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Cors Geirch, Mathan Uchaf Boduan, Gwynedd

Archaeological Desk Based Assessment

Report no. 0003

(LIFE 07 NAT UK 000 948)

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Project Code: A0004
Date: 13/01/2013
Client: The Countryside Council for Wales (CCW)
Written by: Richard Cooke BA MA MIfA and Dr. Michael J. Allen MIfA, FLS, FSA

Figures

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CORS GEIRCH, MATHAN UCHAF, BODUAN: A0004

NON-TECHNICAL SUMMARY

Aeon Archaeology and Allen Environmental Archaeology have undertaken an archaeological desk based assessment and archaeological environmental assessment on behalf of The Countryside Council for Wales (CCW), of a 3.5 hectare plot of land proposed for the extraction of peat and enriched soil, in order to support a programme of conservation to restore the wetland fen habitat. The site is located in proximity to the farm of Mathan Uchaf, and close to the town of Boduan on the Llyn Peninsula, Gwynedd.

The archaeological desk based assessment identified nine sites of archaeological and historic interest within, or in close proximity to, the proposed development area. The majority of these sites were field boundary ditches of low historic interest, and no further assessment or mitigatory measures have been recommended for these features.

The desk based assessment also identified two trackways and partially buried iron peat cutting machinery on the site which lie within the area proposed for soil excavation. Recommendations have been made for the avoidance or relocation of the farm machinery, as well as the basic record of the trackways prior to the commencement of works. The potential for buried archaeological remains within the proximity of the trackway (feature 8) is deemed to be medium and an intensive watching brief has been recommended during the peat extraction in this area.

In addition, the desk based assessment also identified two former gravel islands which have the potential to preserve buried archaeological remains, one of these sites (feature 4) will be impacted upon by the removal of peat and as such an intensive watching brief has been recommended for this area. A partial watching brief has been recommended during the extraction of peat in all other parts of the site.

Acknowledgements
The following people and organisations are thanked for their help in providing background material and advice for this archaeological desk-based assessment. Angharad Stockwell at the Gwynedd Historic Environment Record; the Gwynedd Archaeological Planning Service Development Control archaeologist Jenny Emmett; the Gwynedd Archives office Caernarfon; Dyfed Jones of the Countryside Council for Wales (CCW); and Dr Mike Allen of Allen Environmental Archaeology.

1.0 INTRODUCTION

Aeon Archaeology was asked by the Countryside Council for Wales (CCW) to undertake an archaeological desk based assessment of a 3.5 hectare area of land as part of a planning application (ref: **C12/1176/33/MW**) for the extraction of peat and enriched soil, in order to support a programme of conservation to restore the wetland fen habitat. The site comprised an area of wetland located near Boduan, Gwynedd towards the centre of the Llyn Peninsula (centred on NGR **SH** 31484 36512) (Figure.1 and Figure.2).

The proposed scheme is to consist of ditch infilling, surface re-profiling, ditch diversion, and the creation of constructed wetlands at the site. Specifically, the work will entail:

- Temporary re-routing of spring water to allow easier working conditions
- Permanent diversion of the main drain
- Ditch infilling of the main drain
- Removal of and re-profiling of agriculturally improved surface soils and peat to expose suitable topography and substrate
- Re-connection of 3 spring fed streams across the excavated surface
- Construction of 3 reed bed water treatment systems (constructed wetlands) which will treat the spring water prior to irrigating the new bare peat surfaces.
- Re-grassing of agricultural track post works.

2.0 AIMS

This archaeological desk based assessment is for the proposed development area and immediate land-take, although a 1.0km search area centred on the site was utilised for a search of the Gwynedd Historic Environment Record (HER), to provide a background historical narrative of the area. As part of the archaeological assessment of the potential for the site to have preserved archaeological remains, a series of environmental archaeological hand auger cores were taken, the results and recommendations of which are reported on in '*Geoarchaeology of the mire at Mathan Uchaf, Cors Geirch SSSI, Gwynedd'* which follows this report.

3.0 SPECIFICATION AND PROJECT DESIGN

A detailed brief (**D1721**) was prepared for this project by Jenny Emmett, the Development Control Archaeologist for Gwynedd Archaeological Planning Service (GAPS). The brief stipulated the requirement for an archaeological desk-based assessment to be undertaken of the proposed development area. Furthermore, the assessment of the site was to include an environmental auger survey to be carried out by an appropriately qualified specialist to ascertain the potential for the preservation of buried artefactual and environmental remains.

The following report conforms to the guidelines specified in *Standard and Guidance for Archaeological Desk-based Assessment* (Institute of Field Archaeologists, 1994, rev. 2007).

The archaeological desk-based assessment considered the following:

(i) The history of the site;
(ii) The assessment of impact of development on archaeological remains;
(iii) The assessment of impact of development on the setting of sites of archaeological importance;
(iv) The requirements for further assessment in the form of non-intrusive and intrusive field evaluation.

The archaeological desk-based assessment was undertaken in four stages:

(i) Archival research
(ii) Site walkover including environmental hand auger transects
(iii) Written report
(iv) Project archive

4.0 METHODS AND TECHNIQUES

4.1 Archival research

The archaeological desk-based assessment involved the study of the following records:

(i) The regional Historic Environment Record (Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, LL57 2RT) was examined for information concerning the study area. This included an examination of the core HER, and secondary information held within the record which included unpublished reports, the 1:2500 County Series Ordnance Survey maps, and the National Archaeological Record index cards.

(ii) The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth, SY23 1NJ) was checked for sites additional to the HER.

(iii) Information about Listed Buildings and Scheduled Ancient Monuments from Cadw was examined in the regional HER. The Register of Outstanding and Special Historic Landscapes and the Register of Parks and Gardens was checked, as well as the location of World Heritage Sites.

(iv) Secondary sources were examined, including the Inventories of the Royal Commission on Ancient and Historical Monuments for Wales, and works held within the regional libraries. Indices to relevant journals, including county history and archaeology society journals and national society journals such as *Archaeologia Cambrensis* were checked. In addition topographical dictionaries, antiquarian tours and trade directories were examined where relevant.

(v) Historic aerial photographs from the Welsh Government were obtained and examined for sites that have been demolished and/or sites which were visible only as cropmarks. All photographs examined are listed in the assessment report.

(vi) The Gwynedd Archives (Caernarfon) was searched for archive maps, including estate and tithe maps as well as information from Land Tax Assessments.

(vii) Results from previous archaeological work within the area were also reviewed.

4.2 Site walkover including environmental hand auger transects

The site walkover was carried out on Friday 4th January 2013 by Richard Cooke BA MA MIfA, archaeological contractor and consultant at Aeon Archaeology. The weather conditions were ideal, although an abundance of long vegetation coupled with water-logging reduced the probability of identifying smaller and more subtle upstanding archaeological remains.

4.3 Written report

All identified features were assessed and allocated to categories of international, national, regional/county, local and none/unknown importance as listed in Appendix 2. These are intended to give an idea of the importance of the feature and the level of response likely to be required; descriptions of the features and specific recommendations for further assessment or mitigatory measures, as appropriate, are given in the relevant sections of this report. The criteria used for allocating features to categories of importance are based on existing statutory designations and, for non-designated assets, the Secretary of State's non-statutory criteria for Scheduling Ancient Monuments; these are set out in National Planning Policy Framework.

3.4 Definitions

Definitions of Impact, evaluation methods and mitigation methods as used in the gazetteer (section 5 below) can be found in Appendix 2.

4.0 THE STUDY AREA

4.1 Topographic Description

The proposed development site comprises an area of wetland located near the town of Boduan, Gwynedd towards the centre of the Llyn Peninsula (centred on NGR **SH** 31484 36512) The site is known as Cors Geirch (marsh oats) and lies within the civil parish of Buan. The site is designated as a Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR) and Special Area of Conservation (SAC).

The proposed development site is relatively large (3.5ha) and spans one large field orientated from northwest to southeast, characterised by areas of long sedge grasses and waterlogged areas. It is bordered on all sides by field boundaries comprising water filled ditches and dykes and lies towards the centre of the valley floor. The site is not currently grazed, however neighbouring fields contain sheep and wild ponies which have access to the site, although the area is generally too waterlogged for sustained pastoral grazing.

The site was included within the *Historic Landscape Characterisation of Llyn* report 287 by The Gwynedd Archaeological Trust in 1998 which noted that 'The study area is dominated by a largely unenclosed, wet, open, isolated landscape with little in the way of identifiable historic character or depth. The sense is of a partially-tamed natural wilderness'.

The bedrock geology is of the Crugan Mudstone Formation. A sedimentary bedrock which formed approximately 444 to 446 million years ago in the Ordovician Period when the local environment was dominated by deep seas with infrequent slurries of shallow water sediments, which were then redeposited as graded beds (British Geological Survey).

4.2 Statutory and non-statutory designations

The proposed development area landscape has been studied as part of the *Historic Landscape Characterisation on Llyn* (GAT report 287. 1998). The site also lies within or in close proximity to the following areas/ sites:

(i) Within the Cors Geirch National Nature Reserve (NNR).

(ii) Within the Cors Geirch Special Area of Conservation (SAC).

(iii) Within the Cors Geirch Site of Special Scientific Interest (SSSI).

(iv) Within the Cors Geirch Ramsar site.

(v) Approximately 0.6 km northeast of the grade II Listed Building of Neuadd Bodgadle (PRN: 11336).

(vi) Approximately 0.7 km east of the grade II Listed Building of Ty'n-y-Coed (PRN: 11547).

The list of non-designated sites recorded within the Historic Environment Record, Listed Buildings, and sites from the Royal Commission on the Ancient and Historic Monuments in Wales (RCAHMW) are shown on figure. 1 and listed in Appendix 1.

5.0 THE HISTORICAL CONTEXT

The following sections describe the known archaeological record within the general area of the proposed development. Sites are identified by their PRN number which is the number by which they are identified in the Gwynedd Historic Environment Record (HER), or by their Scheduled Ancient Monument reference, or Listed Building reference numbers if applicable. The intention of this section is to provide a historic and archaeological context to the site. This aids in establishing the relative importance of an archaeological feature within its landscape, as well as assessing the potential for unknown buried archaeological remains on the proposed development site.

5.1 Prehistoric and Roman Period

It is probable that peat was cut, dried and burnt for domestic fuel from the earliest times, especially in areas rich in peat bogs. However, right up to the medieval period, peatlands were scarcely used except for game hunting and were mostly avoided, for the most part being unusable in their undrained state and liable to be flooded in winter (Taylor. J. A.). Indeed, Mesolithic sites have been discovered located on the coastal headlands of the Llyn Peninsula, around Uwchmynydd and Trwyn Bychestyn, which most likely represent the remains of hunting settlements which exploited the coastal plains (Gwynedd HER). Further activity can be seen in the Neolithic period with the quarrying of hard igneous stone from Mynydd Rhiw for the manufacture of polished stone axes in the area, but there is not currently any evidence for early prehistoric activity along marshland fringe within this region of Wales.

The prehistoric and Roman periods are fairly well represented in the wider landscape of the peninsula. Approximately 2.8km to the north of the proposed development area lays the prehistoric hillfort and Scheduled Ancient Monument of Garn Boduan (CN009). The fort covers a large area, approximately 10ha, and has the ruinous remains of at least 170 hut circles. The fort is constructed upon a natural rocky hill with large fortification walls constructed from rampart masonry and enclosing approximately 28 acres. There are two periods of Iron Age construction, followed by a small fort of late Roman or post Roman date upon the summit.

The fort's namesake, as with the town of *Boduan*, bears reference to *Buan*, who is believed to have been a grandson of Llywarch Hen, the 6th century prince of the Brythonic kingdom of Rheged, a ruling family in the Hen Ogledd 'Old North' of Britain. It is therefore possible that both the fort and area may have been his residence in the early 7th century AD.

Laying approximately 3.0km to the west is the prehistoric hillfort and Scheduled Ancient Monument of Carn Fadryn Camp (CN011). The hillfort was defended by two large stone walls, probably representing two periods of the pre-Roman fortification, a smaller fort of about 12 acres having been succeeded by a larger of about 26 acres. The defences enclose

stone hut circles in addition to numerous small, irregularly shaped huts cut into the ruins of the earlier defensive wall. Within the fort enclosure and upon the summit of Carn Fadryn lies the robbed and ruined remains of a Bronze Age stone burial cist. The cist is constructed from large slabs set on edge, and scatterings of loose stones suggest the presence of a former cairn which may have been robbed to construct the nearby fortifications of the hillfort (Gwynedd HER).

Approximately 2.5km to the east of the proposed development site lies a suspected Roman cremation cemetery (PRN: 3650) found by Hyde Hall and near to Cefn Mine in Llanor parish, where vases containing ashes and suspected to be Roman were discovered at the start of the 19th century. Despite the presence of several Roman sites on the Llyn Peninsula, there are no known Roman military sites or roads within the localised area, and it is believed that Roman influence upon the native Celtic traditions within the area may have been relatively minor (GAT report 284).

5.2 Early Medieval and Medieval Periods

The Llyn Peninsula and Bardsey Island played an important part during the early Christian period. The ecclesiastical site on Bardsey is believed to have been founded by St Cadfan, and by the 12th century was believed to have been the burial place of twenty thousand saints, from which it became an important place of pilgrimage. On the mainland, the church at Aberdaron is dedicated to St Hywyn and is first mentioned in 1094 when the Augustinian canons provided a boat for Gruffydd ap Cynan to escape.

Lying approximately 3.5km to the northeast of the proposed development site is the Scheduled Ancient Monument and medieval motte and bailey castle of Ty Newydd (CN096). The motte lies at approximately 200ft above sea O.D. on ground which slopes away gently. A large hollow was excavated on the northern side to provide material for the construction of the motte and for a bank on the southern side to retain water from a small stream for a defensive moat.

In the later medieval period most of the peninsula fell within the cantref of the Llyn, and was divided into the commotes of Cymydmaen, Dinllaen, and Cafflogion, with the centres being located at Neigwl, Nefyn, and Pwllheli. Much of the land was held by the church and monasteries, in particular Bardsey, Clynnog Fawr and Cymer. During the 13th and 14th centuries Nefyn flourished through the fishing industry and as a staging point for pilgrims travelling to Bardsey, becoming one of the principal towns of Gwynedd. The town became a borough after the Edwardian conquest but was devastated during the Glyndwr rebellion of 1400.

The nearest town to the proposed development site, Boduan, retains the roots of a medieval constituent township and gained its name from *Buan*, who is believed to have been a grandson of Llywarch Hen, the 6th century prince of the Brythonic kingdom of Rheged (see 5.1). The town exists today as a loosely nucleated settlement but its medieval origins is recognisable in the occurrence of *uchaf* or *isaf* in farm place names. This can be seen in close proximity to the proposed development area in the nearby farm *Mathan Uchaf*, which almost certainly has medieval origins and would have worked the land and proposed development area since such times.

There are no known medieval sites located within the proposed development area, however it is probable that the land had been utilised for the extraction of peat for burning as fuel since such times. The extraction of peat leaves little trace except for rectangular depressions where the peat was cut from, as well as occasionally peat drying platforms. Such evidence of peat cutting has been found approximately 840.0m to the west of the proposed development area, northwest of Tyn y Coed (PRN 1742).

5.3 Post Medieval Period

In approximately 1780 Pennant described the Llyn Peninsula. *The houses of the common people are very mean; made with clay, thatched, and destitute of chimneys. Notwithstanding the laudable example of the gentry, the country is ina an unimproved state, neglected for the sake of the herring fishery. The chief produce is oats, barley and black cattle.*

This reference to the land of the Llyn Peninsula is relevant to the proposed development site as the welsh name *Cors Geirch* means 'marsh oats'. It therefore seems probable that the site was utilised for the farming of that crop, although it is probable that the name refers to a variety of wild oat which was gathered from the wetland site.

The Buan parish tithe map of 1849 (figure 3.) depicts the proposed development area rather similarly to how it exists today, although the map appears to be inaccurate and the site boundary is only approximate. The site is depicted lying to the southwest of the farm *Mathan Uchaf* which is still in existence today, and is connected to the main road via a trackway. The modern car park in the eastern corner of the site is obviously not depicted, but the access trackway to it is shown connecting the main road with a building, which the tithe schedule refers to as *Mathan Ganol*. This building is depicted along with at least one outbuilding and is situated to the east and outside of the development site, although a small paddock extends into where the car park is now located. No standing remains of this building could be seen during the site walkover.

The tithe map does show however that the site was divided into a series of eight separate fields as detailed in the table below.

