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HORIZON NUCLEAR POWER

WYLFA NEWYDD, ANGLESEY

AREA 13

ARCHAEOLOGICAL POST-EXCAVATION ASSESSMENT REPORT

DECEMBER 2021

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HORIZON NUCLEAR POWER

WYLFA NEWYDD, ANGLESEY

AREA 13 ARCHAEOLOGICAL POST-EXCAVATION ASSESSMENT REPORT

DECEMBER 2021

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SUMMARY

Wardell Armstrong LLP (WA) was commissioned by Horizon Nuclear Power to undertake the post-excavation assessment for archaeological excavations at the new nuclear power station at Wylfa Newydd, Anglesey, Wales, centred on National Grid Reference (NGR): SH 36040 93870. The archaeological fieldwork programme was undertaken in support of a Development Consent Order application (EN010007). The overall fieldwork programme was divided into defined areas and this report details the results of the archaeological excavation at Area 13, which was undertaken in accordance with a Written Scheme of Investigation (WSI) (Horizon Nuclear Power (HNP) 2015), the Technical Update (HNP 2017a) and Community Dig Scope (HNP 2017b). All documents were agreed with Gwynedd Archaeological Planning Services, the archaeological planning advisors to the Isle of Anglesey County Council.

Area 13 was located within a single field, Field L1(e), centred on NGR: SH 36040 93870. The excavation covered an area totalling 369m^{2}and was begun on 10th August 2017.

The investigation revealed that three hollows, formed from fissions in the bedrock, had been utilised during the prehistoric period. The location of these hollows, away from any obvious fresh water source and in such close proximity to the coast, suggests that any burning activity did not derive from typical burnt mound activity, but could represent atypical use, such as for salt panning. It is also possible that these deposits represent rubbish deposition relating to settlement in the wider vicinity. The investigation also identified a small amount of fired clay and worked stone within the burnt material.

CRYNODEB

Comisiynwyd Wardell Armstrong LLP (WA) gan Horizon Nuclear Power i gyflawni asesiad ol-gloddio archaeolegol ar gyfer cloddfau archaeolegol ar safle arfaethedig gorsaf bŵer niwclear Wylfa Newydd, Ynys Môn, Cymru, wedi ei ganoli ar Cyfeirnod Grid Cenedlaethol (NGR): SH 36350 93450. Ymgymerwyd ar y rhaglen waith maes archaeolegol i gefnogi cais Orchymyn Cydsyniad Datblygu (EN010007). Rhannwyd y rhaglen gwaith maes i lecynnau diffiniol ac mae'r adroddiad hwn yn manylu canlyniadau cloddfa archaeolegol yn Area 13. Cwblhawyd y gwaith yn unol â'r Cynllun Ymchwiliad Ysgrifenedig (CYY/WSI) (Horizon Nuclear Power (HNP) 2015), y Technical Update (HNP 2017a) a'r Community Dig Scope (HNP 2017b). Cytunwyd pob dogfen â Gwasanaeth Cynllunio Archaeolegol Gwynedd, ymgynghorwyr cynllunio archaeolegol Cyngor Sir Ynys Môn.

Roedd Area 13 wedi ei leoli yng nghae L1(e), wedi ei ganoli ar NGR SH 36040 93870 ac yn mesur 369m². Cwblhawyd y gwaith maes archaeolegol mewn un diwrnod ar y 10fed o Awst

2017.

Yn ystod yr ymchwiliad nodwyd bod tri phant, wedi eu ffurfio o holltiadau yn y graig, wedi eu defnyddio yn ystod y cyfnod Cynhanesyddol. Mae lleoliad y pantiau, i ffwrdd o unrhyw darddiad amlwg o ddŵr croyw ac yn agos i'r arfordir, yn awgrymu bod unrhyw losgi cysylltiedig ddim yn deillio o weithgaredd twmpath llosg nodweddiadol, ond gallant gynrychioli gweithgaredd gwahanol fel panio halen. Mae hefyd yn bosib bod y dyddodion yn cynrychioli cramennau sbwriel o aneddiadau yn y cyffiniau. Hefyd, nodwyd nifer bach o glai llosg a cherrig wedi eu gweithio yn y deunydd llosg.

ACKNOWLEDGEMENTS

Wardell Armstrong LLP (WA) thanks Horizon Nuclear Power for commissioning the project, and for all their assistance throughout the work.

Wardell Armstrong LLP also thanks Ian Halfpenney at CADW. Ashley Batten, Inspector of Ancient Monuments for North East Wales at CADW (formerly of Gwynedd Archaeological Planning Service (GAPS)), Jenny Emmett, Senior Planning Archaeologist at Gwynedd Archaeological Planning Service and Sean Derby from GAPS. Thanks go also to Wessex Archaeology who undertook the excavation and subsequent interim report, and to Jones Bros Ltd plant hire company for their help throughout this project.

The assessment report was written by Callum Allsop. The figures were produced by Helen Phillips. The finds assessment was undertaken by Sue Thompson and palaeoenvironmental assessment by Freddie Sisson. The environmental team comprised Megan Lowrie, Katherine Bostock and Jyoti Stuart, supervised by Freddie Sisson. The post-excavation assessment was under the overall management of Lynne Gardiner. The project was managed by Damion Churchill and Frank Giecco, and Cat Peters and Frank Giecco edited the report.

1 INTRODUCTION

1.1 Project Circumstances and Planning Background

1.1.1 In August 2017, Wessex Archaeology undertook an archaeological excavation in Area 13, Field L1(e), at Wylfa Newydd, Anglesey, centred on National Grid Reference (NGR): SH 36040 93870 (Figure 1). This excavation was one of multiple defined areas excavated as part of a large scheme of works commissioned by the Client who intends to construct a nuclear power station, related plant and ancillary Structures and offsite power station facilities on the site for which a Development Consent Order application has been submitted to The Planning Inspectorate (EN010007).

1.2 Primary reference numbers (PRN)

1.2.1 Historic Environment Record event numbers ('PRNs') Historic Environment Record event numbers ('PRNs') were assigned following discussions between Wessex Archaeology and Nina Steele, Senior Historic Environment Record Archaeologist at Gwynedd Archaeological Trust. PRN45392 has been assigned to the Wylfa Newydd project as a whole and further event numbers have also been assigned to 'noteworthy components' of the project. Within Area 13, PRN76019 has been assigned to the Early Bronze Age activity. A further three were assigned, see Table 1.1.

Table 1.1 PRN descriptions

PRN	Description	Associated contexts/PRNs
PRN76019	Assigned to Early Bronze Age activity on this site	PRN91976, PRN91977, PRN91978
PRN91976	Hollow, possible burnt mound	[13006=13008] and PRN76019
PRN91977	Hollow	[13010] and PRN76019
PRN91978	Hollow	[13004] and PRN76019

1.3 Project Documentation

1.3.1 The project conforms to a brief prepared by HNP which was prepared in consultation with the Gwynedd Archaeological Planning Service, the archaeological planning advisor to the Isle of Anglesey Council. A WSI (HNP 2015) was then produced to provide a specific methodology based on the brief for a programme of archaeological excavation. This was agreed with the archaeological planning advisor prior to the fieldwork taking place. This is in line with government advice as set out in Section 5.8 of the National Policy Statement for Energy (EN-1) (Department for Energy and Climate Change 2011).

1.3.2 This report outlines the work undertaken on site at Area 13, the subsequent programme of post-excavation assessment, and the results of this scheme of archaeological excavation.

2 EXCAVATION METHODOLOGY

2.1 Standards and Guidance

2.1.1 The archaeological evaluation was undertaken following the Chartered Institute for Archaeologists *Standard and guidance for archaeological field excavation* (2014a), and in accordance with the Wessex Fieldwork Recording Manual (2015).

2.1.2 The fieldwork programme was followed by an assessment of the data as set out in the aforementioned standards (CIfA 2014a), as well as the guidelines from Historic England (MoRPHE 2015) and the *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b).

2.2 The Archaeological Excavation

2.2.1 The excavation at Area 13 comprised the strip, map and sample of an area measuring 23m in length by 14.5m in width, situated in Field L1(e), in the north eastern part of the proposed development area, encompassing an area of 369m^2 (Figure 2). Area 13, with the other defined areas, had been identified for archaeological excavation based on the results of previous geophysical survey and trial trench evaluation. Trench 2282 in Area 13 contained burnt mound material that recorded a C14 date 2200-1985 cal. BC (at 95.4% probability) (Headland 2018).

2.2.2 The general aims of these investigations were:

- *to ensure the adequate recording of any archaeological remains revealed by the strip map and sample work;*
- *to identify, investigate and record the character, nature, extent and relationships of the archaeological remains discovered, to the extent possible by the methods put forward in the specification;*
- *to determine (so far as possible) the stratigraphic sequence and dating of the deposits or features identified;*
- *to integrate the results of the work into the wider historic and archaeological context of the landscape and to address relevant regional research objectives where applicable and so far as is possible;*
- *to disseminate the results through deposition of an ordered archive at the suitable repositories for both physical and digital material, the deposition of a detailed report at the Historic Environment Record (HER)*

and publication at a level of detail appropriate to the significance of the results;

- *to undertake the works in such a way as to allow sufficient data to be gathered to address the various research objectives outlined below. This includes the investigation and recording of features, the identification, recording and collection of artefacts and ecofacts (including environmental samples) and the use of appropriate analytical methodologies / techniques when examining the record / artefacts.*

And specifically, to address archaeological research objectives posed by the Research Framework for the Archaeology of Wales (CIfA Cymru/Wales 2017). The research objectives identified in the technical update to the WSI (Hounsell 2016) were as follows:

- Confirmation of the date, nature, character and extent of potential medieval and prehistoric sites in an order that can be placed into the wider context of Anglesey during these periods. There is particular emphasis on obtaining accurate C14 dates in order that the chronology of sites and ceramic sequences can ascertained.
- To undertake detailed analysis of (early) medieval artefacts and their contexts in order to understand the chronological and typographic development, and use, of the artefacts.
- The setting of the information gained from archaeological investigation into a broader regional and national (including Britain and Ireland) context.
- Gaining insight into the chronology and process of Christian conversion and the broader impact of this on the landscape of (early) medieval society in Wales.
- Identifying, in so far as is possible, the settlement and ecclesiastical sites associated with cemetery sites in order to understand the interrelationships between settlement sites, parish catchment areas and cemetery catchment areas.
- Gaining insights into the local farming economy and the wider exploitation of the natural environment – with particular reference to the exploitation of lakes and bogs (such as the adjacent SSSI site) and the sea.
- Gaining insights into regional, national and international trade (via the analysis of recovered artefacts) especially in such products as pottery, glass and metalwork, and how the development of social networks fitted into this.

