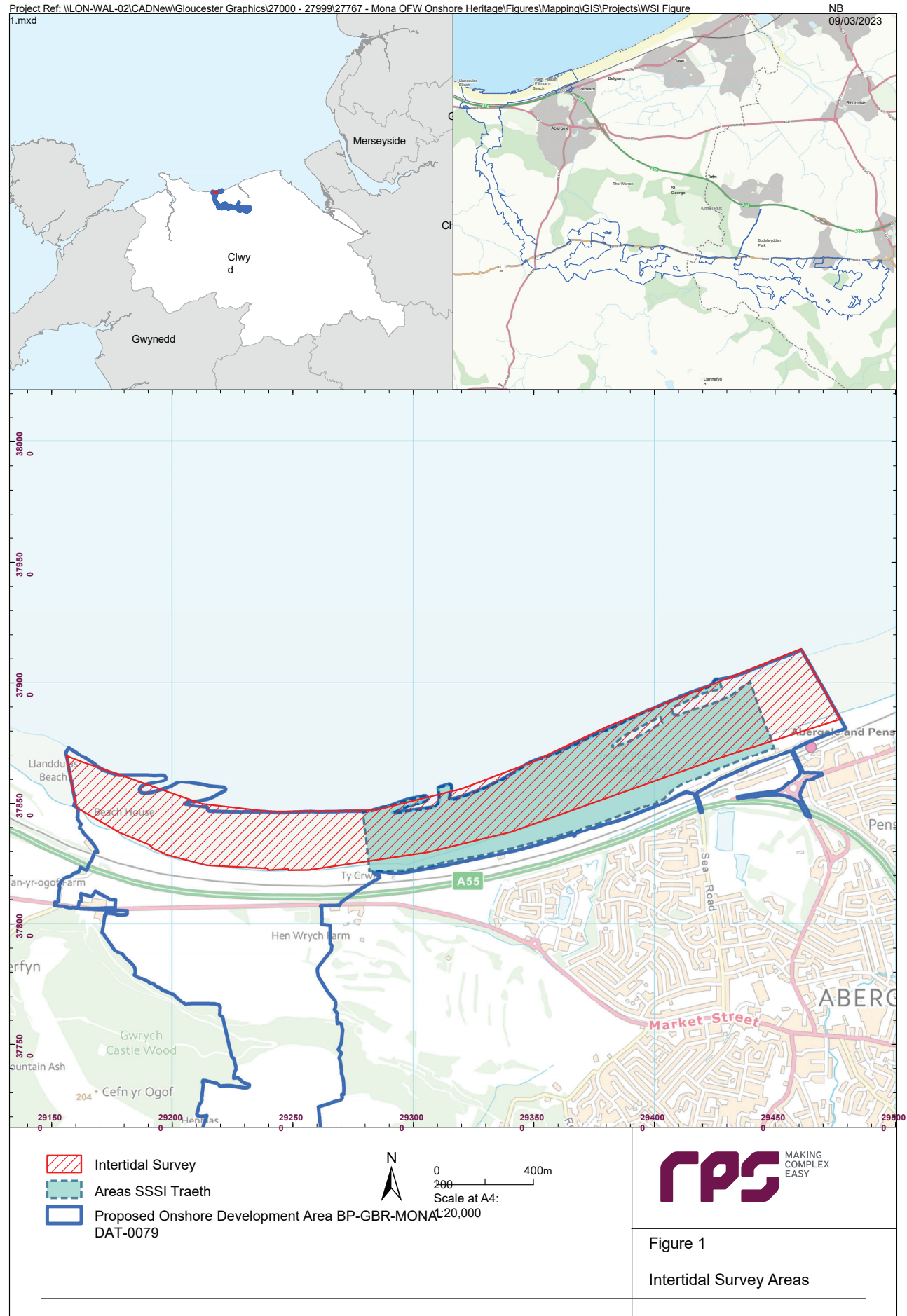
- i) HER summary sheet;
 - j) a summary report to be included in the regional archaeology round up if appropriate.
- 4.9 The integrity of the site archive should be maintained. The archive of all records and finds must be prepared consistent with the principles set out in the guidelines produced by the RCAHMW/ National Monuments Record of Wales, and National Panel for Archaeological Archives in Wales.
- 4.10 The archive will include all materials recovered (or the comprehensive record of such materials) and all written, drawn and photographic records relating directly to the investigations undertaken. It will be quantified, ordered, indexed and internally consistent. It will also contain a site summary and brief written observations on the artefactual and environmental data.
- 4.11 United Kingdom Institute for Conservation guidelines for the preparation of excavation archives for long term storage (1990) will be followed. Arrangements for the curation of the site archive will be agreed in writing with the appropriate local museum and National Monuments Record of Wales, and details of such arrangements will be made by the archaeological contractor.
- 4.12 The site archive, including the digital data sets from the UAV survey, is to be deposited with appropriate local museum and National Monuments Record of Wales within 3 months of the completion of work. It will then become publicly accessible.
- 4.13 In addition, at the start of work (immediately before fieldwork commences) an OASIS online record <http://ads.ahds.ac.uk/projects/oasis/> must be initiated and key fields completed on Details, Location and Creators Forms. All appropriate parts of the OASIS online form must be completed for submission to the CPAT HER and National Monuments Record of Wales. This should include an uploaded .pdf version of the entire report (a paper copy should also be included with the archive). The OASIS process will be completed by the appointed archaeological fieldwork contractor.
- 4.14 Oxford Archaeology North will be engaged to undertake the fieldwork. The field team deployed by the archaeological contractor will include only full time professional archaeological staff. All staff should be experienced on similar sites.

Sources Consulted

General

- Aldhouse-Green, S, Pettit, P and Stringer, S, (1996) 'Holocene humans at Pontnewydd and Cae Gronw caves', *Antiquity* 70, 444-7.
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FIGURES



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APPENDIX C SITE SUMMARY DETAILS

Site name:	Mona Offshore Wind Project Onshore Cable Corridor
Site code:	MOSW22
Grid Reference	SH 9159 7858 to SH 9471 7901
Type:	UAV and Walkover Survey
Date and duration:	18th – 20th October 2022; 3 days
Location of archive:	The archive is currently held at OA North, Mill 3, Moor Lane Mills, Moor Lane, Lancaster, LA1 1QD, and will be deposited with National Monuments Record, Royal Commission on the Ancient and Historical Monuments of Wales in due course.
Summary of Results:	Oxford Archaeology (OA) North was commissioned by RPS to undertake an Unmanned Aerial Vehicle (UAV) and walkover survey of the proposed landfall of the Mona offshore wind project cable route, between Llanddulas Beach (NGR: SH 9159 7858) and Pensarn Beach, Abergele (NGR: SH 9471 7901).

A survey of the intertidal area was undertaken due to the potential for encountering significant peat deposits. RPS produced a Written Scheme of Investigation (WSI) (see Appendix A) for the UAV and walkover survey of the intertidal area, and subsequently, commissioned OA North to undertake the necessary fieldwork, which was completed in three days between 18 and 20 October 2022. The results of the survey support the Preliminary Environmental Information Report (PEIR) and are used to characterise the baseline environment in volume 3, chapter 19: Historic environment of the PEIR.

The survey area was fully surveyed by UAV and on foot during the three day survey, however, there was no evidence of significant archaeological remains or deposits on the surface of the intertidal area. Although the presence of an unstratified lump of clayey peat suggests that there is survival of peat in the vicinity.



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