Table 1. The tithe apportionment of 1849

Plot	Landowner	Occupier	Plot Name	A/R/P
354	Lord Newborough	W. M. Evans of Machan Uchaf	Y Gors	0/3/8
355	Lord Newborough	W. M. Evans of Machan Uchaf	Y Gors	5/1/16
356	Lord Newborough	W. M. Evans of Machan Uchaf	Cae Rhimian	1/3/27
357	Lord Newborough	W. M. Evans of Machan Uchaf	Cae Mathan Bach	1/3/0
358	Lord Newborough	W. M. Evans of Machan Uchaf	Cae Mathan Bach	2/1/14
363	Lord Newborough	W. M. Evans of Machan Uchaf	Caer Odyn	0/1/36
395	Lord Newborough	John Williams of Mathan Ganol	House, offices, yards	1/1/31
396	Lord Newborough	John Williams of Mathan Ganol	Cae Cefn y Ardd	3/2/37

As can be seen from the 1849 tithe apportionment, the proposed development site was owned by Lord Newborough of the Glynllifon Estate. The majority of the site was tenanted by William. M. Evans of Machan Uchaf, who is recorded on the 1841 census as being a 35 year old farmer. He resided along with his wife Margaret Evans aged 30 years and three children Elizabeth (12 years), Sydney (2 years), and Mary (8 months), as well as his mother Ellinor

Evans aged 60 years. The farm was also home to four agricultural labourers, two men and two women.

The two fields (354 and 355) depicted at the western limit of the site are both called *Y Gors* (marsh) and clearly show that the site was a marshland at this time. Field number 363 is depicted towards the centre of the site and a trackway is shown linking this area with Mathan Uchaf farm to the northwest. This trackway is still visible today as a raised earth causeway (feature 8) and was almost certainly the main access route from the farm to the enclosed fields. The tithe schedule names this field as *Caer Odyn* (field kiln) which most likely refers to the use of this area for drying the oats, peat or perhaps some other commodity obtained from the marshes. It is not clear whether this kiln operated as a drying platform for example, or was a constructed feature.

The eastern part of the site is represented on the tithe map as one large field (396) and a small paddock (395) situated where the current car park lies, and continuing to the east of the development site. Both of these two fields were tenanted by John Williams of Mathan Ganol who according to the 1841 census was a farmer of 75 years of age, who resided with his wife Sarah Williams (60 years) and his daughter Mary (15 years). In addition the property was tenanted by two other men who were probably agricultural labourers. The tithe schedule names field 395 as *house, offices and yard* which refers to the property Mathan Ganol, which was situated to the immediate east of the proposed development site. The presence of offices at Mathan Ganol suggests that a business was being run from the farm, there is no further mention of this property in the archival sources but it is a possibility that marsh oats or peat were being obtained from the proposed development site and sold from the premises.

By the production of the first edition county series Ordnance Survey map in 1889 (figure 4.) the proposed development area is depicted more like it exists today. The individual fields depicted on the 1849 tithe map have been subsumed into the large marshy site seen today, the only exception being the retention of field number 396 which was still in existence. The property of Mathan Ganol is not depicted on the first edition Ordnance Survey map and it can be surmised that it was demolished sometime between 1849 and 1889. The trackway (feature 8) linking the farm of Mathan Uchaf with the site is not depicted, and most probably had gone out of use by this point in time.

The second and third edition county series Ordnance Survey maps of 1900 and 1918 respectively, depict the site exactly the same as the first edition map. The eastern most field (396) is still divided from the rest of the site by a field boundary although no evidence of this boundary exists today, and it was clearly removed some time after 1918.

5.4 Aerial Photographs

A range of aerial photographs of the proposed development area were examined from the Welsh Government. This included a high level photograph taken by the Royal Air Force in 1945, as well as an Ordnance Survey photographs from 1972 and 1974. Recent aerial coverage of the proposed development area from 2012 was also inspected. No new archaeological sites were observed on the photographs, however the site appeared to be drier and had the occasional tree growing on it. All three historic photographs showed rectangular areas which appeared to be areas of peat cutting or land improvement which correspond with the gravel island and peat cutting area identified in the gazetteer of sites (feature 3).

5.6 Site Gazetteer

The field walkover discovered eight sites of archaeological and historic interest within, or in close proximity to the proposed development area, as listed below. Each entry contains an assessment of importance, ranked from International through to National, Regional/County,

Local, and None. If it is not possible to assess the importance of the site from the visible remains, then it is ranked Unknown. Identified sites were also assigned a level of impact ranked from high through to medium, and low. Levels of impact can be considered as both adverse or beneficial, and can be direct (physically impacting upon a site) or indirect (visually or indirectly physically impacting upon a site). Where it is expected that a site will be impacted upon by the proposed works then mitigation recommendations are provided. All archaeological/historical sites identified are depicted on figure.2.

1. Field boundary ditch (plate 1)	Category: Local	PRN: 36368
SH 31528 36570	Impact: High adverse direct	
The northern limit of the site is bordered by a field boundary ditch running from northwest to southeast. It carries a small water course and measures approximately 3.5m in width The age of the ditch is unknown but the boundary is depicted on the tithe map of 1849. The majority of this ditch will be in-filled as part of the wetland habitat improvements. A basic record of this feature should be taken prior to the commencement of works.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: None - recorded as part of the desk based assessment.		

2. Field boundary ditch (plate 2)	Category: Local	PRN: 36369
SH 31687 36292	Impact: None	
The eastern limit of the site is bordered by a field boundary ditch running from northeast to southwest. It is filled with drainage water and measures approximately 1.0m in width. The age of the ditch is unknown but the boundary is depicted on the tithe map of 1849. This feature will not be impacted upon by the proposed development and therefore there are no recommendations for further assessment or mitigatory measures.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: None		

3. Gravel island and area of peat cutting (plate 3)	Category: Local	PRN: 36370
SH 31594 36447	Impact: None	
A buried gravel island at this point creates a higher ground level over an area approximately 80.0m by 20.0m and orientated on a northwest to southeast axis. The north-eastern edge of this area has been straightened, presumably through the extraction of peat. This feature will not be impacted upon by the proposed development and therefore there are no recommendations for further assessment or mitigatory measures.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: None		

4. Gravel island (plate 4)	Category: Unknown	PRN: 36371
SH 31255 36591	Impact: High adverse direct	
A gravel island was located during the hand auger survey at this point. It measures approximately 80.0m by 60.0m and is orientated from northeast to southwest. Such gravel island were sometimes utilised in the Mesolithic and Bronze Age as places of temporary hunting camps. This area lies within the area proposed for the extraction of peat and as such it is expected that the proposed works will have a high adverse direct physical impact upon any unknown buried archaeological remains. It is therefore recommended that an intensive watching brief be maintained during intrusive extraction in this area.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Intensive watching brief		

5. Field boundary dyke (plate 5)	Category: Local	PRN: 36372

SH 31386 36415	Impact: None
The southern limit of the site is bordered by a field boundary dyke running from northwest to southeast. The dyke carries a small water course and measures approximately 2.0m in width. The age of the ditch is unknown but the boundary is depicted on the tithe map of 1849. The feature will not be impacted upon by the proposed development and therefore there are no recommendations for further assessment or mitigatory measures.	
Recommendations for further assessment: None	
Recommendations for mitigatory measures: None	

6. Probable peat-cutting machinery (plate 6)	Category: Local	PRN: 36373
SH 31519 36532	Impact: High adverse direct	
A piece of iron farm machinery most probably used for peat cutting lies half buried in the peat at this point. Its dimensions are unclear but its visible size suggests that it was pulled by a tractor rather than horses. Its proximity to the trackway (feature 8) suggests that it was brought onto the site via the track from Mathan Uchaf farm however this appears to have gone out of use some time before the first edition ordnance survey map of 1889. This early date would suggest that either the machinery was fixed in place or that it was brought onto site via a different route and at a later date using a tractor. This feature is located within the proposed excavation area.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Avoidance or careful removal to another part of the site.		

7. Field boundary ditch (plate 2)	Category: Local	PRN: 36374
SH 31217 36689	Impact: High adverse indirect	
The western limit of the site is bordered by a field boundary ditch running from northeast to southwest. The ditch carries a small water course and measures approximately 1.0m in width. The age of the ditch is unknown but the boundary is depicted on the tithe map of 1849. The main drain feeding the ditch will be diverted as part of the proposed development, this will result in the feature silting up over time. A basic record of the feature should be taken prior to the commencement of works.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: None- recorded as part of the desk based assessment.		

8. Trackway (plate 8)	Category: Local	PRN: 36375
SH 31504 36556	Impact: Medium adverse direct	
A trackway depicted on the tithe map of 1849 connects the site at this point with the farm of Mathan Uchaf to the north. The trackway is visible as a raised causeway measuring approximately 4.0m in width. The feature is not shown on the first edition Ordnance Survey map of 1889 and it is presumed to have gone out of use by this point in time. The trackway is located within a field named as *Caer Odyn* (field kiln) on the 1849 tithe apportionment, and it may also have formed part of a peat drying platform or oat drying kiln site. It is therefore recommended that an intensive watching brief be maintained during excavations in this area.		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: None- recorded as part of the desk based assessment and intensive watching brief		

9. Trackway	Category: Local	PRN: 36376
SH 31759 36425	Impact: Low adverse direct	
A trackway depicted on the tithe map of 1849 connects the site at this point with the main road to the north. The trackway was the original access to the farm of Mathan Ganol which is now demolished. The track currently provides access from the main road to the car park in the eastern corner of the proposed development site, but will be covered with turf and reseeded as		

part of the works. The feature should have a basic record taken prior to the commencement of work.
Recommendations for further assessment: None
Recommendations for mitigatory measures: Basic record

6.0 IMPACT AND RECOMMENDATIONS

6.1 General recommendations

6.1.1 Direct impact (see table 2)

The proposed fenland improvement works are expected to have a direct adverse physical impact upon five sites of archaeological and historic significance. All of these are considered to be of *local* importance except for the gravel island (feature 4) which is of *unknown* importance.

The proposed works are expected to have a *low adverse direct physical* impact upon one site (feature 9), a *medium adverse direct physical* impact upon one site (feature 8) and a *high adverse direct physical* impact upon three sites (features 1, 4 and 6).

6.1.2 Indirect impact

The proposed scheme is expected to have a *high adverse indirect physical* impact upon one site of archaeological and historic significance. This is a field boundary ditch of *local* importance which will silt up over time through the re-direction of the main drain which feeds it.

Due to the nature of the proposed works there are not expected to be any *indirect visual* impacts upon any features of archaeological or historical significance.

6.2 Site Specific Recommendations

Although it is expected that the proposed improvement works at Cors Geirch will impact physically, both directly and indirectly, upon six sites of archaeological interest, all of these features are deemed to be of *local* importance except for the gravel island (feature 4) which is of *unknown* importance. It is recommended that a basic record be taken of the field boundary ditches (features 1 and 7) prior to the commencement of work, however the descriptions and photographs taken in this report should be seen as being commensurate with a basic recording level and thus no further recording for these features is required. A basic record has not been taken of the trackway (feature 9) however, and this should be taken prior to the commencement of work on the site.

The buried probable peat-cutting machinery (feature 6) is located within the area proposed for excavation and as such should either be avoided and left in-situ, or carefully moved under supervision of an archaeologist. If moved the machinery should be deposited elsewhere on the site and a basic record taken.

The trackway (feature 8) which forms the historic link between the farm of Mathan Uchaf to the north and the proposed development site will be partially removed by the proposed excavation area. This trackway is of local importance and a basic record should be taken prior to the commencement of work, however the description and photographs taken in this report should be seen as being commensurate with a basic recording level and thus no further recording for this feature is required. The tithe map apportionment does however name the field which contains the trackway as *Caer Odyn* (field kiln) and it is possible that the track also functioned as either a peat drying platform or crop drying kiln. As such there exists a

medium probability for buried archaeological remains in proximity to the trackway, and therefore an intensive watching brief is recommended during excavation within this locality.

The gravel island with peat cutting (feature 3) and the gravel island (feature 4) are considered to have a *medium* potential for the presence of unknown buried archaeological remains. This is partly due to the suitability of the raised areas for the construction of kilns or to function as peat drying platforms, but also for their potential to preserve more ephemeral remains such as prehistoric occupation. The gravel islands would have originally been spits of land projecting out into the water channel prior to the silting and formation of the current peat bog. Such areas have been utilised elsewhere for both Mesolithic and Bronze Age hunting camps, and such activity has been recorded around the coastal fringes of the Llyn Peninsula at Uwchmynydd and Trwyn Bychestyn. The gravel island (feature 4) will be impacted upon by the proposed works and as such it is recommended that an intensive watching brief be maintained during the excavation of peat in this area.

The rest of the site away from the proximity of the trackway and gravel islands is deemed to have a *low* to *medium* potential for the presence of unknown buried archaeological remains. It is expected however that these would most likely take the form of former field boundaries, as shown on the 1849 tithe map, or peat cutting platforms. It is therefore recommended that a partial watching brief is maintained during excavations in these areas (figure 7)

Table 2: Archaeological features					
Number	**Name**	**Category**	**Impact**	**Further Assessment**	**Mitigation Recommendations**
1	Field boundary ditch	Local	High adverse direct	None	None- recorded as part of the desk based assessment
2	Field boundary ditch	Local	None	None	None
3	Gravel island and area of peat cutting	Local	None	None	None
4	Gravel island	Unknown	High adverse direct	None	Intensive watching brief
5	Field boundary dyke	Local	None	None	None
6	Probable peat-cutting machinery	Local	High adverse direct	None	Avoidance or careful removal to another part of the site
7	Field boundary ditch	Local	High adverse indirect	None	None- recorded as part of the desk based assessment
8	Trackway	Local	Medium adverse direct	None	Intensive watching brief
9	Trackway	Local	Low adverse direct	None	Basic record

7.0 ARCHIVE

The archive consists of field notes, historic maps and photographs taken on the field visit. It is currently held by Aeon Archaeology under the project code **A0004.**

8.0 SOURCES

OS Maps

1st edition 25 inch Ordnance Survey Map of 1889

2nd edition 25 inch Ordnance Survey Map of 1900

3rd edition 25 inch Ordnance Survey Map of 1918

OS 1:10 000 Series sheet SH 33 NE, SH 33 SE, SH 33 SW, and SH 33 NW

Aerial Photographs

RAF Aerial Photographs

1945 RAF. 106G UK 664. Fr 4175

OS Aerial Photographs

Ordnance Survey 1972

Ordnance Survey 1974

Ordnance Survey 2012

Google Maps: 2012

Manuscript Sources

Gwynedd Council Archives, Caernarfon

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Tithe Map and Apportionment of the Parish of Buan 1849

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1841 census of Wales. H0107/1390. Parish of Boduan.

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GAT report 287. March 1998. *Historic Landscape Characterisation on Llyn- a methodical statement.*

Newborough (Glynllifon) estate plans: XD2A and XD2A.

Sale Catalogue. XD2/14499. *The outlying portions of the Nanhoron Estate in the celebrated district of Lleyn.*

APPENDIX 1

Sites within 1km of the proposed development area as listed on the Gwynedd HER

PRN	Name	Form	NGR	Type	Period	Status
11336	Neuadd Bodgadle Farmhouse		SH31183566	BUILDING	Post-Medieval	Listed Building
11547	Ty'n-y-coed		SH30673628	BUILDING	Post-Medieval	Listed Building
1742	Feature (peat Cutting), NW of Tyn Y Coed	Earthwork	SH30533640	PEAT CUTTING	Unknown	-

Sites within 1km of the proposed development area as listed on the NMR

NPRN	Name	Type	Period	NGR	Community
16589	neuadd bodgadle farmhouse	farmhouse	Post Medieval?	SH31183566	Buan
16989	ty'n-y-coed	farmhouse	Post Medieval?	SH30673628	Buan

Listed Buildings within 1km of the proposed development area

Number	Name	Locality	Eastings	Northings	Grade
20125	Bryniau	Boduan	231884	337271	II
20126	Cefniwrch	Boduan	232340	336650	II
4273	Tyn-y-coed Isaf	Rhydyclafdy	230666	336244	II
4274	Neuadd Bogdadle	Rhydyclafdy	231189	335670	II

APPENDIX 2: DEFINITIONS OF IMPORTANCE AND RECOMMENDATION

1. Definition of Categories of importance

The following categories were used to define the importance of the archaeological resource.