- Establishing the extent of continuity or discontinuity between the late Roman and Early Medieval periods via analysis of environmental evidence (RO6), the agricultural economy (RO6), artefacts recovered (RO2), changes in settlement patterns and trade (RO7).
- Understanding how the transition between the Late Roman and Early Medieval period on Anglesey (RO10) compares with the same period elsewhere in Wales and Britain.
- Understanding what, if any, impact Irish and Scandinavian populations had on (early) medieval Wales (artefacts, agricultural economy, etc).
- Gaining insights into social organisation and settlement hierarchies.
- Identifying and understanding early field systems.
- Develop our understanding of known, but poorly understood, monument types - such as burnt mounds.
- Develop a better understanding of industrial activity during the prehistoric periods, particularly with reference to stone quarrying and stone / ore resource use in coastal regions and the exploitation of superficial deposits of stone and ore. It is notable that two large, stone, outcrops are present within field L01 and there is some evidence that these have been quarried in the past.

2.2.3 Deposits considered not to be archaeologically significant were removed by a 360˚ tracked mechanical excavator with a toothless ditching bucket, under close archaeological supervision. The area was subsequently cleaned by hand. All possible features were inspected, and selected deposits were excavated by hand to retrieve artefactual material and environmental samples. Once completed all features were recorded according to the Wessex standard procedure as set out in the Fieldwork Recording Manual (Wessex Archaeology 2015).

2.2.4 On completion the excavated area was reinstated by replacing the excavated material in the reverse sequence of which it was removed. Topsoil and subsoil were excavated and stored separately to prevent mixing.

2.2.5 All finds encountered were retained on site and returned to WA Carlisle office where they were identified, quantified and dated to period. A *terminus post quem* was then produced for each stratified context under the supervision of the WA Finds Officer, and the dates were used to help determine the broad date phases for the site. On completion of this project, the finds were cleaned and packaged according to standard guidelines (Watkinson and Neal 2001). Please note, the following categories of material will be discarded after a period of six months following the submission of this

report, unless there is a specific request to retain them (and subject to the collection policy of the relevant depository):

- unstratified material;
- modern pottery;
- and material that has been assessed as having no obvious grounds for retention.

2.2.6 In this report, the work is primarily summarised by investigation for clarity but related features and remains are linked throughout. Where contexts could be identified between the investigations they have been done so and the evaluation contexts are integrated into the excavation phased narrative where applicable.

2.2.7 Within the defined Periods (see below) broad phasing has been ascribed to the features, deposits and structures encountered during the investigations, and the results are presented below in chronological order. The Periods used are derived from those identified in the Research Framework for the Archaeology of Wales (CIfA Cymru/Wales 2017) and are consistent throughout the different Areas of work, but within these the Phases may not be directly compatible. The dating and phasing is provisional as is appropriate for an assessment of the site and may be refined in the light of evidence produced from detailed analysis of the dataset. It is also noted that imposing rigidly defined periods on a continuous process is somewhat of a contrivance but is done so for simplicity.

- Period 0 Natural Drift Geology
- Period 1 Palaeolithic and Mesolithic 250 000 – 4000 BC
- Period 2 Neolithic and Early Bronze Age 4000 – 1500 BC
- Period 3 Late Bronze Age and Iron Age 1500 BC – AD 43
- Period 4 Roman AD 43 - 410
- Period 5 Early Medieval AD 410 – 1100
- Period 6 Medieval AD 1100 - 1539
- Period 7 Post-medieval AD 1539 - 1750
- Period 8 Industrial and Modern AD 1750 – present
- Undated

3 SITE ARCHIVE

3.1.1 A full professional archive has been compiled in accordance with the project specification, and the Archaeological Archives Forum recommendations (Brown 2011). The paper archive and digital data, including photographs, will be lodged with the Royal Commission on Ancient and Historical Monuments of Wales (RCAHMW) in Aberystwyth on completion of the project. The archive can be accessed under the unique project identifier WA19/CL12283/Area 13/35-2016.

3.1.2 The Site Archive comprises the material and documentary archives as follows (Table 2.1).

Table 3.1 Quantification of excavation data

Category	Quantification
Contexts	13
Small finds	0
Bulk finds (worked stone)	5.19kg
Environmental samples	3 samples, 120L
Monochrome film	0
Digital photographs	36
Rectified photographs	0
GPS surveyed digital pre-excavation plans	Yes
GPS surveyed digital excavation plans	Yes
TST surveyed digital excavation plans	No
Hand drawn plans	0
Hand drawn sections	3

4 BACKGROUND

4.1 Location and Geological Context

4.1.1 The proposed development site is located on the north Anglesey coast approximately 2 km west of the village of Cemaes. The nearest village is Tregele, approximately 1 km to the south-east.

4.1.2 Area 13 is located at (NGR: SH 36040 93870; Figure 1) in Field L1(e) in the northeastern part of the proposed development area. It is situated on the coast and small cliffs drop away to the immediate north into Cemaes Bay. An existing nuclear power station, built in the 1960s, lies *c.* 650m to the west. The Tre'r Gof wetland, a Site of Special Scientific Interest (SSSI) lies immediately to the south of, and within the southern limit of Field L1. The area of investigation lies at a height of *c.* 15m aOD (above Ordnance Datum) with the ground sloping down gently to the northeast.

4.1.3 Area 13 is approximately 369 m^2 in size and is roughly rectangular in shape (Figure 2). At the time of excavation, the site comprised improved agricultural land characterised primarily by unenclosed grazing.

4.1.4 The underlying solid geology within the area of investigation is mapped as schist of the Gwna Group formed during the Ediacaran and Cambrian periods between 635 and 508 million years ago. No overlying superficial deposits were recorded in this area (BGS 2019). The natural substrate observed during the current phase of works comprised yellowish-grey sandy clay with gravels and pebbles, and outcrops of bedrock, which is consistent with the mapped geologies above.

4.2 Historical and Archaeological Background

4.2.1 An archaeological baseline assessment was produced to assess the known historical and archaeological background of the site and the surrounding landscape to a distance of 6km (GAT 2012b). It is not intended to repeat that information here and what follows is a brief overview, for further details please refer to the original document.

4.2.2 ***Period 1 - Palaeolithic and Mesolithic (25 000 – 4000 BC):*** There is no known Palaeolithic or Mesolithic activity within Area 13. The earliest known activity on Anglesey is in the form of Mesolithic flint scatters located close to the coast, south of the proposed development area (GAT 2012b).

4.2.3 ***Period 2 – Neolithic and Early Bronze Age (4000 – 1500 BC):*** Across Anglesey, remains of this date are seen to include megalithic and ceremonial sites, funerary sites, artefact

scatters and find spots, with limited amount of settlement evidence from postholes and pits.

4.2.4 Changes and transitions occurred during the prehistoric period, including in burial rites from communal practices to individual burials, as evidenced by urn burials containing cremated remains and inhumations within cists.

4.2.5 Few Bronze Age settlements have been identified on Anglesey. A number of the undated enclosures on Anglesey may date to the late prehistoric period, such as the cropmark feature found to the north of Llanfechell, located 1.4km southeast of the Wylfa Newydd Development Area.

4.2.6 Burnt mounds dating to the Bronze Age (*c.* 2600-700 BC) are also common throughout Anglesey and North Wales (GAT 2012b). These are typically located near to, or alongside watercourses either in groups or individually (*ibid.*). Burnt mounds are found at Carrog (PRN 27515) located nearly 2km to the east of the proposed development site, and east of Penciw (PRN 3565) located nearly 6km to the east of the proposed development site *(ibid*). The evaluation phase also identified a burnt mound deposit in the northwest corner of Field L1, material from which produced a radiocarbon date of Bronze Age origin, the reason for the excavation at Area 13.

4.2.7 Prehistoric remains have also been identified during the evaluation phase in other parts of the site. these include a late Neolithic burnt mound in Field C16, concentrations of pits and post holes in Field K5, a number of burnt mound deposits in K4, a possible focus of settlement in Fields L3 and L8 and a further dense concentration of burnt mounds and other prehistoric activity in Zones A and O (Headland 2018).

4.2.8 ***Period 3 – Late Bronze Age and Iron Age (1500 BC – AD 43):*** There is no previously known Late Bronze Age and Iron Age activity within Area 13.

4.2.9 Evidence for activity of this period on Anglesey comes from hillforts, small enclosed settlement sites (roundhouses, fields etc), and finds including hoards, but very little funerary evidence (GAT 2012b, Cuttler *et al.* 2012). Hillforts and related fortifications continue from the latter part of the Bronze Age into the Iron Age (*c.*800 BC-43 AD). One of the largest promontory forts on the island at Dinas Gynfor is located almost 3km northeast of the Wylfa Newydd Development Area.

4.2.10 Evidence of small enclosed settlement sites, consisting of a single or a cluster of roundhouses, hut sites, rectilinear enclosures and concentric enclosures which are

sometimes palisaded are also located around Anglesey (Cuttler *et al.* 2012). These likely date to the late Iron Age and Romano-British (43-410) periods (*ibid.*). Examples of known sites include farmsteads found at Cefn Du, Cefn Cwmwd and Melin y Plas which was discovered during the A55 archaeological works (*ibid.*).

4.2.11 The archaeological evaluation trenches in Fields L8 and L12 uncovered significant prehistoric activity, in the form of a hilltop ring ditch (Wessex 2016).

4.2.12 ***Period 4 – Roman (AD 43 – 410):*** There is no known Roman activity within Area 13. Anglesey was invaded in *c* .AD 60-61 by the Roman army and there is evidence of settlement sites, ephemeral military establishments (Jacobs 2015), scatters of Roman artefacts and Romano-British enclosure sites in Anglesey. The features encountered during the present excavation works in other areas of the development site, found to have been in existence in the Later Iron Age appear to have continued into the Early Roman period, e.g. in Fields F1, E3 and O5.

4.2.13 ***Period 5 - Early Medieval (AD 410 – 1100):*** There is no previously known Early Medieval activity within Area 13, although an Early medieval cemetery has been excavated 200m to the west, within Area 15 (Headland 2018, 15-18). Some traces of Early medieval settlement activity have also been recorded closer still, within Area 12.

4.2.14 Evidence of early medieval settlement in Anglesey is largely based on references made in documentary sources (Headland 2018), which suggest a pattern of disparate farming sites located close to small ecclesiastical complexes across the island (*ibid*).

4.2.15 Archaeological excavations have established that there is often a spatial relationship between early medieval settlement sites and cemetery site locations on Anglesey (Jacobs 2015) and it is thought that the use of long cist burials is consistent with the wider Welsh Christian burial practices of the 8th to 9th centuries (*ibid*).

4.2.16 Other evidence includes occasional findspots include inscribed stones and a rare small fortified site at Porth Wen may have related to Viking raids of the 9th century.

4.2.17 ***Period 6 - Medieval (1100 – 1539):*** By the 12th century, Area 13 was located within the *Talybolion commote* (a recognised regional unit of royal administration) with a royal manorial centre located at Cemaes (GAT 2012b).

4.2.18 The Talybolion commote was subsequently sub-divided into a number of smaller administrative centres called '*trefi*' (Jacobs 2015) which included: the ecclesiastical parishes of Llanfechell and Llanbadrig; the townships of Cemaes, Clegyrog, Llanfechell

and Caerdegog; and the hamlet settlements of Cafnan, Tre'r Gof, Gwaunydog and Llanddygfael (*ibid*).

4.2.19 Documentary sources indicate that the pattern of medieval settlement on Anglesey during this period was characterised by largely unequal settlements with discrete areas of nucleation (Jacobs 2015). This pattern influenced later post-medieval and early-modern patterns and can be seen as agricultural land with intermittent farmsteads, small hamlets, and villages (*ibid*).