Significance	Description
International (Very High)	Archaeological sites or monuments of international importance, including World Heritage Sites. Structures and buildings inscribed as of universal importance as World Heritage Sites. Other buildings or structures of recognised international importance.
National (High)	Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the Secretary of State's non-statutory criteria. Listed Buildings. Undesignated structures of national importance.
Regional/ County (Medium)	Conservation Areas Archaeological sites and remains which, while not of national importance, score well against most of the Secretary of State's criteria.
Local (Low)	Archaeological sites that score less well against the Secretary of State's criteria. Historic buildings on a 'local list'.
None	Areas in which investigative techniques have produced no or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

2. Definition of Impact

The direct impact of the proposed development on each site was estimated. The impact is defined as follows:

Magnitude	Direct Impacts	Indirect Impacts
High Adverse	Complete removal of an archaeological site. Complete destruction of a designated building or structure.	Radical transformation of the setting of an archaeological monument. A fundamental change in the setting of a building.
Medium Adverse	Removal of a major part of an archaeological site and loss of research potential. Extensive alteration (but not demolition) of a historic building or feature, resulting in an appreciable adverse change.	Partial transformation of the setting of an archaeological site (e.g. the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility or appreciation of an archaeological site). Partial adverse transformation of the setting of a designated building.
Low Adverse	Removal of an archaeological site where a minor part of its total area	Minor change to the setting of an archaeological monument or historic

Magnitude	Direct Impacts	Indirect Impacts
	is removed but the site retains a significant future research potential. Change to a historic building or feature resulting in a small change in the resource and its historical context and setting.	building.
Negligible/ Neutral	No impact from changes in use, amenity or access. No change in the ability to understand and appreciate the resource and its historical context and setting.	No perceptible change in the setting of a building or feature.
Low Beneficial	Land use change resulting in improved conditions for the protection of archaeological remains or understanding/ appreciation of a historic building or place	Decrease in visual or noise intrusion on the setting of a building, archaeological site or monument. Improvement of the wider landscape setting of a building, archaeological site or monument.
Medium Beneficial	Land use change resulting in improved conditions for the protection of archaeological remains, or understanding/ appreciation of a historic building or place, including through interpretation measures (heritage trails, etc). Removal of harmful alterations to better reveal the significance of a building or structure, with no loss of significant fabric.	Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site or monument; and Improvement of the wider landscape setting of a building, archaeological site or monument Improvement of the cultural heritage amenity, access or use of a building, archaeological site or monument.
High Beneficial	Arrest of physical damage or decay to a building or structure;	Exceptional enhancement of a building or archaeological site, its cultural heritage amenity and access or use

3. Definition of field evaluation techniques

Field evaluation is sometimes necessary when the importance of an identified archaeological feature cannot be ascertained via an archaeological desk based assessment alone. There are several different techniques but the three most common are geophysical survey, trial trenching, and supervised metal detector survey:

Geophysical survey
This technique is a non-intrusive form of archaeological field evaluation. It utilises a magnetometer which detects differences within the earth's magnetic field caused by the presence of iron in the soil. This iron often takes the form of magnetised iron oxides in the topsoil which have been re-deposited into lower archaeological features through cutting and backfill. A magnetometer can also detect iron artefacts within the soil and the presence of burnt stone material such as on hearths, kilns, and burnt mounds.

Trial trenching
Where a site is suspected to contain more subtle archaeological features such as pits, a geophysical survey may not be appropriate due to its lack on sensitivity in detecting these features. Indeed, trial trenching can also be utilised when anomalies have been identified during the geophysical survey and clarification is required in order to identify them. Trial trenches usually measure 20m by 2m although can vary ion size if targeting geophysical anomalies. Trenches are excavated using a mechanical tracked excavator and supervised by an archaeologist. The topsoil and subsoil are removed onto buried features or if absent, on to the natural glacial substrata. Any archaeological remains found are usually evaluated and recorded prior to backfilling of the trench, so that further site specific mitigatory recommendations can be made.

Supervised Metal Detector Survey
Some types of underlying substrata and bedrock can mask the results of investigation techniques such as geophysical survey. In such instances an archaeologically supervised metal detector survey can be undertaken. This involves the supervision of metal detectorists by a suitably qualified archaeologist and the spatial mapping of artefacts as they are discovered. This technique can give a geographical spread of metal finds and thus be indicative of 'hotspot' areas which may require further investigation by trial trenching for example.

4. Definition of Mitigatory Recommendations

None:
No further action is required.

Detailed recording:
A photographic and concise descriptive record is required, along with a digital survey.

Basic recording:
A photographic and basic descriptive record is required.

Watching brief:
Monitoring is required by a suitably qualified archaeologist during the proposed development. An archaeological watching brief is divided in to four categories according the IFA. 2001. *Institute for Archaeologists 2001 Standard and Guidance for an archaeological watching brief:*

- comprehensive (present during all ground disturbance)
- intensive (present during sensitive ground disturbance)
- intermittent (viewing the trenches after machining)
- partial (as and when seems appropriate).

Avoidance:
These features should be avoided by the proposed development and any ancillary works including the establishment of compound and material lay-down areas. It may be necessary to surround the feature with a barrier and/or signage to avoid accidental damage.

Reinstatement:
These features should be reinstated to their original location and condition. Supervision by an archaeologist is required.

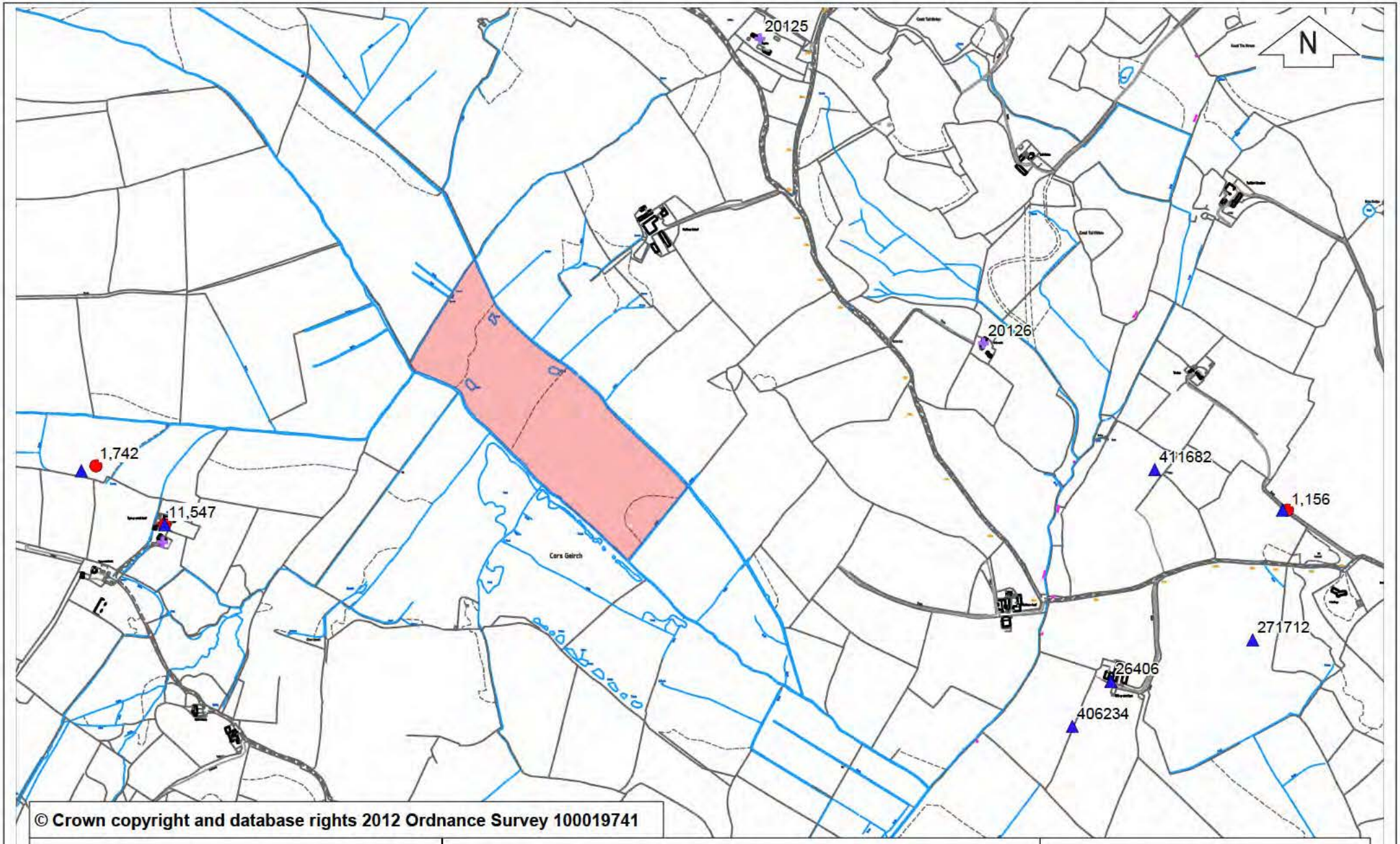

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Figure 1: Site location shaded in red, scale 1:10,000 at A4.
(Sites from the Gwynedd HER shown as red circles;
Listed Buildings shown as purple crosses; sites from the
RCAHMW shown as blue triangles)

Aeon Archaeology
Richard Cooke BA MA MIfA
17 Cecil Street, Boughton, Chester. Cheshire CH3 5DP
Tel: 01244 460070/ 07866925393
www.aeonarchaeology.co.uk

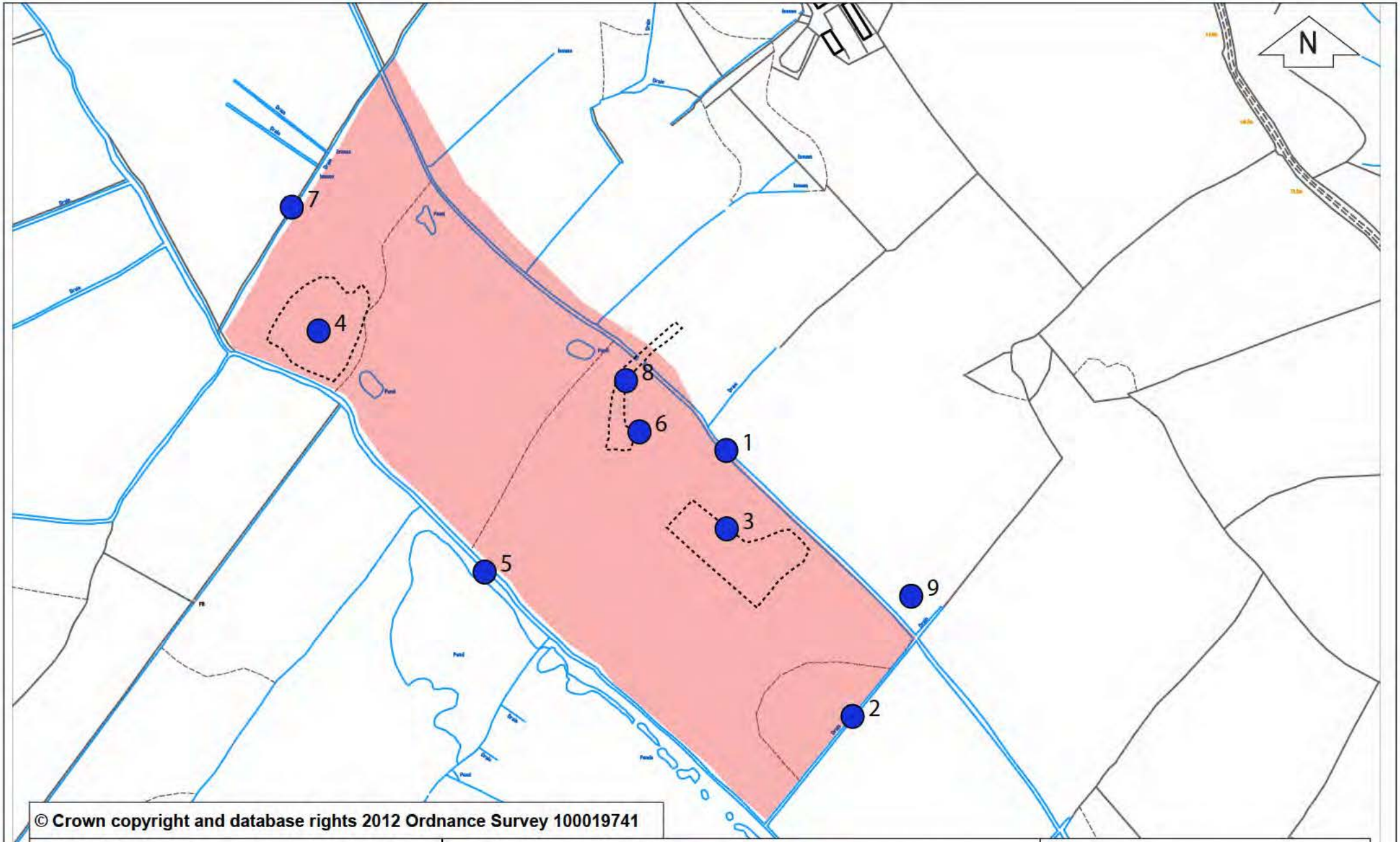

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Figure 2: Site location shaded in red, scale 1:4,000 at A4. (Archaeological sites discovered during the field walkover shown as blue dots)

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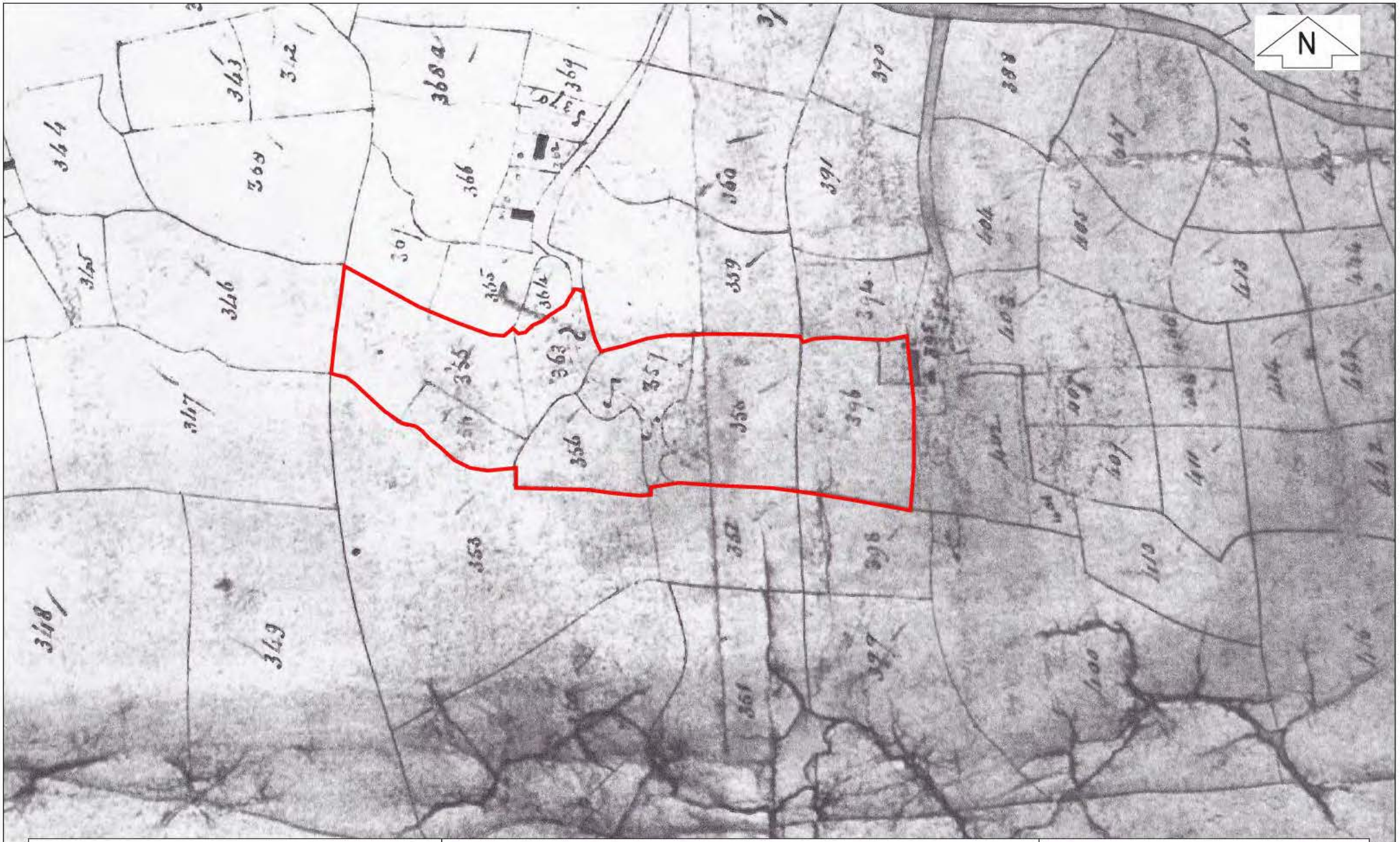

Figure 3: Tithe map of 1849 (site shown outlined in red).