4.2.20 Archaeological evidence indicates that the practice of open-field farming, narrow strips of arable pasture within large unenclosed fields located close to settlements, was common and there is evidence of ridge-and-furrow, associated land clearance cairns, terraces, field boundaries, open fields, pens and small enclosures with examples seen in a survey of the Mynachdy Estate and at Cafnan (Jacobs 2015).

4.2.21 The medieval landscape also contained agricultural buildings, domestic dwellings, mills and other structures though none are known to survive as complete upstanding remains. Only ecclesiastical elements show such survival on Anglesey. The distribution of medieval churches and settlement sites varies to include churches situated at the centre of each village or hamlet, and churches on the periphery of known settlement sites.

4.2.22 South and east of Area 13 evaluation trenches and excavations in fields L2 (Area 17) and L4 (Area 1) revealed the presence of several ditches which corresponded to surveyed geophysical anomalies and others which were previously unknown. The dates and relationships are uncertain, those within Area 17 are thought to be medieval, but they form functional boundaries within the landscape.

4.2.23 ***Period 7 - Post-medieval (1539 – 1750):*** During the 17th and 18th centuries, Cemaes and Cemlyn Bay became principle centres of shipbuilding, fishing and later brickmaking and copper mining (*ibid*).

4.2.24 Although the rural landscape established during the medieval period continued into the post-medieval period there were fewer landowners, controlling larger areas of land and there were changes towards a more 'estate' systems with additional in houses and farmsteads established.

4.2.25 ***Period 8 – Industrial and Modern (AD 1750 – present):*** In the 19th century small-scale gentrification of the countryside continued with larger country houses and farmhouses being constructed or the existing ones being remodelled.

4.2.26 Agricultural land saw improvements to increase productivity during the post-medieval period such as draining of bog-land and changes to farming techniques, ploughing, manuring, enrichment, drainage, stock breeds and crop choices. The late 18th to 19th century land improvements are likely to have removed any remains of earlier surface and buried near surface features, though fairly deep soils may have protected features cut into the substrata.

4.2.27 The recorded remains of post medieval field boundary systems are only part of the preserved landscape. For example, documented and existing boundaries may have been in place much earlier and subsequently denuded and buried, while newer ones added to extend areas of ownership or use.

4.2.28 The archaeological evaluations (Headland 2018, Wessex 2016) have demonstrated that this is not the complete picture and that there is a more complex landscape spanning the medieval to post medieval periods on Anglesey. Upstanding elements that can survive include clawdd (plural cloddiau) which can refer to a ditch or bank, and frequently appears in place-names. Within northwest Wales, the term is usually used to describe an earthen bank, often stone-faced. An unusual feature of stoneclad cloddiau is that the facing stones are commonly laid with their long axis vertical (DSWA 2013).

4.2.29 With the rise of the Industrial Revolution, the amount of industrial activity, such as mining, quarrying and brickmaking on Anglesey dramatically increased from the late 18th century onwards but declined in the early 20th century.

4.2.30 Population varied during this period with associated fluctuations in buildings such as new / remodelled wealthy dwellings, and more functional and modest ones becoming more common. This can be particularly identified for wartime accommodation and the more recent Power Station construction.

4.2.31 Consent was granted in 1961, for the Central Electricity Generating Board (CEGB) to build the existing Power Station and in 1963 work began on the construction of the two Magnox reactors (*ibid*). The construction of the two Magnox reactors and the Power Station was a massive undertaking, involving excavations at 13m below the existing ground level. This work took place between 1963 and 1972, when the power station was officially commissioned (*ibid*).

4.3 Previous Work

4.3.1 ***Documentary Research:*** An archaeological desk-based assessment was originally prepared in 2012 by Gwynedd Archaeological Trust (GAT 2012b), which set out the archaeological and historical background of the site and provided an assessment of the significance of all known and potential heritage assets up to 6km from the area of investigation to support the site preparation and clearance phase of works. An updated desk-based cultural baseline assessment was prepared by Jacobs (2015) to support the DCO application.

4.3.2 The Desk-Based Assessment (GAT 2012b) noted that the linear features identified by the geophysical survey (see below) matched field boundaries marked on first edition Ordnance Survey (OS) mapping onwards. It concluded that the area may contain 'background agricultural features' such as field boundaries and ditches.

4.3.3 ***Geophysical Survey:*** The surveys (ASWYAS 2015; GAT 2011a 2011b and 2012a) revealed only possible field boundary features corelating with boundaries marked on historic OS mapping within Area 13.

4.3.4 ***Archaeological Evaluation:*** Evaluation trial trenching took place in 2017 (Headland 2018) where a total of 84 trenches were excavated in Field L1. One northeast to southwest orientated trench, 2282, contained burnt mound material. A sample from the burnt mound material returned a C14 date of 2200-1985 cal. BC (at 95.4% probability) (Headland 2018).

5 ARCHAEOLOGICAL EXCAVATION RESULTS

5.1 Introduction

5.1.1 The excavation of Area 13 was begun on the 10th August 2017 in Field L1(e) of the proposed development site (Figure 3). The excavation was designed to target a possible Bronze Age burnt mound, suggested from burnt material encountered during the evaluation trial trenching as specified in the Methodology (Section 2). A full description of contexts is given in Appendix 1.

5.1.2 Results are detailed below, deposit numbers are given in **(parenthesis)**, cut numbers are given in **[square brackets],** and structure numbers are given in **{braces}**.

5.2 Results

5.2.1 ***Period 0 Natural***

5.2.2 The area of excavation measured 23m in length and 14.50m in width to a maximum depth of 0.66m. The geological substrate **(13003)**, consisted of yellowish-grey, sandy clay with occasional gravels and pebbles, and was overlain by a 0.42m thick subsoil of mid brownish-orange, loam with occasional gravels and pebbles **(13002)**. The site was sealed by a 0.24m thick topsoil **(13001)**, comprised of mid brown, loam with occasional gravels and pebbles. Four worked stones were recovered from the topsoil, **(13001)**, two of which were a large flat rubber stone for use in a saddle quern and a possible whetstone that could date from the late prehistoric to Roman period. Three features were found to have been natural hollows which were utilised during the prehistoric period (**[13004]**, **[13006=13008]**, and **[13010];** see below).

5.2.3 ***Period 2: Neolithic and Early Bronze Age***

5.2.4 **Phase 1**: A total of three discrete features were investigated and their origins were determined to be natural **[13004]**, **[13006=13008]**, and **[13010]**. The largest of these features **[13006=13008]**, had previously been identified as a potential burnt mound deposit during the archaeological evaluation phase and was the reason for excavating Area 13 (Figure 3). Natural hollow **[13006=13008]** (PRN91976) (measured 3.50m long, 1.45m wide, and 0.51m deep, and was elongated and angular in plan with moderate concave sides and a flat to irregular base (Figure 4; Plates 1 and 2). This hollow **[13006=13008]** was filled by a single layer of burnt material **(13007=13009)**, consisting of dark brownish-black, loamy sand with common sub-angular stones, infrequent heat affected stone, and charcoal flecks which produced an Early Bronze Age C14 date (see

6.5).

5.2.5 Two possible worked stones were recovered from layer **(13007)**, one of which was later determined to demonstrate natural wear, the other showing signs of use as a rubbing or polishing stone (*confer* 5.2.2). Heated stone and possible fired clay were also recovered from layer **(13007),** suggestive of significant levels of heat and/or burning occurring in the vicinity. Environmental samples were taken from layers **(13007)** and **(13009)** contained moderate quantities of charcoal with a Bronze Age origin. Both artefactual and ecofactual remains from layers **(13007=13009)** are indicative of burnt mound-type activity or waste deposition, tentatively associated with the Bronze Age period.

5.2.6 At a distance of 0.10m to the east of burnt mound **(13006=13008)** (Figure 3), was a second smaller natural hollow, **[13010]**, PRN91977, measuring 1.35m long, 1.22m wide, 0.31m deep. This was roughly triangular in plan with moderate concave sides and a flat base (Figure 4; Plate 3). At the base of hollow **[13010]** was a natural layer **(13013)**, comprising yellowish-orange, sand, which was overlaid by a maximum 1.15m wide and 0.31m thick layer of burnt material, **(13011)** consisting of dark brownish-black, sandy silt with common sub-angular stones. On the east side of the feature, burnt material **(13011)** was overlaid by a maximum 0.41m wide and 0.18m thick layer of redeposited natural **(13012)**, comprising light yellowish/orangish-grey, sandy clay with common angular stones. No finds or suitable environmental samples were recovered from this feature.

5.2.7 A third natural hollow **[13004]**, PRN91978, was present 0.80m northeast of burnt mound **(13006=13008)** (Figure 3). Hollow **[13004]** measured 3.39m long, 0.70m wide, and 0.40m deep, and was irregular in plan with shallow concave sides and irregular base (Figure 4; Plate 4). Unlike the other features, hollow **[13004]** contained a single secondary fill **(13005)** comprising loose, flat stones with light black sand, indicative of natural weathering of the hollow. No finds were recovered from this feature, but an environmental sample was taken from fill **(13005)**. The sample indicated that the fill contained a good amount of well-preserved charcoal, further demonstrating burning activity occurring within Area 13.

6 FINDS ASSESSMENT

6.1 Introduction and Methodology

6.1.1 A total of six artefacts, weighing 5,190g, were recovered from the archaeological investigation at Area 13. The finds assemblage comprised stone which were in moderate condition.

6.1.2 All finds were dealt with according to the recommendations made by Watkinson and Neal (2001) and to the Chartered Institute for Archaeologists (CIfA) guidance (CIfA 2014b). All artefacts have been boxed according to material type and conforming to the deposition guidelines recommended by Brown (2011), EAC (2014) and Oriel Ynys Môn.

6.1.3 The material archive has been assessed for its local, regional and national potential in line with the archaeological research framework for Wales (CIfA Cymru/Wales 2017). Quantification of finds by material and context is given in Table 1; quantification of artefacts recovered from the environmental samples is given in Table 2.

Area	Context	Material	Qty	Wgt (g)	Comments
13	13001	Stone	4	4770	Rounded rubbing stones, whetstones
13	13007	Stone	2	420	Rounded flat pebbles
TOTAL			**6**	**5190**	

Table 1: Quantification of Bulk finds by Context and Material

6.2 Stone

6.2.1 The bulk finds recovered from the excavations at Area 13 comprised stone from two contexts. Two stones from context **(13007)** were very hard flat rounded stones; one was very irregular and probably naturally worn, while the other was a very regular flat circular shape and may have been used as a rubbing or polishing stone.

6.2.2 The four stones recovered from context **(13001)**, the topsoil, comprised a large flat rubber stone for a saddle quern measuring 240mm x 200mm x 40mm, two smaller rubbing or polishing stones measuring 110 x 100 x 35mm and 115 x 80 x 25mm and an elongated pebble measuring 105 x 55 x 15mm, slightly flattened at one end and displaying wear consistent with use as a whetstone. Objects of similar design and dimensions, including whetstones, quern fragments and rubbers, were recovered from roundhouse structures S1 and S2 during the A55 road building scheme (Smith 2012, 161-164) and were given a late prehistoric to Roman date. Both of these structures were located at the eastern end of the cable route corridor, at Cefu Dn. Comparison with these objects has been made due to similarities in their appearance,

measurements and materials.

6.3 Finds from Environmental Samples

6.3.1 While they need to be considered alongside the bulk finds assemblage, a separate data set is appropriate for the finds from environmental samples, as it represents a separate recovery and quantification strategy for the retrieval of finds. A total weight of 56g of artefactual material were recovered from two environmental samples (Table 2).

Context	Sample	Material	Wgt (g)	Comments
13007	13002	Fired Clay	12	Abraded
13007	13002	Heated stone	35	-
13009	13003	Fired Clay	6	Abraded
13009	13003	Flint	3	-
Total			**56**	

Table 2: Finds from Environmental Samples

6.3.2 Both samples were taken from the burnt mound with the material recovered attributed to the processes involved with the heating associated with burnt mound activity i.e. burning, in particular, the fired clay and the heat-affected stone. A single piece of flint was also recovered.

6.4 Statement of Potential

6.4.1 Should the project proceed to publication, further analysis may be warranted on the worked stone, including illustration and comparative research, which would include the other archaeological sites at Wylfa and other sites in the vicinity. No further work is warranted on the finds recovered from environmental samples.

7 PALAEOENVIRONMENTAL ASSESSMENT

7.1 Introduction

7.1.1 Three bulk samples were taken during the excavation on Area 13 A total weight of 135kg (83l) of sediment was processed for this stage of works. Further details for each sample can be found in Table 7.1.

7.1.2 This environmental assessment was undertaken by Freddie Sisson.

7.2 Methodology

7.2.1 This report presents the results of the assessment of the environmental samples, palaeobotanical and charcoal remains in accordance with Campbell et al. (2011) and English Heritage (2008). The assessment will establish the significance of the material and will only provide identifications where it was practicable to do so, such as, small quantities of plant material or charcoal identifications where radiocarbon determinations are sought. The report will focus on the preservational qualities and note the potential of the material to warrant analysis.

7.2.2 The bulk environmental samples were processed at Wardell Armstrong LLP. The colour, lithology, weight and volume of each sample was recorded using standard Wardell Armstrong pro forma recording sheets. cf. Table 7.1 The samples were processed with 500-micron retention and flotation meshes using the Siraf method of flotation (Williams 1973). Once dried, the residues from the retention mesh were sieved to 4mm and the artefacts and ecofacts removed from the larger fraction and forwarded to the finds department. The smaller fraction was scanned with a magnet for microslags such as hammerscales. This fraction was then examined for smaller artefacts such as beads. Once fully sorted, and all relevant material removed, the retent residues were discarded.

7.2.3 The flot plant macrofossils and charcoal were retained and scanned using a stereo microscope (up to x45 magnification). Any non-palaeobotanical finds were noted on the flot pro forma, cf. Table 7.2. Once fully sorted and all relevant material removed the flots were discarded.

7.2.4 The four common palaeoenvironmental materials (namely plant remains, charcoal, shell and bone), along with magnetic matter, will be listed within the results section and where none were present this will be stated.

7.2.5 In the absence of single growth entities such as charred plant remains and hazel nutshell fragments charcoal will be utilised for radiocarbon determinations. Charcoal was only identified to species to select the shortest-lived species for radiocarbon determination once the report author had determined what they would like dated. Where no short-lived species were observed the youngest i.e. twig, branch or periderm fragments from longer-lived species were selected. Once this was achieved no further identification was undertaken. Identification was undertaken using Hather

(2000), Schweingruber (1982) and the author's own reference collection. Nomenclature followed Stace (2010).

7.2.6 Methodology employed for the treatment of the samples is fully expanded upon in the Wardell Armstrong LLP Technical Manual No 2. (2018) and determined by Wardell Armstrong (2019).

7.3 Results

7.3.1 Sandy silt dominated the samples' sediment matrix with lesser quantities of sandy/silty clay sediments, further data can be observed in Table 7.1

7.3.2 Flot and finds data is presented in Table 7.2.

7.3.3 Artefactual material recovered from the dried residues were minimal but contained examples of fired clay, flint, industrial waste and worked stone.

7.3.4 CPR: No charred plant remains (CPR) were recovered from Area 13.

7.3.5 CHARCOAL: Charcoal was present in all three samples and was in a relatively good state of preservation. **(13005) <13001>** from **[13004]** and **(13009) <13003>** from **[13008]** were both taken from the fill of natural features. Whilst **(13007) <13002>** was taken from the fill of unknown feature **[13006]**. The identifiable fragments of charcoal were seen to be willow/poplar (*Salix*/*populus)*.

7.3.6 SHELL: There was no shell recovered from Area 13.

7.3.7 BONE: No bone was recovered from the Area 13 samples.

7.3.8 MAGNETIC MATTER: Magnetised material was present in two samples with both assemblages weighing less than 1g. These were examined for microslags under a microscope (x45 magnification), the material was found to be entirely made up of small naturally occurring stone.

7.4 Discussion

7.4.1 Due to the location the ecofactual assemblage was recovered from nothing meaningful can be said about the features themselves except that they appear to have been rubbish dumps for the areas of occupation. Samples **<13001>** and **<13003>** are extremely limited in their use for archaeological significance due to being taken from natural features and were likely to be rubbish deposits.

7.4.2 The charcoal has been identified as willow/poplar and can be seen across other Wylfa sites in the charcoal remains and seems to be a regularly managed source of fuel across the area.

7.5 Statement of potential and recommendations

7.5.1 Due to the nature of the features from which the ecofacts were recovered, despite the good size of the assemblages, they offer little further potential to inform about human activity at Area 13. They may however offer further insight into fuel practices when put into a wider context, therefore further work is recommended.

7.5.2 *Radiocarbon suitability*: material from samples listed in 7.3.4 and 7.3.5 may be suitable for radiocarbon determination. It must be stated that if a radiocarbon determination is sought from charcoal then the fragment must be identified to species prior to submission to select the shorter lived species to mitigate against the potential 'old wood effect' that may present a radiocarbon age far older than the feature.

7.5.3 If there is charcoal present within a context listed in Tables 7.2 but not stated within sections 7.3.4 or 7.3.5 these can undergo further assessment to gauge their suitability for submission.

7.5.4 Care must be employed for selection as this must also be based on the suitability of the feature, for example, a tertiary pit fill or secondary fill of gully would be unlikely to provide a usable date for the feature.

7.5.5 *Retention and discard*: The charcoal should be retained until initial radiocarbon dates have been obtained.

7.5.6 The magnetic matter from all samples may be discarded as it offers no further potential.

7.6 Acknowledgments

7.6.1 Freddie Sisson supervised the environmental team who consisted of Megan Lowrie, Katherine Bostock and Jyoti Stuart.

Table 7.1 Sample Information

C	<>	TQ	Cut	Desc	Matrix	PW	PV	SW	SV
13005	13001	4	13004	secondary fill of natural feature	sandy silt	20	14	10838	9000
13007	13002	4	13006	fill of cut unknown feature	sandy silt	92	40	43357	32120
13009	13003	4	13008	fill of natural feature	silty clay	23	14	9955	7600

Key: C=context; <>=sample number; TQ=tub quantity; Cut=cut number of feature; Desc=description of context; Matrix=sediment matrix processed; PW=processed weight (kg); PV=processed volume(l); SW=sorted weight(g); SV=sorted volume(ml)

Table 7.2 Flot and Finds information

		Flots			Retent					
C	<>	WF	VF	Ch	Ch	FC	Fl	IW	MM	WS
13005	13001	50.4	200	-	25	-	-	-	<1	-
13007	13002	44.4	100	48.89	34	47	-	46	<1	-
13009	13003	53.8	150	-	18	6	1	71	-	12

Key: C=context; <>=sample number; WF=weight of flot(g); VF=volume of flot(ml); Ch=charcoal(g); FC=fired clay(g); Fl=count of flint flakes; IW=industrial waste(g); MM=magnetised material(g); WS=worked stone(g)

8 RADIOCARBON DATING

8.1.1 One charcoal sample was submitted to Beta Analytic for radiocarbon determination.

8.1.2 The sample was treated according to Beta Analytics methodology (Beta Radiocarbon Dating unpub.). The production of the radiocarbon age followed Riemer et al. (2013) and was calibrated to the calendar timescale following Bronk Ramsey (2009).

8.1.3 A sample of willow/poplar (*Salix*/*populus*) charcoal from **<13003>** of fill **(13009)** of natural feature **[13008]** provided a radiocarbon age of 3760±30 BP (Beta-554953, 95.4% probability 2287-2043 calBC) cf. Table 5.

Table 5: radiocarbon results

Lab code	Sample id	CD	Material submitted	Radiocarbon age BP	1σ 68.2%	Relative Probability	2σ 95.4%	Relative Probability
Beta-554953	A13_(13009)_<13003>	Natural feature [13008]	willow/poplar charcoal	3760 ±30	2208-2160calBC	61%	2287-2124calBC	83.1%
					2273-2258 calBC	7.2%	2091-2043 calBC	12.3%

9 CONCLUSIONS

9.1 Interpretation

9.1.1 An archaeological excavation occurred at Area 13 in Field L1(e), within the wider proposed development site of a new nuclear power station at Wylfa Newydd, Anglesey. Area 13 was one of multiple targeted areas of investigation and covered an area of 369m^2 of the proposed 407.23ha development area.

9.1.2 The purpose of the excavation was to investigate the remains of burnt mound material identified during previous archaeological works at the site in advance of development of a nuclear power station and to establish the how the archaeological remains can expand on our understanding of the archaeology of the Isle of Anglesey regarding the regional research framework of Wales (CIfA Cymru/Wales 2017). The site was excavated down to the top of the natural substrate.

9.1.3 Archaeological evidence was identified continuing beyond the previous evaluation trial trench (TR2282), which had encountered the possible remains of a burnt mound deposit. The archaeological evidence revealed during the excavation phase was concentrated in the northern half of the site, and comprised deposits revealed within the exposed natural geology. The location, away from any obvious fresh water source, suggests that any burning activity did not derive from a typical burnt mound, but could represent atypical use, such as salt panning. The sheltered coastal location may also be a factor. It is possible that these deposits represented rubbish deposition relating to outlying settlement activity, or a dump of used burnt mound stone and a cache of stones ready for heating. The data recovered indicates that the use of these hollows in Area 13 is likely to have occurred in the Bronze Age.

9.1.4 The survival of the archaeological features was moderate. Survival had been influenced by soil conditions as the deposits did not lie within features deliberately cut into the natural substrate but were found within hollows created in fissures within the natural geology. This use of a natural crevice for heating processes, analogous to a burnt mount or some other function, provides a valuable insight into the variety of prehistoric technologies and exploitation of the environment.

9.2 Significance

9.2.1 Where substantive archaeological remains have been recorded, these need to be recognised in their own right as sites forming part of Wylfa's archaeological landscape, rather than merely being part of its setting. The significance of the archaeology recorded in Area 13, however, is limited. The deposits encountered are indicative of historic land-use and could achieve research framework aims if the ecofactual material is analysed alongside other evidence retrieved from the wider project. The very small assemblage of grinding/rubbing stones from the site warrant comparison with other similar artefacts recovered during the project.