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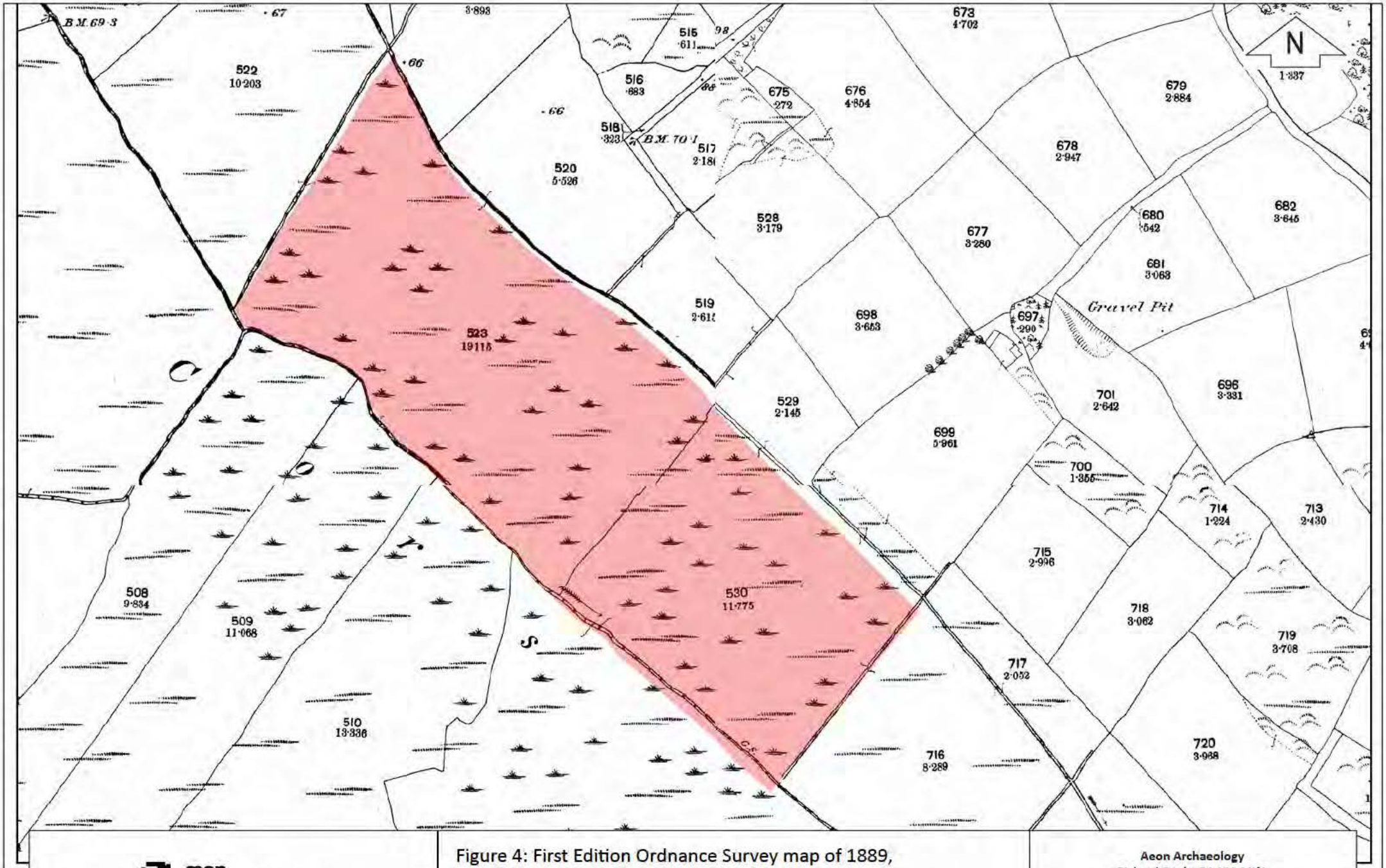

Figure 4: First Edition Ordnance Survey map of 1889,
1 to 4,000 at A4.
(Site shaded in red)

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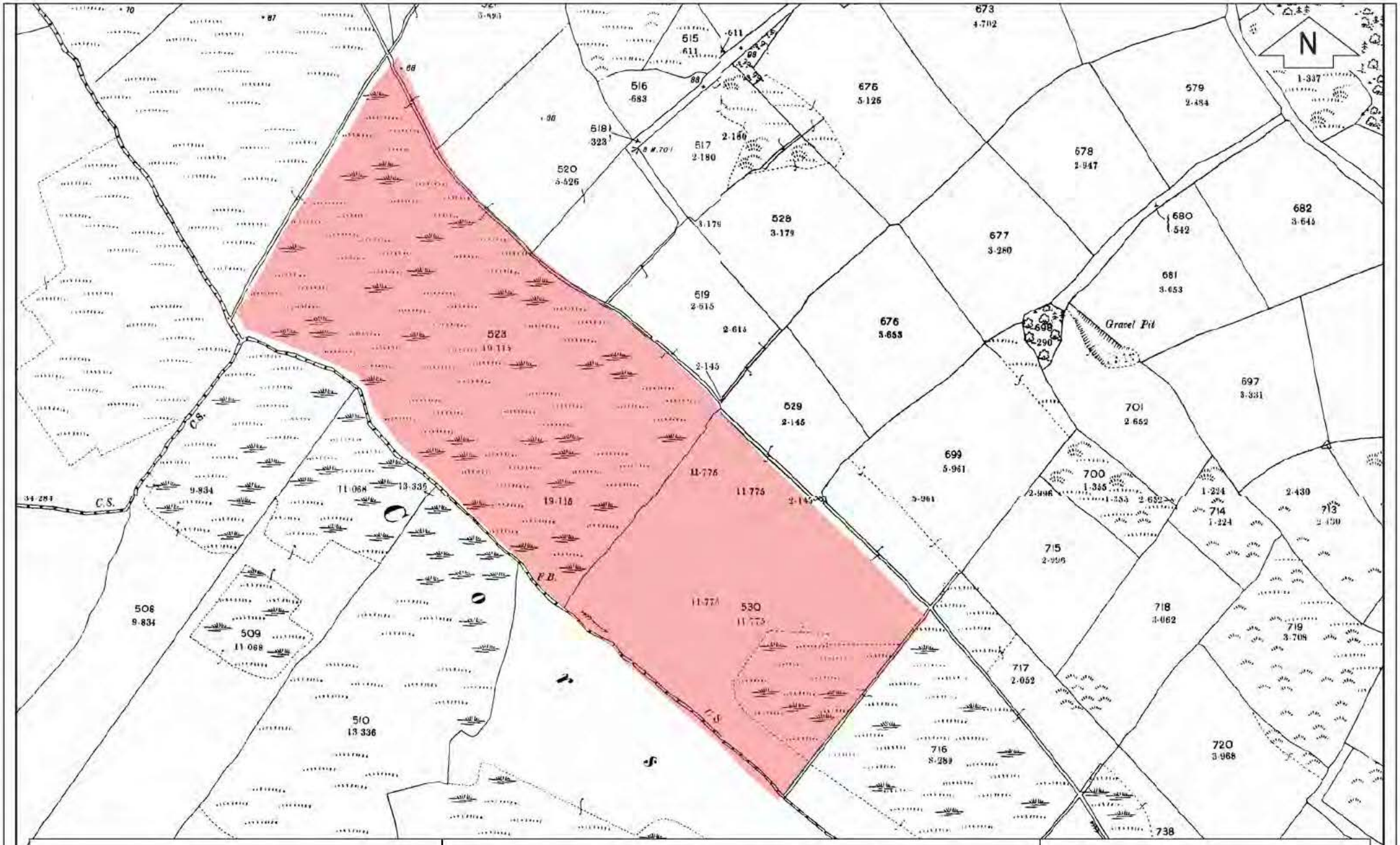

Figure 5: Second Edition Ordnance Survey map of 1900, 1:4,000 at A4.
(Site shaded in red)

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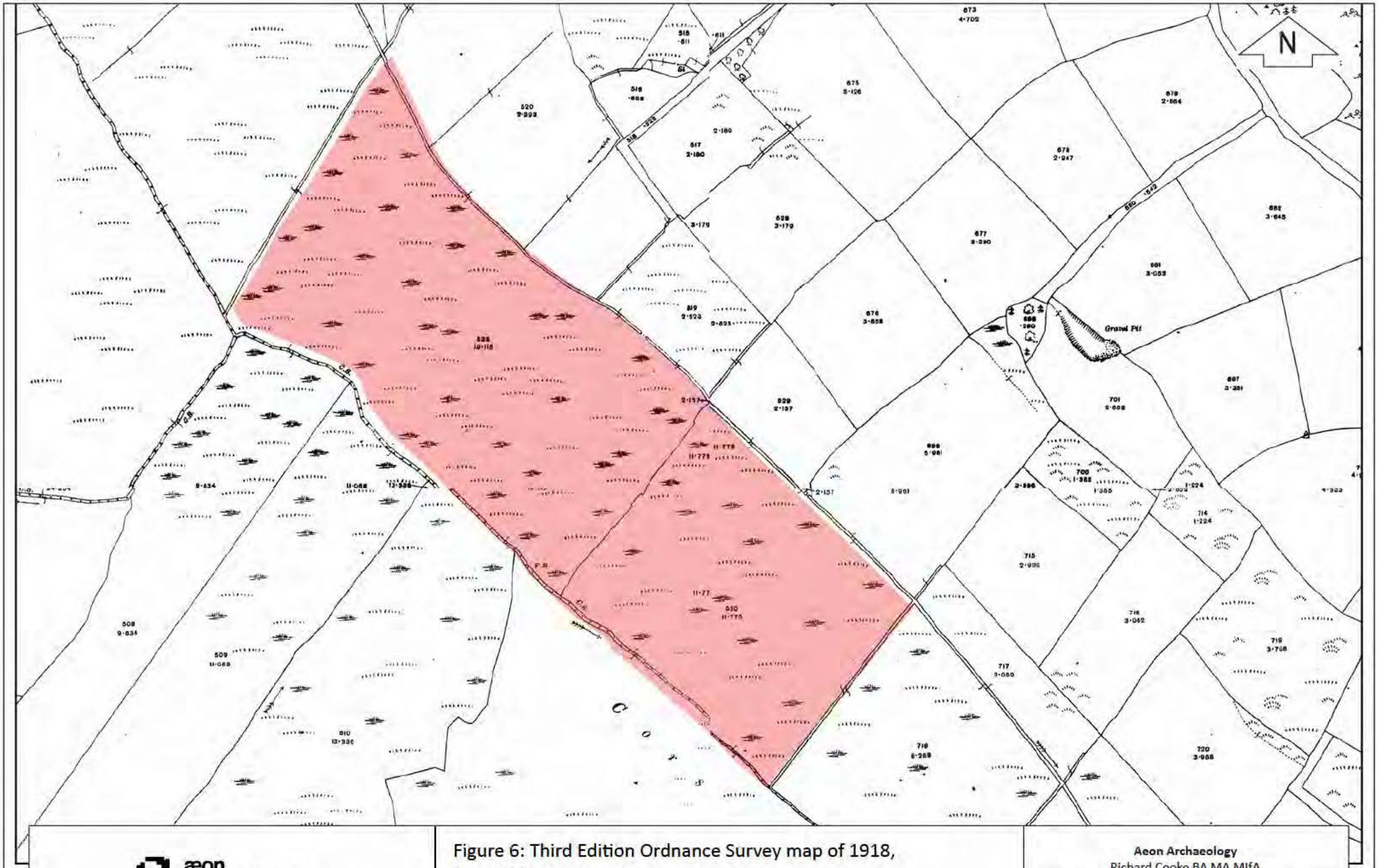

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Figure 6: Third Edition Ordnance Survey map of 1918,
1 to 4,000 at A4.
(Site shaded in red)

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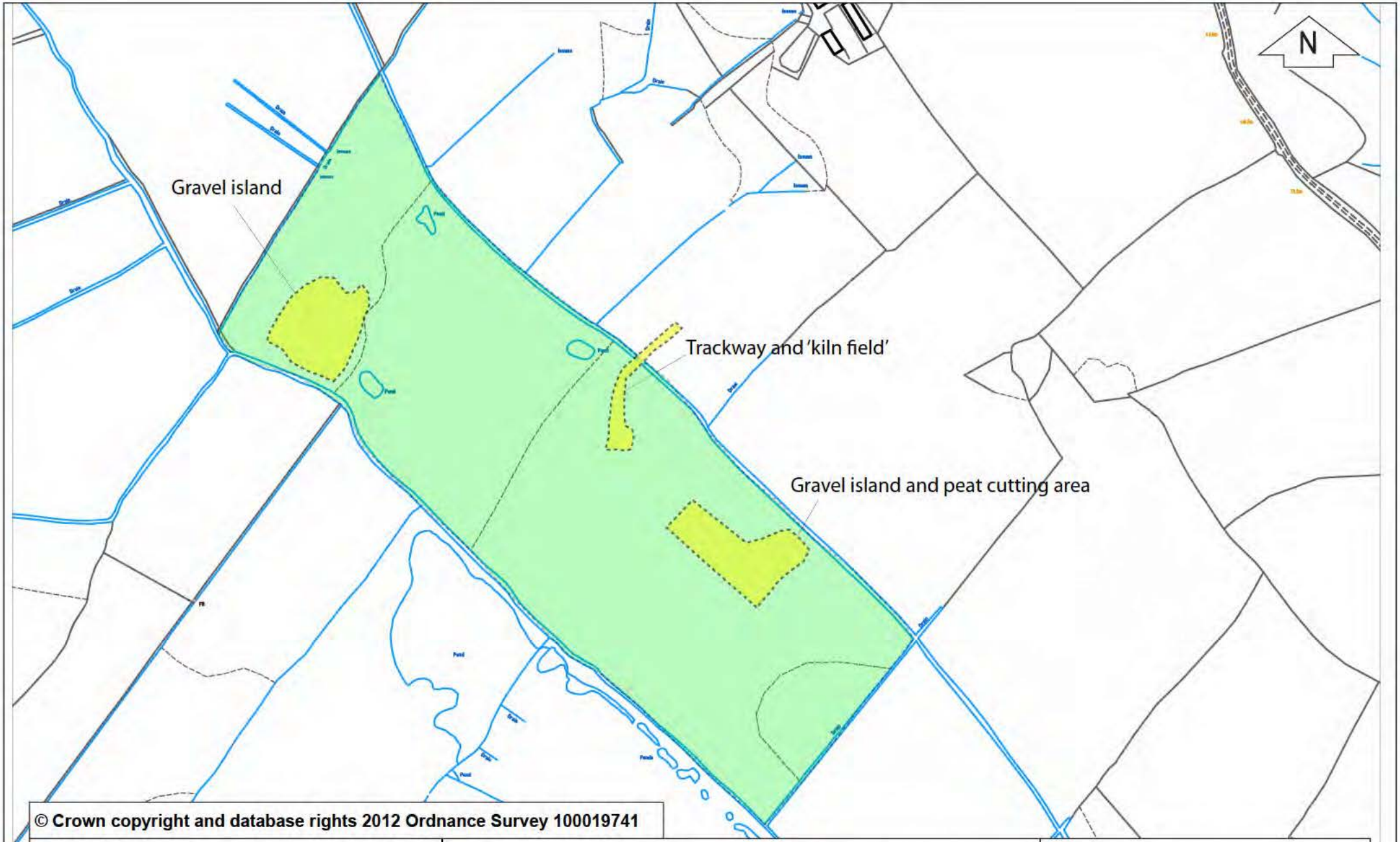

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Figure 7: Archaeological deposit model, scale 1:4,000 at A4.
(Areas shaded yellow represent a medium risk of buried archaeological remains, areas shaded green represent areas of low to medium risk)

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Plate 01: Field boundary ditch (feature 1) from the east. Scale 1.0m.