9.3 Recommendations

9.3.1 The burnt deposits warrant further analysis as they retain the potential to provide further information about fuel usage and husbandry across Anglesey and the wider North West Wales landscape.

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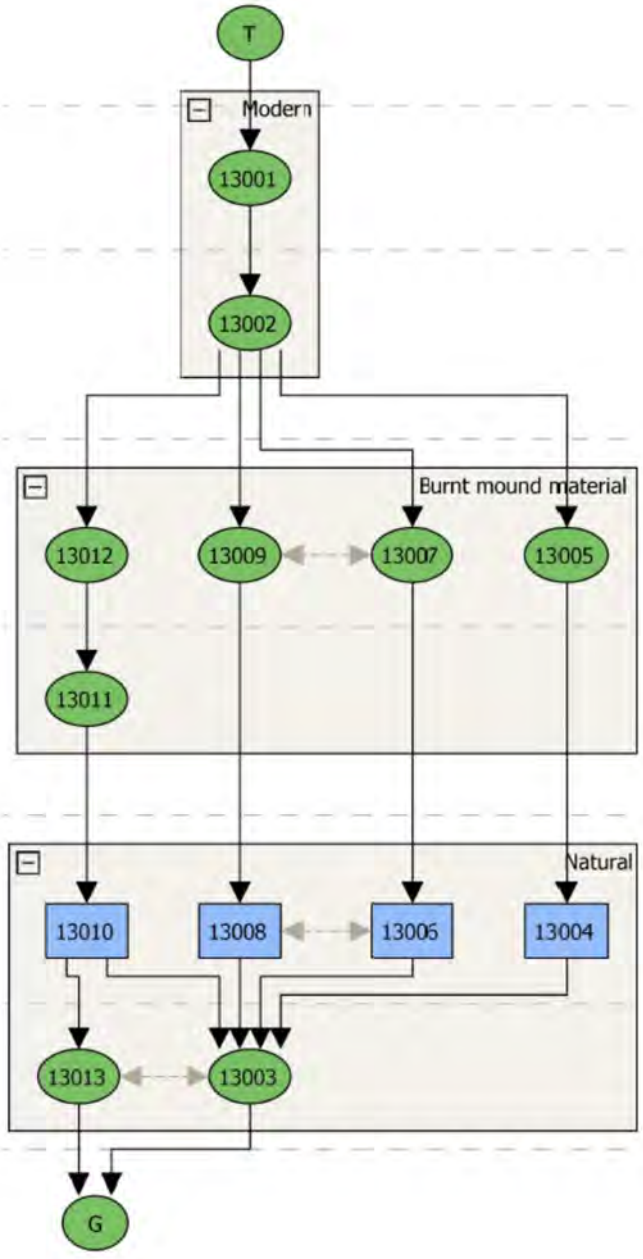
APPENDICES

APPENDIX 1: CONTEXT INDEX

Context Number	Context Type	Description	Height/Depth	Discussion
13001	Layer	Mid brown, loam with occasional gravels and pebbles	0.24 m thick	Topsoil
13002	Layer	Mid brownish-orange, loam with occasional gravels and pebbles	0.42 m thick	Subsoil
13003	Layer	Yellowish-grey, sandy clay with occasional gravels and pebbles	0.66 m BGL	Natural substrate
13004	Cut	Irregular E-W orientated cut with shallow concave sides and irregular base	3.39 m long, 0.70 m wide, 0.40 m deep	Cut of natural hollow
13005	Fill	Loose, flat stones with light black, sand	0.40 m thick	Secondary fill of natural hollow [13004]
13006	Cut	Sub-circular cut with moderate concave sides and flat base	3.50 m long, 1.45 m wide, 0.51 m deep	Cut of natural hollow – same as [13008]
13007	Layer	Dark brownish-black, loamy sand with common sub-angular stones, infrequent heat affected stone, and charcoal flecks	0.51 m thick	Layer of burnt mound within [13006]
13008	Cut	Sub-circular cut with moderate concave sides and flat base	3.50 m long, 1.45 m wide, 0.51 m deep	Cut of natural hollow – same as [13006]
13009	Layer	Dark brownish-black, loamy sand with common sub-angular stones, infrequent heat affected stone, and charcoal flecks	0.51 m thick	Layer of burnt mound within [13008]
13010	Cut	Sub-rectangular cut with moderate concave sides and flat base	1.35 m long, 1.22 m wide, 0.31 m deep	Cut of natural hollow
13011	Layer	Dark brownish-black, sandy silt with common sub-angular stones	1.15 m wide MAX 0.31 m thick MAX	Layer of burnt mound within [13010]
13012	Layer	Light yellowish/orangish-grey, sandy clay with common angular stones	0.41 m wide MAX 0.18 m thick MAX	Redeposited natural within [13010]
13013	Layer	Yellowish-orange, sand	0.31 m BGL	Natural fill of burnt mound [13010]

APPENDIX 2: HARRIS MATRIX



APPENDIX 3: PLATES

Plate 1; Post-excavation shot of feature [13006/13008], facing north with one 1m scale.

Plate 2; South facing section of feature [13006], facing north with one 1m scale.

Plate 3; South facing section of feature [13010], facing north with one 1m scale.

Plate 4; Post-excavation shot of feature [13004], facing north with one 2m scale.

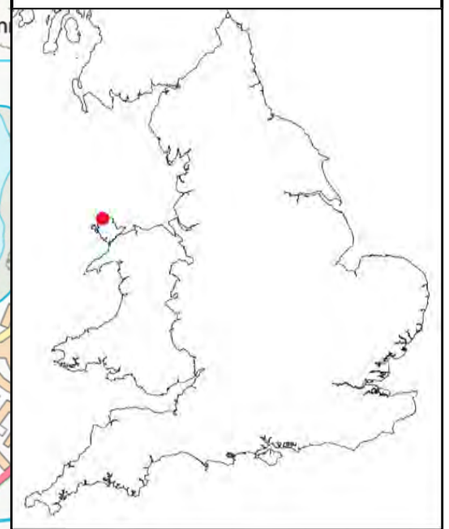
APPENDIX 4: FIGURES

DO NOT SCALE FROM THIS DRAWING

Wylfa Newydd development area

Excavation area

Hot spots



REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Horizon Nuclear Power

PROJECT

Area 13,
Wylfa Newydd, Anglesey

DRAWING TITLE

Figure 1:
Wylfa Newydd development area and excavated sites

DRG No.		REV
CL12283-1301		A
DRG SIZE	SCALE	DATE
A3	1:12,500	Feb 2020
DRAWN BY	CHECKED BY	APPROVED BY
HP	DAC	FG

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BIRMINGHAM, BOLTON, CARDIFF, EDINBURGH, GLASGOW, LEEDS, LONDON, MANCHESTER, N-U-T, STOKE ON TRENT

N:\CP\CL12283 - WYLFA POSTEX ASSESSMENT\03 - DESIGN\AUTOCAD\AREA 13\CL12283-1301-A.DWG

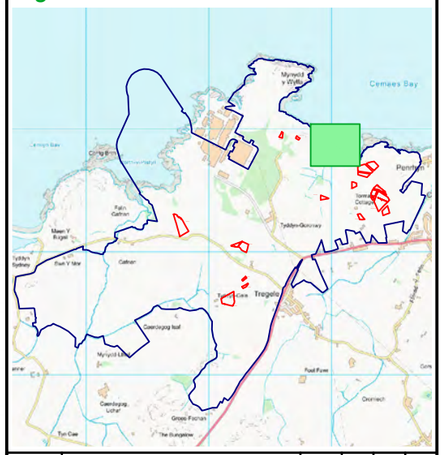
DO NOT SCALE FROM THIS DRAWING

Wylfa Newydd development area

Excavation area

Excavation areas in vicinity

Figure location:



REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Horizon Nuclear Power

PROJECT

Area 13,
Wylfa Newydd, Anglesey

DRAWING TITLE

Figure 2:
Detailed site location

DRG No.	REV
CL12283-1302	A

DRG SIZE	SCALE	DATE
A3	1:1,250	Jan 2020

DRAWN BY	CHECKED BY	APPROVED BY
HP	FG	FG

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N:\CP\CL12283 - WYLFA POSTEX ASSESSMENT\03 - DESIGN\AUTOCAD\AREA 13\CL12283-1302-A.DWG

DO NOT SCALE FROM THIS DRAWING

(13000) Context numbers

Sections shown in further figures

Limit of excavation

Excavated area

Trench location

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Horizon Nuclear Power

PROJECT

Area 13,
Wylfa Newydd, Anglesey

DRAWING TITLE

Figure 3:
Area 13; detailed plan

DRG No.	REV
CL12283-1303	A

DRG SIZE	SCALE	DATE
A3	1:100	March 2020

DRAWN BY	CHECKED BY	APPROVED BY
VT	FG	FG

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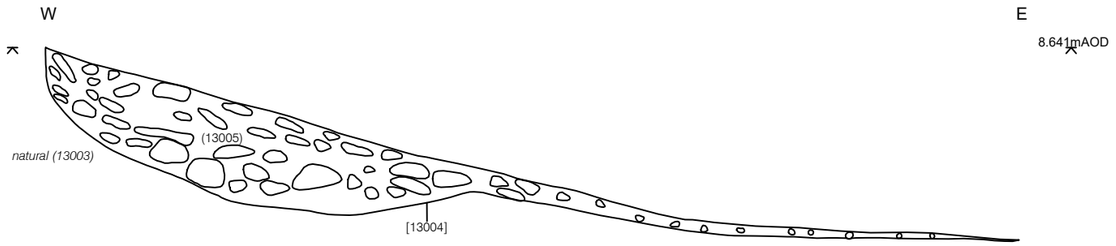
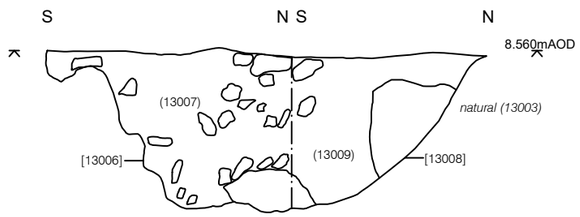
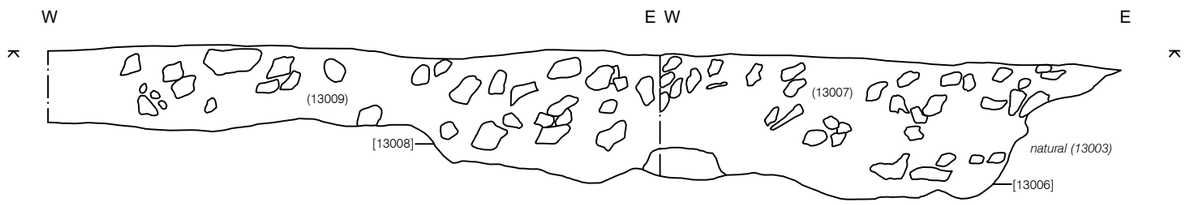


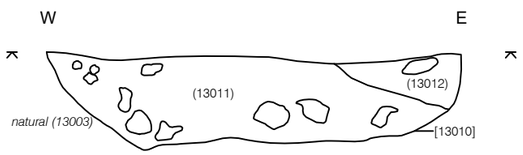
Section 13001. South facing section across feature [13004].