Plate 02: Field boundary ditch (feature 2) from the northeast. Scale 1.0m

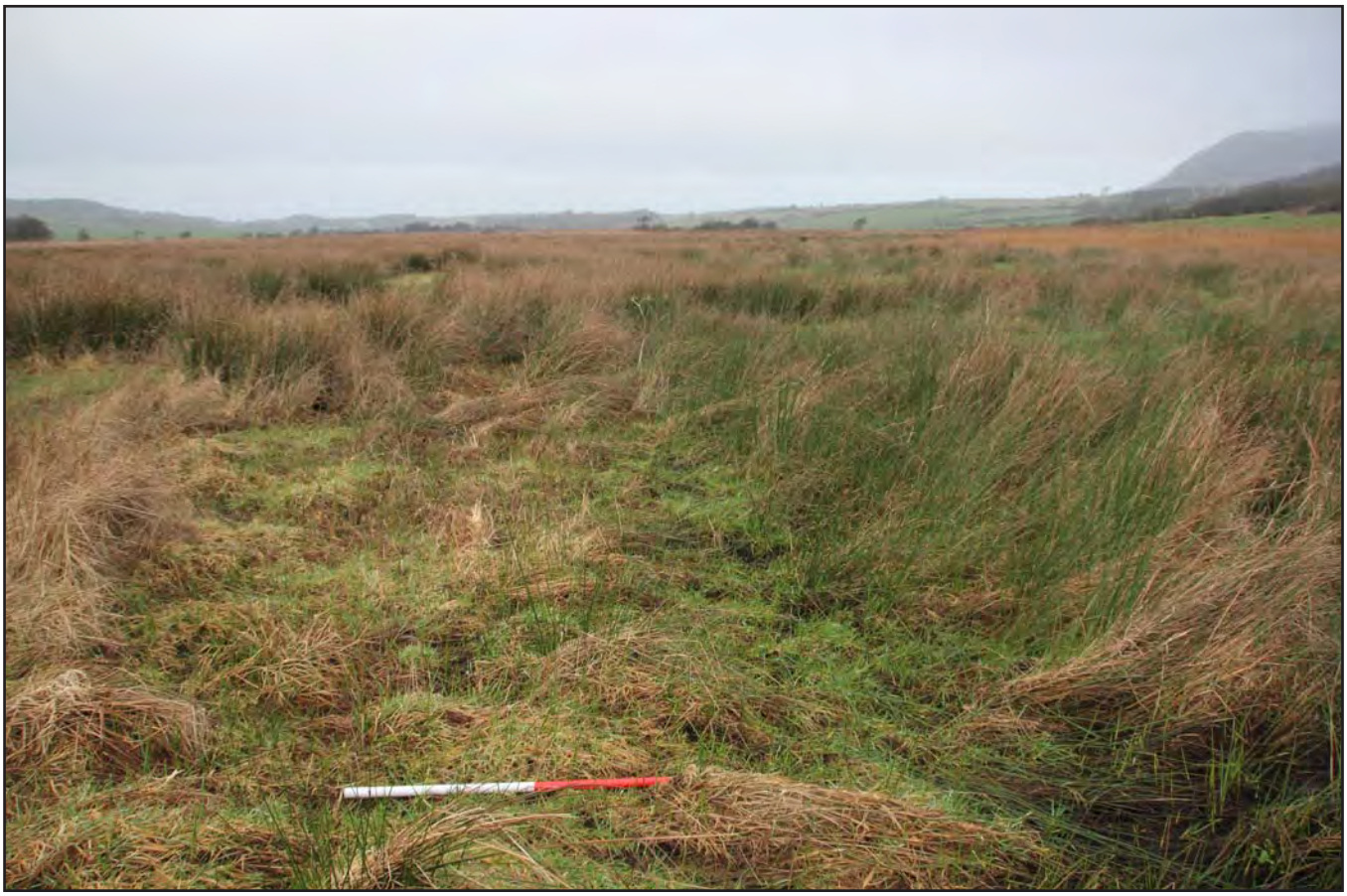

Plate 03: Gravel island and area of peat cutting (feature 3) from the southeast. Scale 1.0m.

Plate 04: Gravel island (feature 4) from the southwest. Scale 1.0m

Plate 05: Field boundary dyke (feature 5) from the northwest.

Plate 06: Peat-cutting machinery (feature 6) from the northeast. Scale 1.0m

Plate 07: Field boundary ditch (feature 7) from the southwest. Scale 1.0m.

Plate 08: Trackway (feature 8) from the south. Scale 1.0m

GEOARCHAEOLOGY OF THE MIRE AT MATHAN UCHAF, CORS GEIRCH SSSI, GWYNEDD

Stage 1: coring and geoarchaeological record

by ***Michael J. Allen, PhD, MIFA, FLS, FSA***

version 198.1.2
9th January 2013
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for:-
Richard Cooke, aeon archaeology

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GEOARCHAEOLOGY OF THE MIRE AT MATHAN UCHAF, CORS GEIRCH SSSI, GWYNEDD: *Stage 1~ coring and geoarchaeological record*

CONTENTS

List of Figures and Tables

NON-TECHNICAL SUMMARY

An area of *c* 3.5ha of wetlands at Cors Geirch, Mathan Uchaf, near Boduan, Gwynedd, on the centre of the Llŷn peninsula, was subjected to geoarchaeological investigation. A series of 22 hand cores were recorded which showed that almost the entire area studied was blanketed in black humified peat over brown fibrous peat typically of 0.75m thickness. These overlay sands (with fine gravels) probably of Late Glacial/Early post-glacial date. One sand island was recorded which is becoming engulfed in peat growth. The sequence shows a major environmental change at the beginning of the post-glacial period and long-term development of peat. There is clear potential for well-stratified and datable palaeo-environmental (pollen and diatom) sequences which have been rarely recovered and studied in north-west Wales. The sand island offers the potential for past human activity exploiting the resources of the wetland, and the potential exists for archaeological evidence both centred on the island, but also buried by the extensive peat deposits. This potential is, however, tempered by the general paucity of archaeological finds in the immediate catchment.

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AEA 198

GEOARCHAEOLOGY OF THE MIRE AT MATHAN UCHAF, CORS GEIRCH SSSI, GWYNEDD:

Stage 1~ coring and geoarchaeological record

The site comprises an area of wetland totalling approximately 3.5 hectares near Boduan, Gwynedd. Boduan is located towards the centre of the Llŷn peninsula, approximately 6.5km to the north-west of Pwllheli. The wetland at Mathan Uchaf is designated as a SAC, SSSI and Ramsar site

The area around Boduan, and north-west Wales generally, is covered by a myriad of small valley bogs and mires of which that Mathan Uchaf, Cors Geirach, SSSI is threaten by peat cutting, surface re-profiling, ditch diversion, and creation of constructed wetlands as part of a LIFE Project scheme. The Site is the area bounded by ditches and containing the auger points (Figs 1.1 and 1.2).

Aims and Objectives

A geoarchaeological survey was undertaken to:-

- test the location and extend of peat
- test the depth/thickness of the peat
- profile the peat to construct a deposit model,

This evidence then provides the basis with which to define the extent and depth of the peat and related deposits and consider the potential for buried and preserved archaeological sites and landscapes. The nature of the deposits can be evaluated for their likely palaeo-environmental potential. The data is then reviewed to address the:-

- geoarchaeological and palaeo-environmental potential
- possibility of the presence of buried archaeological sites and the significance
- archaeological significance in its landscape context

Topography, Geology and Soils

The mire occupies a broad glaciated valley and the north-eastern slope and mire dominated by Ashgill Rocks (undiff.) comprising Ordovician mudstones, silts and sandstones, with alluvium mapped in the valley and glacial sands and gravels on the north-eastern slope. To the south of the mire Ordovician Felsic lavas are overlain by superficial diamicton till.

The soils on the valley sides are brown earths with humic earthy peat soils at the base of the slope over well developed peats.

The north-eastern slope clearly drains into the mire, the footslope strip to the north-east of the drain and outside the survey area, was dominated by wet mire and marsh. The mire itself

is supported by high groundwater levels comprises marsh species, reeds and predominantly herbaceous vegetation providing good cover for ground-nesting birds. Many of the open pools of water contained a diatomitic film indicating the presence of diatoms in this open water.

Methods

Field Methods

Hand augering was conducted using a 2.5cm diameter gouge auger with a 1m long chamber to recover undisturbed sediment sequences. The profiles were cleaned with an auger spatula and described on site following standard pedological terminology (Hodgson 1976). Munsell colours were recorded moist in the field and used to define the main basic units. The location of all hand augering points was recorded using a hand-held GPS, and the hand auger points on the main transects (see below) were also surveyed in relation to each other using a dumpy level to obtain their relative heights.

A number of adjacent cores were taken using a 40mm diameter Russian corer with a 0.5m long chamber (Fig. 1.3) to recover a series overlapping undisturbed sediment profiles. These were transferred to sediment sleeves and examined and sampled at the AEA laboratory.

Laboratory methods

The cores were laid out in depth-related stratigraphic order and the exposed profile carefully cleaned. The profile was described in detail using an illuminated magnifier, and these descriptions (see Appendix 1) were used to amplify the field records where appropriate. Both sequences were sampled for pollen, with 51 samples taken at 10mm band-width and 40mm intervals through the majority of the sequence. Six samples were taken from on sequence 6 for diatoms (Table 1.1; Appendix 1). Ten samples of identifiable or recognisable short-lived plant matter were removed for consideration for AMS radiocarbon dating (Table 1.1).

Coring

Fieldwork was conducted on 3rd and 4th January 2013, and comprised 20 gouge auger records and two retrieved cores (Russian corer; 20 and 21).

Previous coring by Arup for the Countryside Council for Wales provided a transect at the footslope along the north-eastern edge of the Site, just to the south-west of the main drain (Figs 1.1 and 1.2). Further augering by Rob at CCW provided 6 additional records. To complement this and provide full spatial coverage to enable deposit modelling, three main auger transects were recorded perpendicular to the slope. These were augmented with five additional hand augered points between them providing further crude transects parallel to the slope (Figs 1.1 and 1.2).

This survey provided the basis for the deposit model, but also defined the best locations for coring and sampling. Although the sediment sequence was relatively uniform, some variation did occur and two key locations were cored using a 40mm diameter Russian corer with a 500mm long chamber (Fig. 1.3).

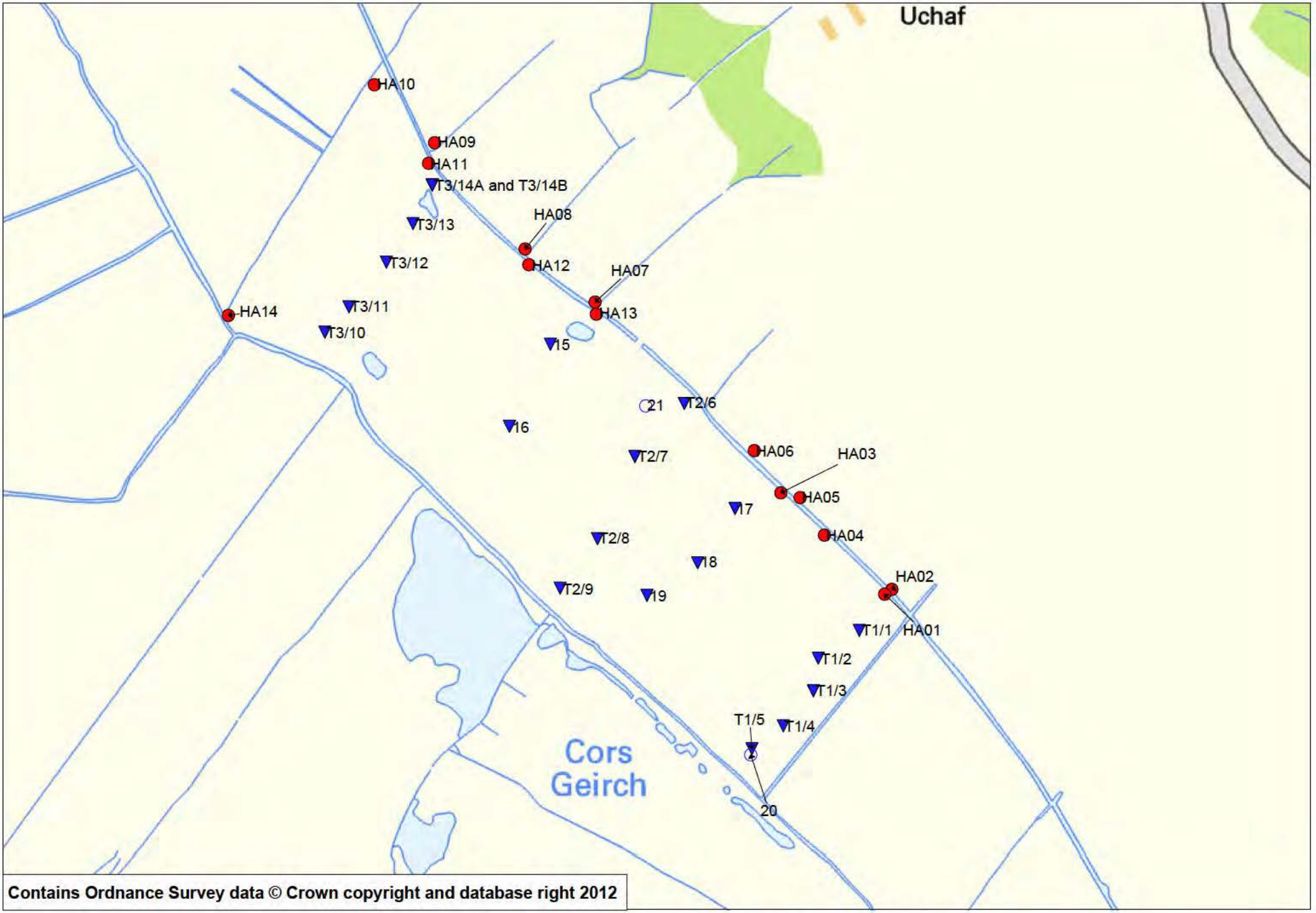

Figure 1.1: Plan of the auger points conducted (3-4 Jan 2013), showing previous points (in red) by Arup for CCW

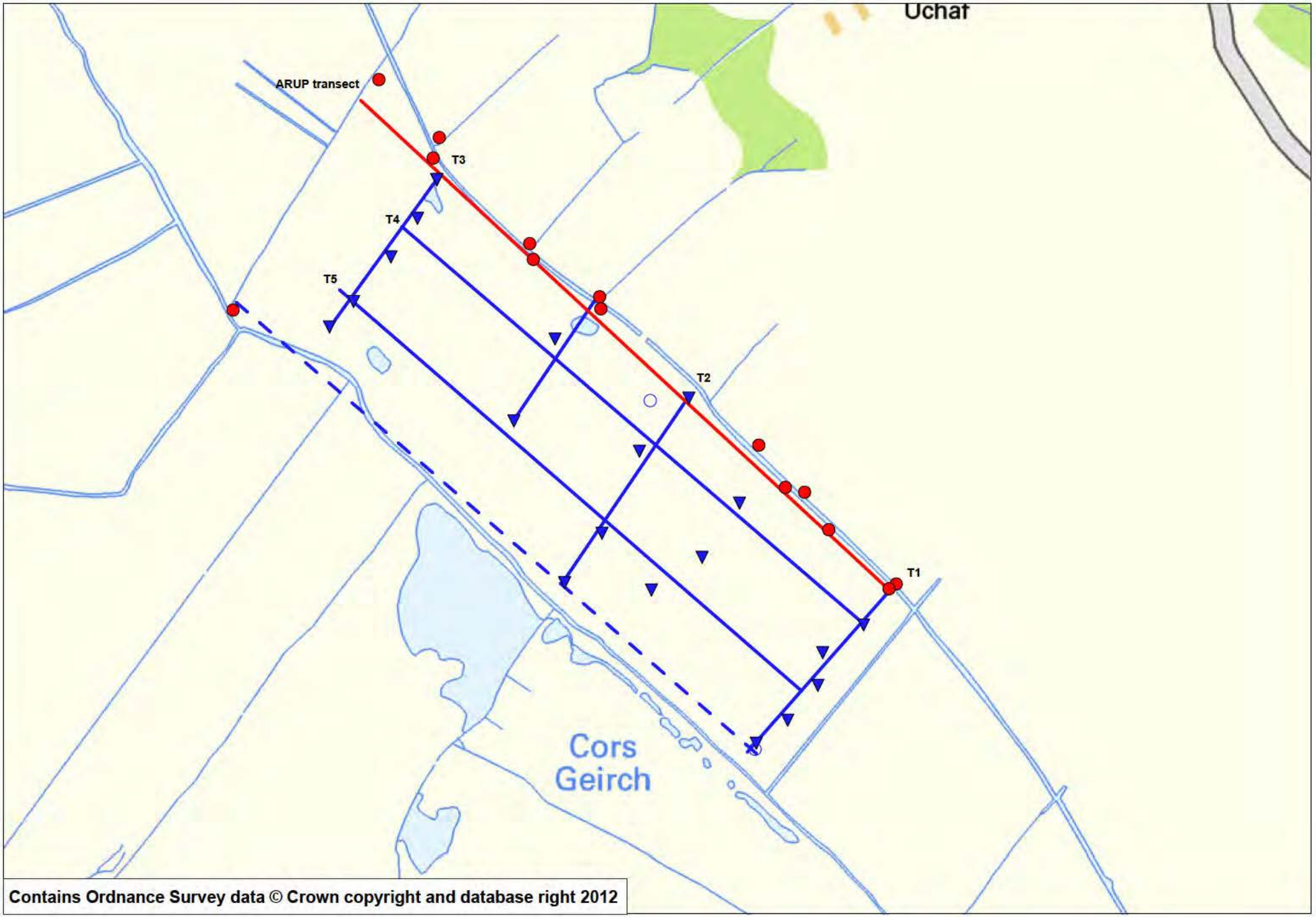

Figure 1.2: Plan of the auger transects (see Figures 1.7 and 1.8)

The deposit model draws on the 20 hand auger records and 2 core records undertaken here, and incorporates previous records (13 records by Peter Jones largely comprising the north-eastern transect), and 6 records further records, comprising a data base of 41 records.