Section 13002A. Mirrored east facing section across feature [13006], [13008].



Section 13002B. Mirrored south facing section across feature [13006], [13008].



Section 13003. South facing section across feature [13010].

0 2m

DO NOT SCALE FROM THIS DRAWING

(13000) Context numbers

Limit of excavation

Height mAOD

Stones

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

Horizon Nuclear Power

PROJECT

Area 13,
Wylfa Newydd,
Anglesey

DRAWING TITLE

Figure 4:
Area 13; sections

DRG No.	REV
CL12283-1304	A

DRG SIZE	SCALE	DATE
A3	1:20	March 2020

DRAWN BY	CHECKED BY	APPROVED BY
VT	FG	FG

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N:\CP\CL12283 - WYLFA POSTEX ASSESSMENT\03 - DESIGN\AUTOCAD\AREA 13\CL12283-1304-A.DWG

APPENDIX 5: RADIOCARBON CERTIFICATE

BetaCal 3.21

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: d13C = -26.0 o/oo)

Laboratory number **Beta-554953**

Conventional radiocarbon age **3760 ± 30 BP**

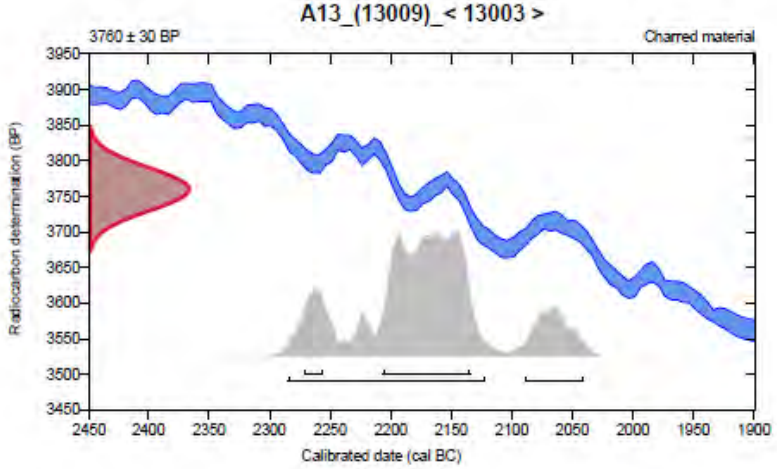
95.4% probability

(83.1%)	2287 - 2124 cal BC	(4236 - 4073 cal BP)
(12.3%)	2091 - 2043 cal BC	(4040 - 3992 cal BP)

68.2% probability

(61%)	2208 - 2136 cal BC	(4157 - 4085 cal BP)
(7.2%)	2273 - 2258 cal BC	(4222 - 4207 cal BP)

A13_(13009)_< 13003 >



Database used

INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, Radiocarbon55(4).

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

APPENDIX 6: GAZETTEER OF FEATURES ENCOUNTERED IN AREA 13

Feature	*Date*	*Description*	*Easting, northing*
Possible salt panning or rubbish deposition site	Bronze Age	Three natural hollows close to the coast found to contain burnt material, charcoal flecks returning a date in the Early Bronze Age. One whetstone, two polishing stones and a fragment of quernstone also recovered from the fill	236038,393868

APPENDIX 7: POST-EXCAVATION ASSESSMENT METHOD STATEMENT

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

HORIZON

WYLFA NEWYDD

POST EXCAVATION ASSESSMENT METHOD STATEMENT

APRIL 2019

wardell armstrong

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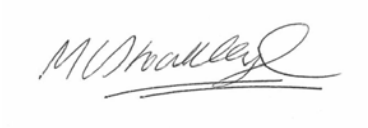
DATE ISSUED: April 2019

JOB NUMBER: **CL12271**

PREPARED BY:

Megan Stoakley — Finds and Archive Specialist



Lynne Gardiner — Senior Environmental Archaeologist

APPROVED BY:

Frank Giecco — Technical Director

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WYLFA NEWYDD POST EXCAVATION ASSESSMENT METHODOLOGY

Introduction

This document has been prepared to provide the client with an explanation of the Post Excavation Assessment (PXA) process and to provide Wardell Armstrong's own technical team, with clear guidance on undertaking the PXA for the Wylfa Newydd archaeological mitigation works. Post Excavation Assessment (PXA) is the first stage of a process of post-excavation analysis, publication and archive deposition. It provides quantification and initial assessment of the archive resulting from excavation and provides a framework to inform further investigation and publication. It is designed to ensure that Horizon Nuclear Power meet their requirements to secure discharge (by the two primary stakeholders: Gwynedd Archaeological Planning Service (GAPS) and CADW) of the early works archaeological mitigation programme at Wylfa Newydd.

It is based on the requirement described in the Written Scheme of Investigation for Trial Trenching and Excavation (2015) and Written Scheme of Investigation for Strip Map and Sample Excavation and Paleoenvironmental Assessment (2016). It is informed by the following guidance, Association of Local Government Archaeological Officers (ALGAO) Advice Note for Post-Excavation Assessment (2015), Conservation principles for the sustainable management of the historic environment in Wales CADW (2011), Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Excavation (2014) sections 3.4 to 3.6, and for human remains The British Association of Biological Anthropology and Osteoarchaeology Human Bones from Archaeological Sites. In addition, GAPS require reference to Society of Museum Archaeologists (1993), Selection, Retention and Dispersal of Archaeological Collections: Guidelines for use in England, Wales and Northern Ireland, as well as Welsh Office Circular 60/96, (1996), Planning and Historic Environment: archaeology.
This current document identifies the stages of the PXA process, then describes the broad tasks required for each stage. The document concludes with a report template containing individual sections within the PXA report and UPD.

Requirement for and Purpose of the Post Excavation Assessment

The PXA will follow a staged process of post excavation assessment detailed in Written Scheme of Investigation for Trial Trenching and Excavation (2015) and the Written Scheme of Investigation for Strip Map and Sample Excavation and Paleoenvironmental Assessment (2016).

As stated in the ALGAO *Advice Note for Post-Excavation Assessment*, "following the completion of archaeological fieldwork, it is standard practice for a post excavation assessment (PXA) to be undertaken". CIfA describe the purpose of a PXA as a means by which "the findings should be assessed against the original project design to determine the extent to which the original research aims have been met, and the identification of any new research questions to be incorporated in a post-excavation project design". CIfA further state that PXA work "must be carried out by suitably qualified and experienced staff, who must be apprised of the project design before commencing work. The post excavation manager should preferably be a corporate member of CIfA. The level of assessment of records and materials should be appropriate to the aims and purpose of the project".

In brief the PXA process involves cleaning, processing, sorting and cataloguing the finds and environmental samples and the ordering of the documentary site records to create an archive, and then assessment of that archive to focus further analysis and reporting on that archive. The archive consists of two elements, the material archive (finds, processed environmental samples and human remains) and the documentary archive (site records and ancillary research documentation such as notes on archival sources).

Post Excavation Assessment Stages and Outputs

The PXA consists of four separate, largely, though not necessarily, sequential stages; processing of the finds, palaeoenvironmental samples and any human remains (the material archive); archival preparation for data assessment and deposition (both material and documentary archive); data assessment and finally reporting. The outputs are two stand alone documents, although often bound together under a single cover as they will be in this case. The documents are the Data Assessment Report (DAR) which quantifies the data, identifies its significance and potential for further research, and the Updated Project Design (UPD), which scopes the response necessary by achieving the site's research potential and provides the basis for a cost for doing so.

The proposed work described in the UPD is entirely separate from the PXA and will form a future stage of work involving any necessary post-excavation research and leading to the

publication of the results of the excavation. This future stage concludes with the deposition of the entire project archive with the Oriel Museum Anglesey. Funding of the required future research, publication and archive deposition for long-term curation is a requirement to secure final discharge of the 2017-2019 phase of fieldwork at the Wylfa site.

For Wylfa Newydd each site will have a separate DAR and UPD to allow GAPS/CADW and the client, to be fully appraised of the justifications for further analytical work. Each site can then be discussed in relation to its specific significance before arriving at a consensus with regard to further work requirements. There will also be a need for an overview DAR and UPD which will have two functions:

- To succinctly summarise the findings of the individual site DARs and UPDs following consultation and provide a cohesive assessment of the whole project as well as a basis for an overall justified costing for future work requirements.
- To provide a research statement regarding the overall potential of the Wylfa Newydd development area. Clearly many of the sites will not merit the publication of a standalone report. Consequently, the research potential of such sites will be best realised in contributing to period-based volumes that address regional research framework questions.

Stage 1 Processing

A summary of the processing requirements is given below. A more detailed breakdown of the required procedures for finds is contained in appendix 1 and for environmental samples in appendix 2.

Environmental sample processing involves sieving individual 10 litre tubs of soil samples for bulk samples (collected from site) in a purpose-built water filtration tank. The flots (floats) and retents (sinks) are then dried, bagged and labelled. More specialised forms of sample processing may be required for other samples taken such as column samples for insects, pollen monoliths or cores, but these represent only a tiny fraction of the samples collected. Human remains (cremated and non-cremated) require different cleaning methods depending on their state of preservation. Non-cremated articulated and disarticulated human remains in good condition will undergo wet cleaning but without the bones being immersed in water. Human remains in poor condition must not be wet-washed and will have to be dry-brushed to avoid unnecessary damage to the remains.

Bulk finds are cleaned by washing. Small finds are cleaned according to the requirements of the material, this usually but not always involves washing. Following cleaning, most finds will need to be dried and some may require stabilisation to preserve them. Cleaning and stabilisation by material and object will be as described in Watkinson & Neal (1998). Specialist conservation will not be routinely undertaken at this stage as this will involve items being sent away to specialist laboratories and the consequent costs, but the conservation need will be defined by a specialist in conservation. Where an immediate conservation need is identified this will be addressed to ensure item stability.

Stage 2 Archival Preparation

Three tasks are required in stage 2 in relation to the material archive, marking in accordance with Oriel Museum guidelines, X-raying metal objects and boxing the finds and human bones for long term curation. There will be some need to carry out X-ray photography of metal objects to be able to identify them and assess their significance. Finds, mainly pottery, will need to be marked as appropriate. As some Prehistoric and Roman pottery is of a sandy fabric this can sometimes be difficult to place a mark directly on the fabric so clear nail varnish is required to prepare the location of the mark. Following marking the finds will be bagged and boxed. The archive boxes need to be made of acid free cardboard for long term conservation storage and will need to be purchased specifically for the project.

The documentary archive should have been appropriately ordered, indexed and catalogued before it left site, but it will require checking and final cross-referencing before it can be assessed. The checking will involve both digital and paper-based records and include a finalisation of plan and section data, both hand-drawn and recorded through a digital medium. Relevant HER entries will need to be listed in full detail. All records will need security copies. Paper records (drawn plans, sections and record sheets) will be scanned for digital archiving. The digitisation of all hand drawn plans and sections is to be avoided as not cost effective. Drawings for digitisation can be selected in the analysis phase when it is known which drawings will contribute to the publication. This ensures that all digitisation will be 'heads up' and only for the purposes of report illustration rather than 'heads down', thus removing the need for digitisation tablets and increasing efficiency.