Figure 1.3: Russian Core with 500mm of undisturbed sediment - peat over silts and sand (photograph © M.J. Allen 2013)

Site Condition

The valley floor supported tall *Carex* and *Juncus*-type vegetation (Fig. 1.4), with occasional small woody bushes, and tussocky ground vegetation (Fig. 1.5). During the fieldwork the groundwater level was high with surface water covering the vegetation over the majority of the area, at depths of generally 5cm to 30cm (Fig. 1.6), but with pools of water up to 0.6m deep. Subsurface ground conditions were, however, firm and peat deposits at depth were moist and firm not soft and saturated (Fig. 1.3)

Figure 1.4: Tall herbaceous and reed vegetation along the north-eastern edge of the wetlands adjacent to the drain (photograph © M.J. Allen 2013)

Although mapping the vegetation was not a part of this survey, there were clear areas of open drier short herbaceous vegetation (marked in Fig. 1.9), areas dominated by *Phragmites* reed, or *Carex / Juncus* which may reflect past land-use, or below ground soil and sediment or hydrological variations.

Figure 1.5:. Tussocky wetland vegetation and gouge auger (photograph © M.J. Allen 2013)

Figure 1.6: Low herbaceous wetland vegetation showing high standing groundwater (photograph © M.J. Allen 2013)

Deposits

The deposit are recorded in three 'north-south' profiles (Fig. 1.7) and three 'west-east' profiles (Fig. 1.8). The deposits can be summarised as follows:-

Stratigraphic deposit history

1. Clay: A 'very soft grey/blue clay' was recorded in as the lowest basal beneath sand in only one core (HA06) occurring at 0.8m depth (17.3m OD) and beneath the ubiquitous sands (and fine gavels). This deposit was not encountered in any of the 22 cores undertaken and is, therefore, assumed to represent a minor cannel, or even localised depression infilled with 'clay' and subsumed by the fluvial sands.

2a. Sand (and fine gravel): A fine to medium greyish to greyish blue well-sorted sand was recorded ubiquitously across the site in almost all previous and current records, and represents the base of the recorded Holocene sequence. These sands represent fluvial and alluvial channel deposition at the base of the sequence. Although the deposit is predominantly sandy it was clear from the augering that the deposits penetrated were sandy but contained a few small stones (fine gravel). The 2.5cm diameter gouge will not recover or record stones, but no significant number of stones were 'heard or felt' during augering. Stonier deposits with gravel may occur at depth and this would be typical of the fining of riverine gravel deposits becoming dominated by finer-grained clasts and then sand toward the top of the sequence. Sands were recorded to maximum thickness of 0.35m (auger 16) and no more than 1.15m depth (T1/5). Where it lay over clay but under peat (HA06) it was only 0.1m thick. This may represent Late Glacial or Early post-glacial channel deposits.

2b. Silt: At the top of the sand, in some places, a thin deposit of greyish to bluish gray stone-free silt was present, represent the final fining of alluvial deposits. Both the sand or silt were engulfed by peats, but in all records the boundary between the two was abrupt to sharp an erosive episode and the loss of this upper alluvial sequence, rather than a gradual development from an alluvial and riverine environment to the onset of paludification (peat forming conditions) and the development of the mire.

3. Brown Fibrous Peat:- A thick brown and reddish brown fibrous peat with recognisable plant matter and non-vertical stems occurs across the valley floor up to between 0.16m and 1.07m thick, but generally greater than 0.4m thick. The only place within the entire Site that this did not occur was at T3 10 and 11 where a gravel island with no deposits was recorded (Fig. 1.9). This indicated the change from fluvial conditions to the development of a valley bog and mire and the growth of hugh groundwater levels but the development of a rich marsh and bog vegetation

3b. Silt Inwash Band:- A dark grey silt band was recorded at the top of the brown fibrous peat in cores T1/3, T2/6 and T2/7 (Fig. 1.7) and a thinner less distinct silt band within the brow fibrous peat in cores T3/14 and T4/17. T

4. Black Humified Peat:- Lying above the brown fibrous peat, and under the earthy peat soils was a black humifed peat with many fine roots, but little recognisable plant matter in a humic (slightly silty) soft peat. This may represent subtle changes in local conditions (occurring after then main silt inwash band in one locality, see Fig. 1.9), or represent post-deposition degradation of the plant matter due to fluctuation ground water conditions.

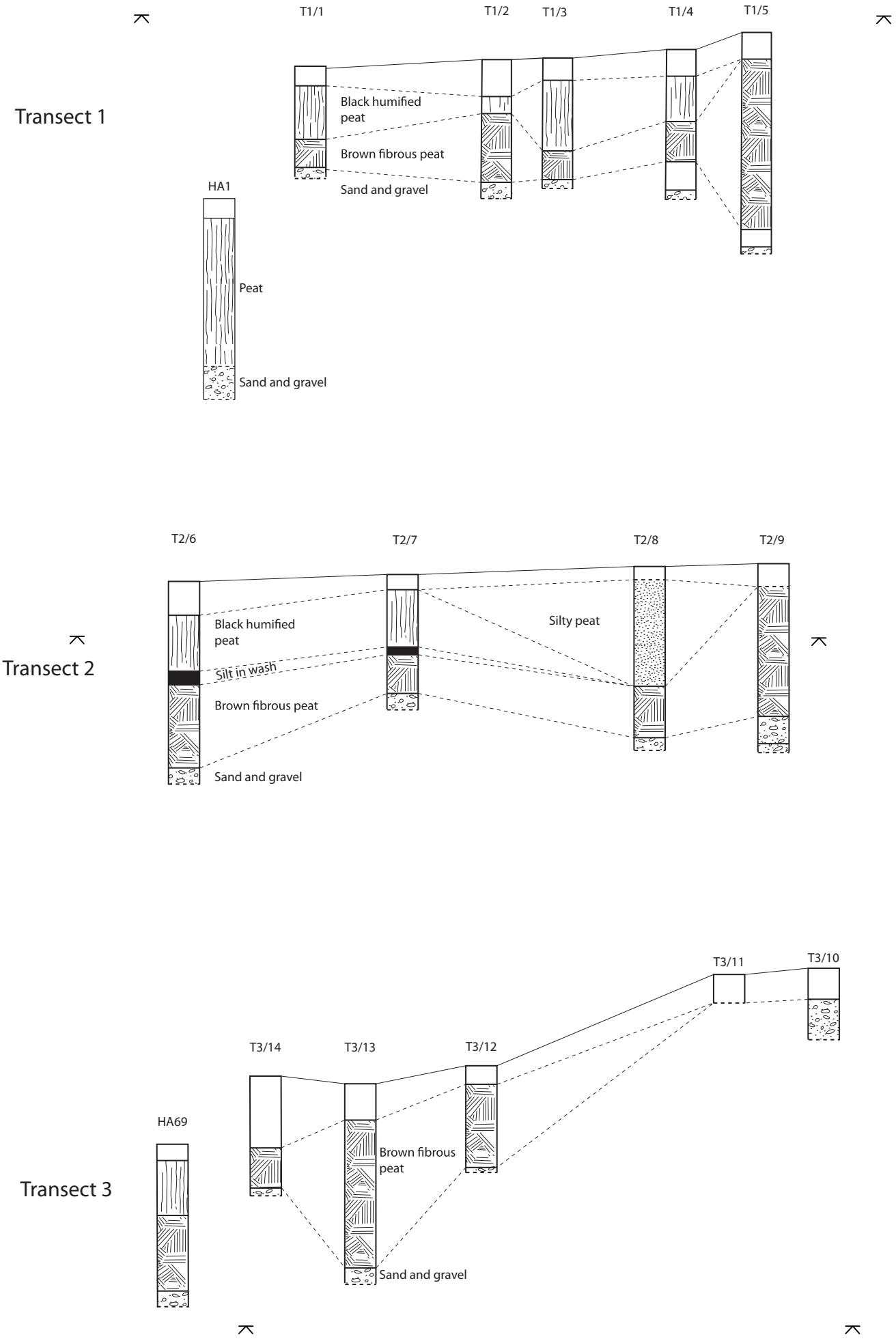

Figure 1.7: 'North-south' sediment profiles

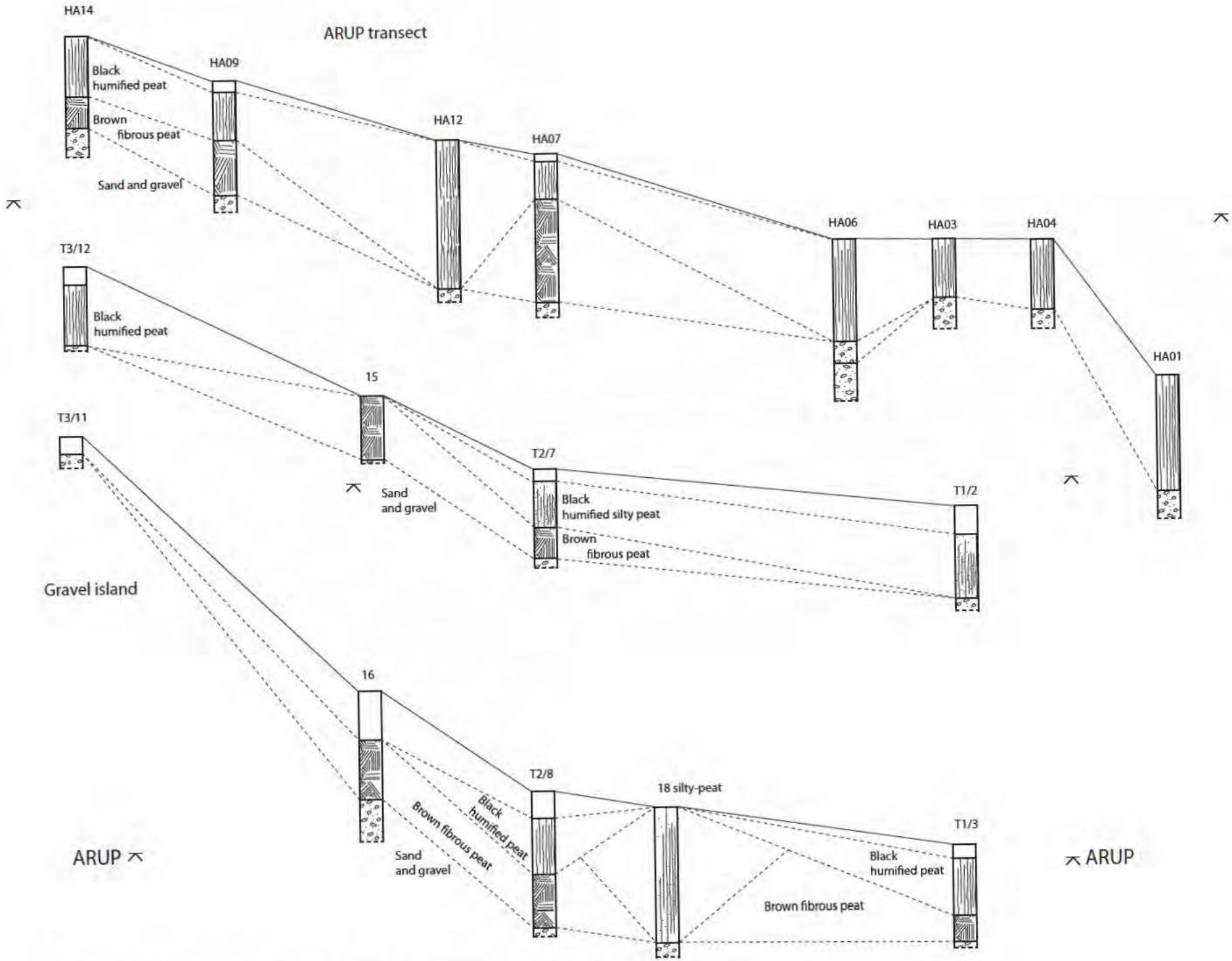

Figure 1.8: 'West-east' sediment profiles including Arup profile

5. Silty Peat:- In two locations (T2/8 and 18) relatively deep (0.3m and 0.91m) of soft silty peat was recovered, probably represent infilled channels, or pools or cuttings in the mire. As no definition or extent of these could be defined by the relatively wide-spaced augering, these have not been included in the deposit modelling (Fig. 1.9) but are a part of the wider landscape history.

Discussion

The geoarchaeological record is presented in summary above, and in detail in Appendix 1. From the profiles it is clear that the valley floor within the Site is essentially level, though beyond the main drainage ditch the land falls slightly towards the middle of the Site before rising at its south-western edge (Fig. 1.7). The valley floor, however, drops from west to east initially, but then is broadly level (Fig. 1.8). The distribution of the sediments is mapped in the deposit model in Figure 1.9.

Extent and nature of the peat

Either black humified peat or brown fibrous peat occurs across the majority of the Site, typically to depths of 0.7 to 0.75m depth, but up to 1.07m. The peat is clearly stratified *in situ* deposits forming in mire and bog conditions. The brown fibrous peat being less humified contains more recognisable plant remains, principally cellulose- rich stems (some of which seemed to be *Phragmites*), and rare fine wood twigs and woody fragments. Noticeably fewer recognisable plant remains were present in the upper black humified peat, which contained more common fine fleshy and fibrous roots. Only area of clearly drier vegetation (Fig. 1.9) was not covered by peat - this was the sand island. The peat represents a long history of valley mire development.

Silt inwash

Silt inwashes were recorded as single within the peat and thin (20-60mm) bands; either within the brown fibrous peat (T3/14 and T4/17) of at the junction of the humified and fibrous peat (T2/6 and T2/7). These are found on the north-eastern half of the site south of the valley slope and main drain and probably present spring flushes from the valley or overbank flooding from channels along the valley edge. These seem to represent only one of two episodes of alluviated silt punctuation the peat development

Islands

Although the peat was extensive, one area devoid of peat was defined (T3/10 and T3/11) and this is a sand (and gravel) island. The approximate size and shape of the island was gauged from the vegetation (Fig. 1.9). The potential of the presence of this island is discussed below, however other such smaller islands may exist. No obvious similar areas of drier vegetation were noted with the exception of that between 17 and 18 which was test cored and revealed a full peat sequence.

Summary ~ Sedimentary and local mire history

The valley floor contains fluvial sands, possibly relating to increased runoff in the valley during Late Glacial and Early post-glacial periods. The valley floor probably existed as an open, largely un- or poorly vegetated expanse with a number of river channels (braids) separated by low sand islands, some of which were prominent enough to form distinct areas of higher ground.

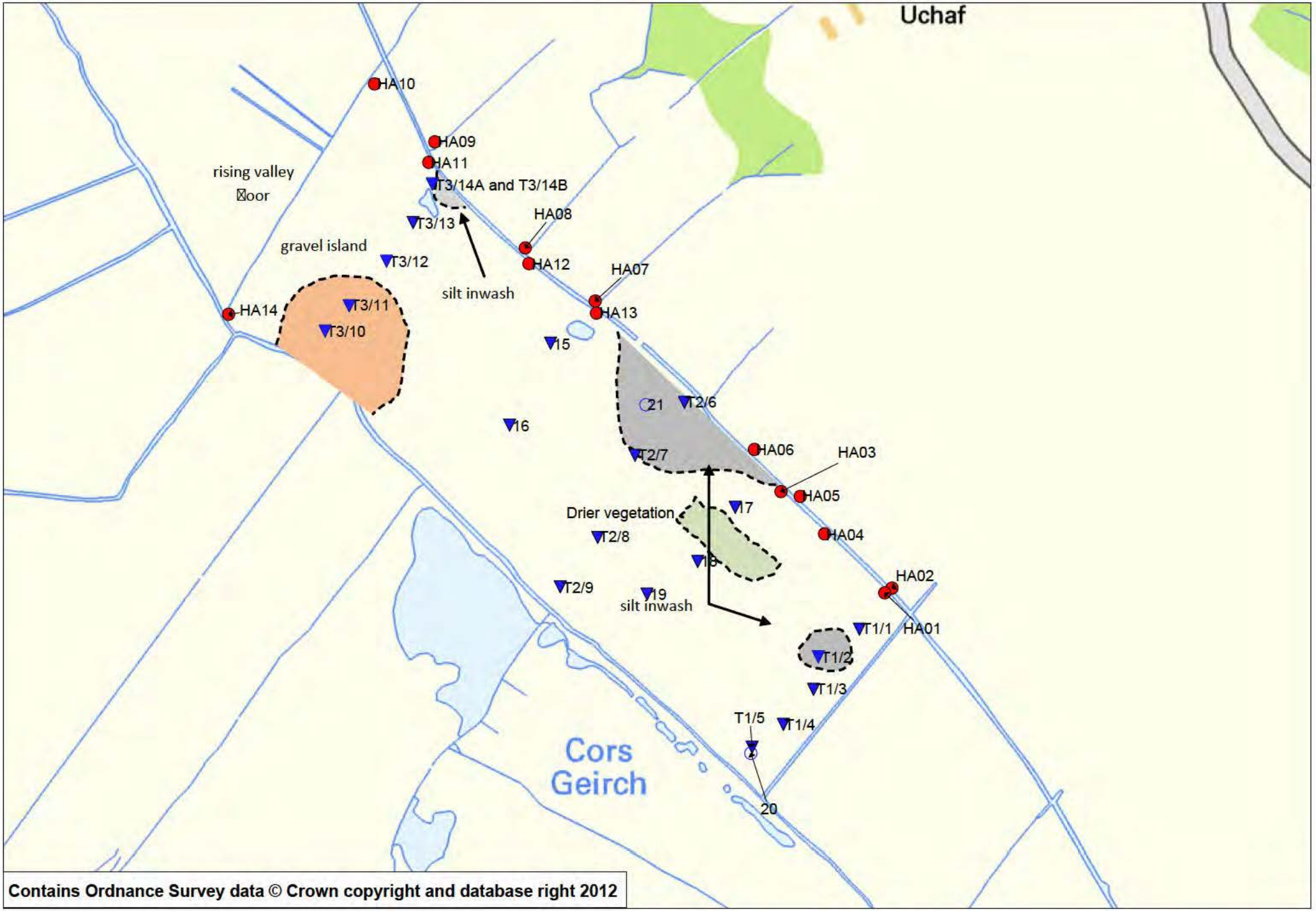

Figure 1.9: Deposit model plan

A major and rapid change in the sediment record probably represents the onset of warmer climatic conditions at the onset of the Holocene. Higher ground water tables, and less water flow through the valley lead to paludification and peat formation as the valley floor became swamped in peat and bog vegetation. As the peat developed, initially some sand islands would have been exposed within the valley floor as localised higher and drier area (Fig. 1.9), but eventually became virtually entirely engulfed in the growing peat mire. The mire developed from this period and is still developing today.

Potential and Significance

This geoarchaeological record allows us to consider some the archaeological potential and significance of both the deposits themselves, but also of the valley floor mire within the site.

Potential palaeo-environmental significance

Pollen: No formal assessment of the presence or nature of the pollen assemblages has been undertaken. Nevertheless, mires such as this are usually pollen-rich and contain long vegetation histories relating to the local landscape, and Cors Geirch is no exception. The archaeological relevance of this may, however, be in question because the general paucity of significant, especially prehistoric, sites within the immediate catchment. However, few palaeo-environmental studies have been conducted in North-west Wales in contrast to other areas. Considerable numbers palaeo-geographic and palaeo-environmental studies have been conducted in South Wales (e.g. Chambers *et al.* 2007a; 2007b; 2001, Jones *et al.* 2006; and Walker *et al.* 2009; 2006; 2001), many relating directly or indirectly to archaeological sites, most notably (e.g. Barland's Farm; Walker 2004), and in Mid Wales (e.g. Lewin 1992; Lewin *et al.* 1983). There are relatively little, if any, relevant comparable studies in north west Wales. As such this significantly raises the significance of the information here and of the potential of the sampled core (core 20 and 21; see Table 1.1 and Appendix 1)

Diatoms: Again no formal assessment of the presence of palaeo-diatom assemblages has been undertaken, but diatomitic film on the open water indicates their occurrence today. The presence of diatom frustules within the peat is likely. Diatoms, living in aquatic and semi-aquatic habitats, have the potential to provide information about the nature of the water; water chemistry, pH and nutrient levels, water temperature and climate, water depth and flow rates and the aquatic vegetation and flow regime as well as different types of human disturbance.

Both of these data can provide information about the changing environment, and potentially detect human disturbance and direct or indirect modification the mire and adjacent landscape. In order to provide a long history of events there is a necessity to date key points in the sequence; i.e. base of peat develop, top of peat development and key stratigraphical or bio-stratigraphical changes within it. The humic nature of the sequence and presence of recognisable *in situ* plant material provides the potential to obtain the dating required.

Palaeo-geography- palaeo-channels and islands

There seems little evidence of major palaeo-channels which might augments the palaeo-environmental record, and the valley floor pre-mire channels were probably broad and shallow. However the presence of sand islands is important. These provide the potential for

temporary human habitation and are typical loci of human activities; temporary camps, and location for the exploitation of riverine and mire resources. Typically prehistoric activity has been found on such topographical features in the form of artefact distributions around their edges, ephemeral features and even preserved wooden structures or artefacts. The presence of islands within the mire increases the potential for ephemeral human activity, and thus potentially raises the significance of both the site, and the palaeo-environmental data it preserves (cf. Needham and Macklin 1992).

Buried soils and landscapes
The peat has the potential to preserve former land-surfaces and buried soils; but there is no evidence of this. More importantly, however, it has the potential to bury, seal, engulf and incorporate evidence of human activity. Human activity may be restricted to the valley floor, and island fringes, where the rich and diverse resources were being exploited, and such evidence is often undetectable by normal archaeological reconnaissance; aerial photography, artefacts scatters, surface test pit evidence etc. (cf. Allen 1991; 2005; Needham and Macklin 1992; Bell 1992). In this location the waterlogged nature of the deposits would facilitate the preservation of wood, plant remains and textiles etc.

Recommendations

1. Palaeo-environmental assessment and analyses
1.1 The assessment, and if appropriate, the analysis of one full pollen sequence - probably core 21 as this has the better preservation and is within the area of proposed disturbance.

1.2. Diatom assessment and analysis at crude intervals of the same sequence.

1.3. Two or three AMS radiocarbon dates on individual recognisable plant items from top and base of the sequence and potentially at key physical of bio-stratigraphical changes, i.e. the junction of the brown fibrous peat and the black humified peat.

1.4. Reporting that puts these data, and this evidence into an archaeological rather a purely palaeo-environmental, context.

2. Geoarchaeology and archaeology
2.1 The profile and deposit model information presented here should be used to place any palaeo-environmental studies into their broader context (see 1.1, 1.2 and 1.4).

2.2. Further coring is unlikely to significantly increase the deposit model resolution unless a substantial major systematic coring programme is undertaken. In view of the minimal archaeological potential the presence of archaeology and archaeological artefacts especially on, or at the fringes of, any islands could be tested by limited field work on the island (Fig. 1.9) and watching brief conducted during any intrusive and destructive works along the north-eastern edge of the Site where peat cutting and extraction is proposed

Acknowledgements
Fieldwork would not have been possible without the field assistance and GPS recording of Richard Cooke, Aeon Archaeology, who not only commissioned this work but also provided

figures 1.1, 1.2, 1.7, 1.8 and 1.9 from my drafts. Dyfed Jones provided evidence of previous augering and fruitful and useful discussions with Jenny Emmett are acknowledged.

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CORE 20			*CORE 21*			
Sedimentary Unit	**Pollen samples**	**C14 samples**	**Sedimentary Unit**	**Pollen samples**	**Diatom samples**	**C14 samples**
black humic silt	4cm 8cm 12cm	7cm	black humic silt	4cm 8cm		
			dark brown fibrous peat	12cm 16cm 20cm 24cm 28cm 32cm 26cm 40cm 44cm 48cm 52cm 56cm 60cm	12cm 28cm 44cm 60cm	 22cm 43cm
very dark brown organic peaty silt, with less plant matter and more humified from 65cm	16cm 20cm 24cm 28cm 32cm 36cm 40cm 44cm 48cm 52cm 56cm 60cm 64cm	40cm	very dark brown humic peaty silt	64cm 68cm 72cm 76cm 80cm 84cm 88cm	 76cm	64cm 88cm
dark grey silt	68cm 72cm 76cm 80cm 84cm 88cm 92cm 96cm 100cm	80cm 92cm 96cm 97cm				
sand and gravel	104cm 108cm		dark grey sand	92cm 96cm	92cm	
total samples	27	6		24	6	4
grand totals	32			34		

Table 1.1: List of subsamples removed from the two sediment core profiles

APPENDIX 1: Sediment records

AEA 198 Cors Geirch (Mathan Uchaf) cores recorded 3 and 4 January 2013 records

Transect 1

T1 / 1: SH31696 / 36346

Depth (cm)	*Unit*	*Sample*	*Description*
20cm			Standing water
0-13	peaty soil		Ah; very dark brown humic silt with vegetation
13-40	Blk HP		Black humified peat, clear boundary
40-56	Bwn FP		Peat with fibrous plant matter, sharp boundary
56-60	Alluvium		Bluish grey silt over medium sand

T1 / 2: SH31662 / 36323

Depth (cm)	*Unit*	*Sample*	*Description*
27cm			Standing water
0-21	peaty soil		Black humified silty peat
21-27	Blk HP		Black to very dark brown less humified silty peat with some recognisable plant matter , abrupt boundary
27-65	Bwn FP		Dark reddish brown peat with common plant remains, sharp boundary
65-71+	Alluvium		Light bluish grey medium sand

T1 / 3: SH31658 / 36296

Depth (cm)	*Unit*	*Sample*	*Description*
12cm			Standing water
0-10	peaty soil		Very loose humified silt with many roots
10-47	Blk HP		Humified reddish brown peat with 2cm silt band inwash 2cm thick at base, clear to abrupt boundary
47-67	Bwn FP		Light brown firm fibrous peat, sharp boundary
67-70+	Alluvium		Sand (not recovered)

T1 / 4: SH31633 / 36367

Depth (cm)	*Unit*	*Sample*	*Description*
15cm			Standing water and loose soil/mud
0-14	peaty soil		Loose vegetation and mud
14-45	Blk HP		Black humified silty peat, clear to abrupt boundary
45-60	Bwn FP		Dark brown firm peat with recognisable plant matter, sharp boundary
60-63	silt alluvium		Greyish blue silt
63-83+	alluvium		Light grey sand

T1 / 5: SH31607 / 36248

Depth (cm)	*Unit*	*Sample*	*Description*
0-14	peaty soil		Dark Brown/black humified soft vegetative detritus, sharp to abrupt boundary
14-107	Bwn FP		Reddish brown firm peat, sharp boundary
107-115	Alluvium		Greyish blue (Gley 2 67/10B) silt, abrupt boundary
115-125+	Alluvium		Light bluish grey sand

Transect 2

T2 / 6: SH31551 / 36534

Depth (cm)	*Unit*	*Sample*	*Description*
18cm			Standing water
0-16	peaty soil		Black humified silty peat
21-47	Blk HP		Black to dark brown humified, becoming fibrous peat, abrupt boundary
47-53	silt inwash		Dark grey silt band
53-102	Bwn FP		Dark brown silty peat, recognisable plant matter @ 92 vertical woody root sharp boundary
102-109+	Alluvium		Silt over sand

T2 / 7: SH31510 / 36490

Depth (cm)	*Unit*	*Sample*	*Description*
33cm			Standing water
0-8	peaty soil		Dark greyish black humic silt
8-39	Bwn FP		Reddish brown peat and roots
39-44	silt inwash		Dark grey silt band
44-45	Bwn FP		Dark greyish brown silty peat, abrupt boundary
45-64	Bwn FP		Brown dry peat and plant matter and woody, sharp boundary
64-67+	Alluvium		Grey medium sand, rare very small stones

T2 / 8: SH31479 / 36422

Depth (cm)	*Unit*	*Sample*	*Description*
24cm			Standing water
0-16	peaty soil		Dark grey to black humic silt and plant matter
16-56	Blk HP		Silty peat, abrupt boundary
56-89	Bwn FP		Reddish brown fibrous peat, sharp boundary
89-101	Alluvium		Grey silt over sand

T2 / 9: SH31448 / 36381

Depth (cm)	*Unit*	*Sample*	*Description*
18cm			Standing water
0-16	peaty soil		Dark grey to black humic silt and plant matter
16-84	Bwn FP		Reddish brown peat, sharp boundary
84-100	Silt alluvium		Grey silt
100-102+	Alluvium		Bluish grey sand

Transect 3

T3 / 10: SH31253 / 36593

Depth (cm)	*Unit*	*Sample*	*Description*
0-20			Very dark grey humic sand and vegetation
20-40+	Alluvium		Yellowish brown medium sand

T3 / 11: SH31273 / 36614

Depth (cm)	*Unit*	*Sample*	*Description*
0-12+	Alluvium		Dark grey sand and fine gravel in a humic silt (Ah) matrix

T3 / 12: SH31304 / 36651

Depth (cm)	*Unit*	*Sample*	*Description*
0-13	peaty soil		Very dark grey to black humic silt and roots
13-52	Bwn FP		Reddish brown fibrous peat, sharp boundary
52-54+	Alluvium		Sand (most not recovered)

T3 / 13: SH31326 / 36683

Depth (cm)	*Unit*	*Sample*	*Description*
25cm			Standing water
0-20	peaty soil		Very dark grey to black humic silt
40-102	Bwn FP		Reddish brown uniform fibrous peat, sharp boundary
107-110+	Alluvium		Sand

T3 / 14A: SH31342 / 36715

Depth (cm)	*Unit*	*Sample*	*Description*
0-80	Bwn FP		Reddish brown peat
80+	stone		Stone

T3 / 14B: SH31342 / 36715

Depth (cm)	*Unit*	*Sample*	*Description*
15cm			Standing water
0-37	Bwn FP		Dark brown to reddish brown peat
37-41	silt inwash		humic silt band with rare snails
41-65	Bwn FP		Reddish brown fibrous peat
65+	stone		Stone/gravel

Transects 4 & 5 and intermediate auger points

T4 / 15: SH31440 / 36583

Depth (cm)	*Unit*	*Sample*	*Description*
9cm			Standing water
0-59	Bwn FP		Dark brown developing to reddish brown fibrous peat, sharp boundary
59+	Alluvium		Grey sand

T5 / 16: SH31407 / 36515

Depth (cm)	*Unit*	*Sample*	*Description*
11cm			Standing water
0-28	peaty soil		Very dark grey to black humic silt
28-70	Bwn FP		Reddish brown to dark brown peat, abrupt boundary
70-105+	Alluvium		Grey silt over sand

T4 / 17: SH31593 / 36477

Depth (cm)	*Unit*	*Sample*	*Description*
19cm			Standing water
0-4	peaty soil		Black humic silt/silty peat
4-54	Bwn FP		Reddish brown fibrous peat, clear boundary
54-59	Bwn FP		Black to dark brown peat with some silt
59-63	silt inwash		Grey silt inwash lens
63-68	Bwn FP		Dark brown peat, sharp boundary
68-69	silt alluvium		Grey silt
69-81+	Alluvium		Grey sand