Stage 3 Data Assessment

In all cases the assessment begins with a quantification of the items to be assessed, whether it be sample residues, finds or site records. The material archive assessment involves separate

assessments of ecofacts, artefacts and any human remains. Further details of the finds assessment are contained in appendix 3.

Every flot and retent will be examined to establish whether they contain plant macrofossils, zooarchaeological remains, snail shells etc, artefacts or metal working residue. Ecofacts, residues and any artefacts are then extracted and examined. Ecofactual assemblages are identified and characterised. The assessment of individual ecofactual assemblages must be undertaken by a suitably-qualified palaeoenvironmentalist.

The finds assessment involves the quantification, identification and dating of the recovered artefacts. The finds assessment can only be compiled by a suitably-qualified finds specialist who can identify and spot-date the artefacts. Where necessary, specialists with local expertise will be consulted, especially regarding the pottery assemblages.

Radiocarbon dating, or any other form of absolute scientific dating, will be undertaken at the assessment stage, though some samples may need to be sent for testing to identify their suitability for dating. As this is an assessment a full suite of dates suitable for Bayesian analysis will not be undertaken but the potential for such future work will be highlighted in the UPD. The documentary archive assessment involves identifying each site's stratigraphic phases assisted by a Harris Matrix. It is required that this will be done using the Harris Matrix generator software. Duplicate and false contexts will be identified, recorded and discarded.

<u>Stage 4 PXA and UPD Reporting</u>

Stage 4 results in the creation of the PXA report and the UPD. A detailed template for producing these documents follows. The documents produced will be technical grey literature reports and not publication reports.

Report Template

The following report template is laid out in accordance with the desired structure and layout of the report. Sentences in italics refer to the required illustrations whether drawings or photographs.

1. **Non-technical summary, including reasons for work, aims and summary results**

2. **Introduction**

2.1 Site location (include eight digit NGR), site code/ PRN reference, and Event Number

2.2 Scope of the project.

2.3 Dates/duration of fieldwork.

2.4 Outline of the site's character (including topsoil, subsoil and substrata descriptions, past land use impacts on preservation and impact of bioturbation) and how the site fits into the local archaeological landscape.

2.5 Brief summary of previous work including directly relevant nearby sites (i.e. likely to be part of same archaeologically represented activity), geophysical results, metal detecting results and evaluation results.

2.6 Explanation of the purpose of the assessment report and organisation of the report (refer to this report template and include as appendix 1).

2.7 *Site location map related to the development area.*

2.8 *Plan of site and excavated area (usually these will be the same).*

3. **Summary of the excavation methodology**

3.1 Proposals set out in the approved Written Scheme of Investigation for the fieldwork (copy of the Written Scheme of Investigation sections 4 and 5 only as appendix 2).

3.2 Any variations from the Written Scheme of Investigation with justifications.

3.3 Site planning strategy with justifications for the applied methodology.

3.4 A description of any avoidance strategies or re-burial methods used to preserve unexcavated archaeological remains in situ, indicating whether or not these will be subject to a monitoring scheme and, if so, providing a description of it or references to supporting relevant documentation.

4. **Site archive**

4.1 Summary details of the contents and organisation of the project archive

4.2 Quantification of documentary archive (including catalogues and indices) and details of current (give date) location of the paper archive. Details of the digital archive and arrangements for storage security.

4.3 Summary of work carried out on the documentary archive during post-excavation assessment.

4.4 Quantification of material archive (by storage box) and details of current (give date) location.

4.5 Summary of work carried out on the material archive, including nature of processing and cleaning, and any necessary preliminary conservation/stabilisation.

4.6 Details of any samples sent for scientific analysis or dating as a necessary precursor to costing a programme of analysis.

4.7 Agreed destination of the site archive (in all instances this will be the Oriel Museum, Anglesey) with a statement of any receiving repository conditions if necessary.

4.8 OASIS reference supported by completed data collection form as appendix 3.

4.9 *Representative sample photographs of site features that aid understanding of the assessment of stratigraphic data*.

5. Stratigraphic data

5.1 Summary of the nature of the investigated features/deposits described by phase in chronological order (not by individual context or feature), supported by a Harris matrix/matrices in appendix 4 (use context group numbers if appropriate).

5.2 Statement of significance of the stratigraphic data.

5.3 *Final pre-excavation plan.*

5.4 *Either an overall plan for all phases or individual phase plans or both as appropriate to the site's complexity.*

5.5 *Sections of key features with a location plan showing position of sections.*

5.6 *If relevant a more detailed plan of key structures.*

5.7 *Where relevant a structure through motion model illustration(s).*

6. Artefacts

6.1 Quantification (by weight in grams for bulk finds) of finds by type.

6.2 Description of condition, stability and the immediate and longer term conservation and storage needs by artefact group.

6.3 An assessment of the character, range and variety, date, meaning and significance of all recovered artefact groups.

6.4 Statement by a recognised specialist on the research potential of each individual artefact group. If no further work beyond assessment is considered necessary this should be clearly indicated.

6.5 Statement of significance for the retention of material and a proposal for a fully justified discard strategy for low/nil value assemblages, in agreement with GAPS/CADW.

6.6 *Supporting finds illustrations at appropriate scales (for the assessment wherever practicable scaled photographs should be used rather than line drawings).*

7. **Palaeoenvironment**

7.1 Quantification (by weight in grams) of the retents and flots available for analysis. Quantification by sample bucket where further portions of a sample are available and the assessment sub-sample has revealed that further sample processing is worthwhile for the additional data it may reveal. Sub-sampling will have been sufficient to characterise and understand a sample.

7.2 Factual summary of each type of sample (e.g. bulk organic, dendrochronological, monolith), quantity, preservation, post-depositional processes, curation and storage need by ecofact group.

7.3 An assessment of the character, range, variety and significance of all ecofactual groups (likely to include plant macrofossils, pollen, animal bone, shell, snails and insects).

7.4 Statement by a recognised specialist on the research potential of each individual ecofact group, including potential to provide scientific dating. If no further work beyond assessment is considered necessary, this should be clearly indicated.

7.5 Statement of significance for the retention of material and a proposal for a fully justified discard strategy for low/nil value assemblages, in agreement with GAPS/CADW.

7.6 *Representative photographs of key assemblages*.

8. **Human remains**

8.1 For inhumations quantify by number of burials and then summarise information on skeletal completeness in a table divided as >75%, -75%, -50%, <25%. For cremations, bone remains from each context should be quantified by weight in grams.

8.2 Factual data about the bone assemblage, describing the provenance of the skeletal material and the general condition of the remains. The condition of the bone will influence the information that can be gained from the assemblage.

8.3 Statement by a recognised specialist on the research potential of the human remains.

8.4 Note on the long-term arrangements for the curation or reburial of the human remains.

8.5 *Plans showing the location of burials or other deposits of human remains*

8.6 *Photographs and/or drawings of inhumation burials in situ or a structure through motion 3d model.*

9. **Discussion**

9.1 A brief summary of the character and significance of the site as represented through its stratigraphic, artefactual and palaeoenvironmental data. Include where relevant the results of any documentary research. If no further work beyond assessment is considered necessary, this should be clearly indicated. If further work is required then include 9.2, 9.3 and 9.4 below.

9.2 A tabulated list of relevant sources discovered (relevant books, articles, HER data, archival sources) quantity, variety, level of study of sources during post-excavation assessment.

9.3 Indicate applied studies that will be necessary for further analytical work. These might include, for example, comparative analysis, archival and/or cartographic research and intra and inter-site spatial analyses, site morphological studies, absolute dating methods, scientific techniques not covered by the standard suite of applications (e.g. specific chemical analyses, thin sectioning for soils or ceramic research, isotope studies, scanning electron microscopy, specific biological analyses etc).

10. **Statement of potential**

10.1 A summary of the potential of the data in terms of local, regional, national and international importance, referencing as relevant regional and national period and subject specific research agendas. This should include:

- an appraisal of the extent to which the site archive might enable the data to meet the original research aims of the project;
- a statement of the potential of the data in developing new research aims, to contribute to other projects and to advance methodologies;
- an assessment of the relevant level at which the site data might be published e.g. site specific publication, project landscape overview or background contextual data (choose one only).

10.2 An informed strategy for the detailed analysis of some or all data groups as recommended by relevant specialists to enable a reconstruction of the history and use of the site to be developed, in line with the site's relevant research potential

(where no further work is recommended this section is not required). This strategy must include provision to incorporate the results of any earlier phases of archaeological work on a specific site, reappraising materials and artefacts recovered during earlier assessment and evaluation phases and, where appropriate, earlier excavation results - including, where possible, from neighbouring sites

10.3 *Map of the site in context at a regional or local level, showing other relevant sites and where appropriate connections and networks.*

11 Bibliography of sources used in the compilation of the PXA

12. Updated Project Design

12.1 Introduction including purpose of the UPD to provide details of a programme of analysis leading to the appropriate mechanism for the dissemination of the results of the project. Also, to provide a basis for costing the programme of analysis, publication and deposition of the archive.

12.2 Justification for the contents of the proposed programme of analysis and any theoretical approaches to be deployed, in relation to the site's statement of potential and proposal for publication/dissemination as appropriate:

- inclusion of main results in an overall synthetic volume only
- thematic paper on a specific research theme
- internet publishing through journal or proprietary website (stating whether all catalogues will be available and interactive)
- short illustrated site report for a journal
- section/chapter in edited monograph
- fully illustrated site monograph
- popular booklet (additional publication only and not to be the primary publication).

12.3 Proposal for analysis of the stratigraphic data concentrated on key feature groups.

12.4 Detail of illustrations required to support the stratigraphic analysis.

12.5 Detail of retention and discard strategy for the material archive.

12.6 Proposals for scientific dating (potentially an initial suite of dates and a second after provisional results from the artefact and ecofact analysis are received).

12.7 Proposals for a Bayesian analysis to refine chronologies, following consultation with Cadw regarding to the selection of contexts and samples for scientific dating.

12.8 Proposals, where relevant, for other forms of scientific analysis such as lipids, strontium or oxygen isotope analysis.

12.9 Details of illustrations required to support the artefact analysis.

12.10 Requirement for conservation works on material archive.

12.11 Proposals for further research, including archive visits and comparative analysis of other investigated relevant sites in order to contextualise the site data.

12.12 Details of resultant technical/archive report.

12.13 Publication report synopsis where relevant, including any additional illustrations required.

12.14 Proposals for monitoring and continued liaison with GAPS and CADW throughout the post-excavation analytical programme.

12.15 Staged programme and timetable for any proposed further work up to and including publication and archive deposition. Task list and Gantt chart.

Task breakdown for PXA

1. **Processing**

1.1 Environmental sample processing

1.2 Cleaning human remains

1.3 Bulk finds cleaning

1.4 Small finds cleaning

1.5 Artefact stabilisation

2. **Archival preparation**

2.1 Finds marking

2.2 X-raying metal objects

2.3 Archive box purchase

2.4 Boxing

2.5 Site record checking and cross-referencing

2.6 Compilation of list of archival sources

2.7 Records scanning

3. **Data assessment**

3.1 Zooarchaeological remains

3.2 Insects

3.3 Snails

3.4 Shells

3.5 Plant macrofossils

3.6 Pollen

APPENDIX 1 METHOD STATEMENT: STAGE 1 FINDS PROCESSING

Finds processing and assessment summary

At stage 1 the finds will be cleaned (usually but not always involving washing). At stage 2 the finds will marked, bagged and boxed. Once this is done in stage 3 the finds will be quantified and assessed; this involves the creation of an Excel spreadsheet into which are recorded numbers of items, weight and spot-dating and the finds are cross-referenced to the stratigraphic contexts from which they were derived. Having done this in stage 4 a report will be prepared on the assessment results. The work will be solely aimed at identifying significant assemblages for further future analysis as will be detailed in the Updated Project Design.
The following specification allows for the cleaning of bulk finds.

Washing and cleaning

Bulk artefacts (pottery, animal bone, glass, ceramic building material) are bagged up on-site and returned to the post-excavation department. The finds are washed and cleaned using two bowls (one to wash, one to rinse) and toothbrushes. The finds are placed in trays linked with newspaper – the site code, context number and (if applicable) the small find number is written either on the newspaper or on a tag attached to the tray with permanent marker. To increase the efficiency and speed of the finds' drying time, a drip-tray system is employed in

which finds are put on newspaper first before being placed in the tray. This ensures excess water is soaked up (and is particularly useful for large, heavy fragments such as architectural stone and ceramic building material).

Organic finds are processed differently and will depend on whether they have been recovered from waterlogged deposits; leather, shale, jet, wood and worked bone that has been recovered from waterlogged deposits needs to be kept dark, dry and cool. Objects are cleaned primarily with soft wet brushes and they are bagged (with water in the bags) and are put in an organics fridge.

All metalwork (including copper alloy, lead and iron) and oyster shell is dry-brushed. Delicate metal and non-metal small finds are dry-brushed and placed in crystal boxes in trays on acid-free tissue paper. Plaster/mortar are dry-brushed and placed in labelled trays.
Human remains (cremated and non-cremated) are processed differently and will require different cleaning methods depending on their state of preservation. Non-cremated articulated and disarticulated human remains in good condition will undergo the same processing as bulk finds, but the bones are not immersed in water. The human remains will only be marked depending on the requirements of the curator and county repository. Human remains in poor condition must not be wet-washed and will have to be dry-brushed for remains to stabilise.

Time estimates for finds washing and cleaning

It must be emphasised that finds washing is hugely dependent on a wide range of variables, including the original burial environment (acidic soils, different soil types e.g. clay versus sand) and previous activity on the site (agricultural activity such as ploughing may damage the finds).

Find type	**Weight**	**Time**
Prehistoric pottery	1kg	1-2 hours
Roman pottery	1kg	1-1.5 hours
Saxon pottery	1kg	1-1.5 hours
Medieval pottery	1kg	1 hour
Post-medieval pottery	1kg	1 hour
CBM & daub	1kg	1-1.5 hours
Animal bone (good condition)	1kg	1-1.5 hours
Animal bone (bad condition)	1kg	1-2 hours

Human bone (complete skeleton, good condition)	7-8kg	1-1.5 days
Human bone (bad condition)	1kg	1-2 days
Glass	1kg	1-1.5 hours
Metalwork	1kg	1-1.5 hours
Oyster shell	1kg	1-1.5 hours
Flint	1kg	1 hour
Stone	1kg	1 hour
Leather	1kg	1-1.5 hours
Archaeometallurgical waste	1kg	1 hour
Plaster/Mortar	1kg	1-2 hours
Clay Pipe	1kg	1-1.5 hours

APPENDIX 2 METHOD STATEMENT: STAGE 1 ENVIRONMENTAL PROCESSING

Environmental processing and assessment summary

For environmental samples in stage 1 the samples will be processed. In stage 2 this material will be dried, bagged and sorted. In stage 3 this material will be examined to establish whether or not they contain plant macrofossils, zooarchaeological remains, artefacts or metal working residue. Having done this in stage 4 they will be required to prepare a report on the assessment results. They will not be instructed to analyse the materials derived from the flots and retents at the assessment stage. The work will be solely aimed at establishing significant flots and retents for further future analysis as will be detailed in the Updated Project Design. The following specification allows for the processing and assessment of bulk environmental samples and for waterlogged materials from a General Biological Analysis sample (GBA).

General Biological Analysis sample

The colour, lithology, weight and volume of the sample will be recorded on the sample sheet. The sample will be then be processed. All samples will be floated on a 250-300 mm mesh and the heavy residues washed over a 0.5-1 mm mesh as required by SCCAS. The flot should be air dried.

The flot should be 100% sorted with all relevant material being recovered, once this process has been completed, the remaining material may be discarded. Any plant remains should be quantitively recorded. All ecofactual material should be removed as should relevant artefactual material. Earthworm and nematode capsules should be counted but not recovered. If charcoal-rich a 2mm sieve should be used, the resultant material should then be

subject to the same process outlined above. The data from the flot sorting should then be recorded into a spreadsheet (Excel) or database (Access).

Once dried the entire retent residue should be sorted. In order to ease sorting, the dried residues may be passed over a 4mm mesh, this also aids charcoal retention of a suitable size for ID. The dried residues should be described (colour, lithology, weight and volume of the individual fractions).

The <4mm fraction will be scanned with a magnet in order to pick up micro-slags, and 100% sorted for the recovery of artefacts and ecofacts.

The fine fraction will be sorted and any relevant material recovered. The sorted residues can then be discarded. Any resulting artefactual and ecofactual material should be recorded (abundance/actual quantities dependent on material and weighed).

Recording of the Environmental Data

Where possible quantify, counts of over 50 individuals per species can be referred to by levels of abundance, such as +=50-100, ++=100-200, +++=200-500 and ++++ to indicate greater than 500. If identification is not to species level then a distinction between cereals and weeds species (or non-economic taxa) should be made. The presence of chaff should be noted.
For long term storage, the plant remains should be stored in soda glass tubes with sample information, and identification (where relevant) clearly marked using pencil and a Tyvek label placed inside the tube.

Waterlogged Samples

Between 250 and 500ml of a 1l sub sample from the GBA is processed by placing the material in a 500µm sieve and washing the sample through until all of the sediment has been removed. The latter is essential or the fluid in which the sample is stored will become cloudy. Once clean the sample is removed from the sieve to an airtight jar and stored in ethanol (95% alcohol).

Paraffin Flotation

The remaining 9l of the GBA will be placed into a bucket filled with hot water to disaggregate the sample. A handful of the material is then placed in a 300µm sieve and washed until as much of the sediment as possible has been removed. The material is then tipped from the

washing sieve into a further sieve and allowed to drain and dry. Once the sample has been completely processed, it will then be left to dry for an hour. The sample is then tipped back into the bucket and enough paraffin to coat the sample is added –multiple buckets may be required if the sample is large. This will be then allowed to stand for 15 minutes and cold water added to the bucket.

The bucket is then allowed to stand for a further 15 minutes. At this stage any insect sclera should have risen to the surface of the water as the paraffin adheres favourably to the chitin which forms the exoskeleton of the beetle. The top 2cm of bucket is then poured off through a 300µm sieve and this process is repeated twice more.

At the end of this process, the flots within the sieve will be washed using domestic washing up-liquid until all traces of both the paraffin and detergent have been removed. The latter is essential as any trace of either left on the flot will render the storage medium cloudy. The sample is then stored in ethanol (95% alcohol) inside an airtight jar.

METHOD STATEMENT STAGES 2 AND 3 FINDS ASSESSMENT

Summary

The finds assessment involves the quantification, identification, dating and significance assessment of the recovered artefacts. The assessment of significance happens in stage 4 when the context of the finds can be taken into account as their significance is not solely based on the object's intrinsic interest. The finds assessment can only be compiled by a suitably-qualified finds specialist who can identify and spot-date a wide range of artefacts.

The finds assessment will adhere to a number of national guidelines, including CIfA (2017), Historic England, EAC (2014), Brown (2011) and Watkinson & Neal (1998) as well as the specific county museum's own standard requirements plus national and regional fabric codes (prehistoric through to post-medieval pottery). The finds assessment will make recommendations to be included in the UPD (updated project design). These may include further literary research and comparative analysis, AMS C14 dating, strontium or oxygen isotope analysis, Bayesian scientific methods plus illustration / photography.

The following specification allows for the quantification, identification and dating and significance assessment of the finds.

Stage 2

Certain types of find, when dry, are then marked; this can be dependent on the curator and the county repository. Finds, including pottery, CBM, animal bone, glass and clay tobacco pipe, are marked with the site code, context number, small find number and the museum accession number (if applicable). The finds are marked using permanent Indian ink (Winsor & Newton); for finds with rough surfaces (applicable to all types of pre post-medieval pottery), a small patch of acrylic or nail varnish is applied to provide a smoother surface.

Types of finds and ecofactual remains that are not marked include human bone, leather, shale, jet, all metalwork, plaster/mortar, oyster shell, slag and wood.

Once the finds are dry and marked, they are quantified and bagged in zip-lock self-sealable bags and the site code, context number, small find number and museum accession number is written on the bags. For small finds and delicate/fragile artefacts, 2 layers of acid-free ridged

foam is cut and inserted into the bag beforehand and the artefact is sandwiched between the two layers.

The non-metal artefacts, when bagged, are placed in acid-free archive boxes and they are ordered by material type and by context. Boxes should not weigh over 6kg. Metal artefacts and some organic finds are kept in Stewart tubs with a bag of silica gel and humidity strip indicators. WA Ltd's in-house archive labels are then put on the front of the box.

Time estimates for finds marking and bagging and boxing

Marking 30-40 seconds per artefact e.g. per bone, per pot sherd.

Bagging and boxing 1 box at 6 kg full capacity – 30-40 minutes.

Stage 3

Once processed (cleaned and dried stage 1 and marked stage 2) the finds will need to be assessed. In stage 3 preliminary recording and description of the assemblage is undertaken and an Excel spreadsheet is created. This stage is where the artefacts are quantified, weighed, spot-dated and where additional comments / notes are made. The Excel spreadsheet (or Access database) forms a critical part of the finds assessment and every finds report must have one. The preliminary recording is conducted by a suitably-qualified finds specialist, with a proven record and appropriate local knowledge.

Time estimates for preliminary recording

Recording and describing 1 box (6 kg) of finds = 1-3.75 hours dependent on the nature of the items.

Materials costs to be considered to PXA

In addition to the person costs there is a material cost for storage materials, including boxes, silica gel, acid free tissue and zip-lock bags, for the artefacts and the human bone. For example, finds and documentary archive boxes need to be acid free for long term storage. Appropriate temporary storage and monitoring of waterlogged artefacts is required, prior to conservation.

There will be some need to carry out X-ray photography of metal objects to be able to assess their significance.

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