T5 / 18: SH31562 / 36402

Depth (cm)	*Unit*	*Sample*	*Description*
20cm			Standing water
0-91	Bwn FP		Reddish brown to dark brown peat with wood and roots @ 71cm shale stone @ 80-91cm wood and root sharp boundary
91-100+	Alluvium		Grey sand

T5 / 19: SH31520 / 36375

Depth (cm)	*Unit*	*Sample*	*Description*
11cm			Standing water
0-12	peaty soil		Very dark grey / black humic silt
12-83	Bwn FP		Reddish brown to dark brown peat, sharp to abrupt boundary
83-91	silt alluvium		Grey silt
91-109+	Alluvium		Grey medium sand

Russian Cores 20 and 21

Russian Core 20 (= T1/5) SH 31606 / 36243

Depth (cm)	*Unit*	*Sample*	*Description*
0-14	peaty soil	4cm 8cm 12cm	Black (10YR 2/1) humic silty mud, common very fine fibrous and some woody roots and some medium stems clear boundary C^{14} - 7cm horizontal stem
14-45	Blk HP	16cm 20cm 24cm 28cm 32cm 36cm 40cm	Very dark brown (10YR 2/2) organic peaty silt with many fine stems and plant matter, highly humified to 45cm, C^{14} - 40cm recognisable plant matter
45-65	Blk HP	44cm 48cm 52cm 56cm 60cm 64cm	very dark brown becoming less humified, silty more silt content - transition
65-94cm	Bwn FP	68cm 72cm 76cm 80cm 84cm 88cm 92cm	Dark brown fibrous peat with plant matter more recognisable C^{14} - 80cm recognisable plant matter C^{14} - 92cm vegetation detritus
94-99	transition	96cm	Dark grey silty peat, abrupt to sharp boundary C^{14} - 96cm - recognisable plant matter C^{14} - 97cm fine twig
99-103	silt alluvium	100cm	Grey (10YR 4/1) smooth silt, rare sand particles, abrupt boundary
103-110+	Alluvium	104cm 108cm	Grey (gley 1 5/2) to bluish grey (gley 2 5/10B) well-sorted fine-medium sand, rare small gravel

Russian Core 21 (= T2/6) SH 31519 / 36532

Depth (cm)	*Unit*	*Sample* D=diatoms	*Description*
0-11		4cm 8cm	Black to very dark brown loose humic peaty silt with many fine roots
11-30		12cm D 16cm 20cm 24cm 28cm D	Dark brown (10YR 3/3-4) transition C^{14} - 24cm horizontal stem
30-63		32cm 36cm 40cm 44cm D 48cm 52cm 56cm 60cm D	Dark brown (7.5YR 3/3) humic fibrous peat with common vegetation stems and rare fine woody fragments, clear boundary C^{14} - 43cm fine wood fragment
63-91		64cm 68cm 72cm 76cm D 80cm 84cm 88cm	C^{14} - 64cm fine twig Dark brown firm fibrous peat with comminuted plant stems and plant matter, sharp boundary C^{14} - 88cm recognisable plant matter
91-95+		92cm D	

PROJECT DESIGN FOR ARCHAEOLOGICAL ASSESSMENT

TENDER CODE: T0010

SITE: Mathan Uchaf (Cors Geirch), Boduan, Gwynedd

NGR: 231484/ 336512

PLANNING REF: C12/1176/33/MW

DATE: 13th December 2012

PREPARED FOR: Countryside Council for Wales (CCW)

æon archæology

1. INTRODUCTION

Aeon Archaeology has been asked by The Countryside Council for Wales (CCW) to provide a cost and project design for carrying out an archaeological assessment of a 3.5 hectare area of land as part of a planning application (ref: **C12/1176/33/MW**) for the extraction of peat and enriched soil, in order to support a programme of conservation to restore the wetland habitat. The site comprises an area of wetland located near Boduan, Gwynedd towards the centre of the Llyn Peninsula (centred on NGR **SH** 31484 36512).

A mitigation brief has been prepared for this scheme by the Gwynedd Archaeological Planning Service (GAPS) (ref: **D1721**), and recommendation has been given for an archaeological assessment of the proposed development area. It is recommended that the content of this design be approved by GAPS

This design will conform to the guidelines specified in *Standard and Guidance for Archaeological Desk-based Assessment* (Institute of Field Archaeologists, 1994, rev. 2001, 2008).

2. STATUTORY AND NON-STATUTORY DESIGNATIONS

The site lies within or in proximity to the following designated areas:

(i) Within the Cors Geirch National Nature Reserve (NNR).

(ii) Within the Cors Geirch Special Area of Conservation (SAC).

(iii) Within the Cors Geirch Site of Special Scientific Interest (SSSI).

(iv) Within the Cors Geirch Ramsar site.

(v) Approximately 0.6 km northeast of the grade II Listed Building of Neuadd Bodgadle (PRN: 11336).

(vi) Approximately 0.7 km east of the grade II Listed Building of Ty'n-y-Coed (PRN: 11547).

3. ARCHAEOLOGICAL BACKGROUND

There are no known archaeological sites within the proposed development area, however the wetland of Cors Geirch is believed to have been in existence since at least the medieval period. In close proximity to the site lies the grade II Listed Building of Neuadd Bodgadle Farmhouse (PRN: 11336), a 17th century two storey cottage. Also in close proximity to the site is the grade II Listed Building of Ty'n-y-Coed (PRN: 11547), an early 18th century two storey cottage and features associated with peat cutting (PRN: 1742) have been observed, although the age of these is not currently known.

In the wider landscape the prehistoric and Roman periods are fairly well represented, with the prehistoric hillfort and Scheduled Ancient Monument of Garn Boduan (PRN: 446) lying approximately 2.8 km to the north, and the prehistoric hillfort and Scheduled Ancient Monument of Carn Fadryn Camp (PRN: 425) lying approximately 3.0 km to the west. In addition to this, a suspected Roman cremation cemetery (PRN: 3650) was found approximately 2.5 km to the east of the site and the Scheduled Ancient Monument of a Roman hut circle settlement (PRN: 447) is located approximately 3.0 km to the north.

The site has not been included within any other archaeological study aside from its inclusion within the Historic Landscape Characterisation project (PRN: 33495).

4. ARCHAEOLOGICAL AIMS

An archaeological desk-based assessment is defined as "a programme of assessment of the known or potential archaeological resource within a specified area or site on land, inter-tidal zone or underwater. It consists of a collation of existing written, graphic, photographic and electronic information in order to identify the likely character, extent, quality and worth of the known or potential archaeological resource in a local, regional, national or international context as appropriate" (IFA 2008, 2)

The aims of the archaeological assessment are:

(i) to identify and record archaeological and historical assets within a given site or location;

(ii) to evaluate the importance of the identified archaeological and historical assets;

(iii) to recommend ways in which impact upon the archaeological and cultural assets identified can be avoided, negated, or mitigated for.

(iv) to create an archaeological deposit model which will incorporate the results of a programme of environmental deposit assessment via hand-auger transects, to graphically represent the archaeological potential of the site.

For the above aims to be met it is sometimes necessary to undertake a programme of field evaluation once the archaeological desk-based assessment has been completed. This is sometimes required as not all sites can be assessed by desk-based work alone, and may require additional investigation to correctly identify or evaluate them. This usually takes the form of a geophysical survey or trial excavation, although measured survey, supervised metal detector survey, and other forms of non-intrusive geophysical survey can sometimes be used.

The archaeological desk-based assessment will make recommendations for any further investigation/ evaluation work if and when required.

5. PROGRAMME OF WORK

5.1 Introduction

The archaeological desk-based assessment will consider the following:

(i) The history of the site
(ii) The assessment of impact of development on archaeological remains
(iii) The assessment impact of development on the setting of sites of archaeological importance
(iv) The requirements for further assessment in the form of non-intrusive and intrusive field evaluation.

The archaeological desk-based assessment will be undertaken in four stages:

(i) Archival research
(ii) Field visit including environmental hand auger transects
(iii) Report compilation
(iv) Project archive

5.2 Archival Research

The archaeological desk-based assessment will involve a study of the following records:

The regional Historic Environment Record (Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, and secondary information held within the record which includes unpublished reports, the 1:2500 County Series Ordnance Survey maps, and the National Archaeological Record index cards.

The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth, SY23 1NJ) will be checked for sites additional to the HER, and if required additional supporting information will be examined at the NMR.

Information about Listed Buildings and Scheduled Ancient Monuments from Cadw will be examined in the regional HER, with supporting information from Cadw if required. The Register of Outstanding and Special Historic Landscapes and the Register of Parks and Gardens will be checked, and also the location of World Heritage Sites.

Secondary sources will be examined, including the Inventories of the Royal Commission on Ancient and Historical Monuments for Wales, and works held within the regional libraries. Indices to relevant journals, including county history and archaeology society journals and national society journals such as *Archaeologia Cambrensis* will be checked. Also at this stage 19th century topographical dictionaries, antiquarian tours and trade directories will be examined where relevant.

Evidence from aerial photographs will be collated. Vertical and oblique collections held by the NMR, CCW and Welsh Government will be considered for examination. All photographs examined will be listed in the assessment report.

Archive maps, where relevant, will be consulted in the National Library of Wales at Aberystwyth, and at the Gwynedd archives. This will include the relevant estate maps and tithe maps and information from Land Tax Assessments. Where relevant antiquarian prints and photographs from the national and regional archives will be examined.

Results from previous archaeological work within the area will also be reviewed.

5.3 Field survey

The field survey will involve a walkover of the proposed development site and its immediate environs by a suitably qualified archaeologist. Any upstanding or physical remains of sites identified during the archival research stage will be assessed, and any new sites noted will be assessed. All sites observed will be photographed using a digital SLR camera set to maximum resolution, and photographs will be taken from, to, and between significant viewpoints if deemed necessary. The potential locations for well preserved environmental deposits will be noted. All sites will be assigned a twelve figure national grid reference.

As part of the archaeological assessment the Gwynedd Archaeological Planning Service (GAPS) has requested that an auger survey be undertaken by an appropriately qualified environmental archaeologist. This is to take the form of a hand auger survey across auger transects the data from which will be incorporated into the desk based assessment to create an archaeological deposit model, which will graphically represent the knowledge of archaeological potential across the site.

<u>Access onto land is to be arranged by the Clients.</u>

5.4 Field Evaluation/Further Works

As part of the assessment of the potential of the site to have unknown, buried archaeological remains, the Gwynedd Archaeological Planning Service has requested that an auger survey be carried out by a specialist archaeologist. A project design for this work has been written by Dr. Mike Allen of Allen Environmental Archaeology (AEA) and is included at the end of this project design with fee quotes.

The archaeological desk-based assessment will make recommendations for a programme of field evaluation of further works if required. These works are necessary when an archaeological or historical asset(s) cannot be assigned a category of importance because further assessment work is required. Further evaluation work, if necessary, will often take the form of a geophysical survey or programme of trial trenching, but may also include measured survey, supervised metal detector survey, and other forms of non-intrusive geophysical survey.
Recommendations for any field evaluation considered necessary will be contained within the archaeological desk-based assessment report.

Specific attention will be paid during the assessment as to the suitability of the vegetation and geology for geophysical survey.

5.5 Data processing and report compilation

Following completion of the stages outlined above, a report will be produced incorporating the following:

Non-technical summary
1. Introduction
2. Aims
3. Specification and Project Design
4. Methods and techniques, including details and location of project archive
5. Archaeological and Topographical Background
6. Results of assessment in the form of a gazetteer
7. Assessment of impacts
8. Proposals for field evaluation and/or mitigation
9. An archaeological deposit model
10. Summary and conclusions
11. List of sources consulted.

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included. Photographs of relevant sites and of the study area where appropriate will be included.

The archaeological deposit model will graphically represent in plan, and if required in profile, the archaeological potential of the site.

A draft copy of the report will be sent to the regional curatorial archaeologist and to the client prior to production of the final report.

4.6 Definition of category of importance

To assess the importance of sites and to allow the appropriate mitigatory action to be proposed for each, a framework of categories will be used with each site allocated to a particular category according to its relative importance:

Significance	Description

Significance	Description
International (Very High)	Archaeological sites or monuments of international importance, including World Heritage Sites. Structures and buildings inscribed as of universal importance as World Heritage Sites. Other buildings or structures of recognised international importance.
National (High)	Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the Secretary of State's non-statutory criteria. Listed Buildings. Undesignated structures of national importance.
Regional/ County (Medium)	Conservation Areas Archaeological sites and remains which, while not of national importance, score well against most of the Secretary of State's criteria.
Local (Low)	Archaeological sites that score less well against the Secretary of State's criteria. Historic buildings on a 'local list'.
None	Areas in which investigative techniques have produced no or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

6. ARCHIVING

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. All plans, photographs and descriptions will be labelled, and cross-referenced, and lodged in an appropriate place within six months of the completion of the project. The location is to be agreed with the Curatorial Archaeologist.

Bound copies of the report and an archive CD will be sent to the regional HER (Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, Gwynedd LL57 2RT).

7. PERSONNEL

The work will be managed and undertaken by Richard Cooke, Archaeological Contractor and Consultant at Aeon Archaeology. Full details of personnel involved, with *curricula vitae,* can be supplied upon request.

8. MONITORING

Monitoring visits can be arranged during the course of the project with the clients and with the appropriate Development Control archaeologist.

9. HEALTH AND SAFETY

Aeon Archaeology has a Health and Safety Policy Statement which can be supplied upon request. Furthermore, site-specific Risk Assessments and Method Statements are compiled and distributed to every member of staff involved with the project prior to the commencement of works.

10. INSURANCE

Liability Insurance – Towergate Insurance Policy 000467

- Employers' Liability: Limit of Indemnity £10m in any one occurrence
- Public Liability: Limit of Indemnity £2m in any one occurrence
- Legal Defence Costs (Health and Safety at Work Act): £250,000

The current period expires 30/09/13

Professional Indemnity Insurance – Towergate Insurance Policy 2011025521290

- Limit of Indemnity £250,000 any one claim

The current period expires 30/09/13

11. SOURCES CONSULTED

GAPS brief: D1721

Reproduction of Client Drawing **222-1196-01**

Standard and Guidance for Archaeological Desk-based Assessment (Institute of Field Archaeologists, 1994, rev. 2001 & 2008)

APPENDIX I: ALLEN ENVIRONMENTAL ARCHAEOLOGY PROJECT DESIGN

AEA: Allen Environmental Archaeology
Redroof, Green Road, Codford St. Peter, WARMINSTER, Wiltshire, BA12 0NW (Tel: 07828 103454)

Mathan Uchaf (Cors Geirch), Boduan, Gwynedd

The site comprises an area of wetland totalling approximately 3.5 hectares near Boduan, Gwynedd. Boduan is located towards the centre of the Llŷn peninsula, approximately 6.5km to the north-west of Pwllheli.

Stage 1 Walkover survey, fieldwork and coring
Walkover survey to examine the topography
Test the location and extend of peat with 1cm and 2.5cm diameter gouge auger
Test the depth/thickness of the peat with 1cm and 2.5cm diameter gouge auger
Define a suitable field and sampling strategy and geoarchaeological fieldwork statement etc.

Based on the above, but likely to involve a number of auger transects (2.5cm diameter gouge auger) to profile the peat to construct a deposit model, and to define the best location for coring and sampling. The geoarchaeological deposit model with define the extent and depth of the peat and related deposits and consider the potential for buried and preserved archaeological sites and landscapes. This information can be used by the archaeological team in relation to HER data, APs etc. The geoarchaeological deposit model will be presented for the archaeological team to produce suitable graphics.

Coring and sampling using a Russian peat corer the full peat sequence will be samples as undisturbed sediment, and described in the field

Sampled sequences will be describe in laboratory conditions and subsampled at 10mm band width and appropriate intervals (e.g. 40mm, 80mm) intervals for the assessment and analysis of pollen.

Suitable samples of identifiable or recognisable plant matter, or failing this small bulk samples, will be removed for AMS radiocarbon dating

Stage 2: Dating and assessment
The geoarchaeological stratigraphy will be reported
Pollen samples will be assessed and a costed programme of analysis proposed, and specialist will be nominated.
Typically two samples, top and bottom, but up to 4 samples, will be identified and submitted for radiocarbon dating.

Stage 3: Analysis and reporting
The proposed analytical programmes (e.g. pollen analysis, stratigraphic/sediment and any further radiocarbon assays) will be undertaken.

A full report will be compiled detailed the extent and history of the local mire, and in particular examining evidence for human activity and impact on the mire.