

**South Wales Gas Pipeline Project
Site 26.05
Land West of Cwmifor
Manordeilo and Salem
Carmarthenshire**

Archaeological Excavation



for
Rhead Group
on behalf of
National Grid

CA Project: 9150
CA Report: 13308
Event: DAT108809

March 2014

South Wales Gas Pipeline Project Site 26.05

Archaeological Excavation

CA Project: 9150
CA Report: 13308
Event: DAT102846

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GLOSSARY

CA – Cotswold Archaeology
 CAP – Cambrian Archaeological Projects
 CPAT – Clwyd Powys Archaeological Trust
 DAT – Dyfed Archaeological Trust
 GGAT - Glamorgan Gwent Archaeological Trust
 FTP – Felindre to Brecon gas pipeline
 HER – Historic Environment Record
 MHA – Milford Haven to Aberdulais gas pipeline
 NAL – Network Archaeology Ltd
 NLMJV – Nacap Land & Marine Joint Venture
 UPD – Updated Project Design

SUMMARY

Project Name:	South Wales Gas Pipeline Project
Location:	Site 26.05, Land West of Cwmifor, Manordeilo and Salem, Carmarthenshire
NGR:	SN 6548 2540
Type:	Excavation
Date:	11 June to 11 July 2007
Location of Archive:	To be deposited with RCAHMW (original paper archive) and Carmarthenshire Museum (material archive and digital copy of paper archive; accession number CAASG 2008.0282)
Site Code:	FTB07

An archaeological excavation was undertaken by Cambrian Archaeological Projects during groundworks associated with construction of gas pipelines (part of the South Wales high pressure gas pipeline scheme) between Milford Haven and Aberdulais, and Felindre and Brecon, which were conducted between 2005 and 2007.

The excavation revealed small quantities of residual Mesolithic material. The earliest cut features were associated with Carinated Bowl pottery and Early Neolithic radiocarbon dates and were probably the remains of an Early Neolithic settlement. Amongst these features were postholes which may have been the remains of a square or rectangular building and pits containing possible closure deposits. The discovery of a possible building of this date represents a rare discovery for the period, particularly within Wales.

The site continued to be used during the Late Neolithic or Early Bronze age and the Middle Bronze Age periods and were probably associated with prehistoric features found within Site 26.04 and, potentially, with burnt mounds found at Sites 26.1, 26.02, 26.03, 26.04 and 26.06 in which case potentially providing a rare example of contemporary burnt mounds and settlements located in close proximity.

1. INTRODUCTION

1.1 NACAP Land and Marine Joint Venture (NLMJV), on behalf of National Grid, commissioned RSK Environment (part of the RSK Group) to manage the archaeological works (non-invasive surveys, desk based assessment, evaluation, watching brief, and open area excavation) on a 216km-long section of pipeline from Milford Haven (Pembrokeshire) to Brecon (in Powys). The high pressure gas pipeline (part of the 316km-long pipeline route from Milford Haven to Tirley in Gloucestershire) was required to reinforce the gas transmission network. The archaeological work performed in advance of this pipeline was undertaken in a number of sections by a number of archaeological companies. The westernmost section of 122km, from Milford Haven to Aberdulais, was investigated by CA (then Cotswold Archaeological Trust) during 2005–2007 with some additional excavation work carried out by CAP. The section of 89km, from Felindre to Brecon was investigated by CA during 2006–2007 and CAP during 2007. Assessment reports on the works were completed in January 2012 (NLM 2012a, 2012b) and the current reporting stage was commissioned in February 2013.

1.2 In June and July 2007 CAP carried out an archaeological excavation at Site 26.05, Land east of Dolau Farm, Manordeilo and Salem, Carmarthenshire (centred on NGR: SN 6548 2540; Fig. 1). The objective of the excavation was to record all archaeological remains exposed during the pipeline construction.

1.3 The excavation was carried out in accordance with professional codes, standards and guidance documents (EH 1991; IfA 1999a, 1999b, 2001a, 2001b, 2001c and IfA Wales 2008). The methodologies were laid out in an *Archaeological Framework Document* (RSK 2007) and associated *Written Statements of Investigation* (WSIs) and *Method Statements*.

The site

1.4 The site is located within a field close to the confluence of the Rivers Towy and Dulais (Fig. 1). It lies at 50m OD, towards the base of a fairly steep south-east facing slope leading down to the floodplain.

1.5 The underlying solid geology of the area is mapped as Ashgill Rocks of the Ordovician Period (BGS 2013).

Archaeological background

- 1.6 No archaeological remains were identified within the site during the preliminary *Archaeology and Heritage Survey* (CA 2006) and none are recorded by the HER. Archaeological remains within the site were first recorded during the evaluation undertaken in advance of the pipeline construction works. Site 26.06 of the 2006–7 evaluation comprised three trenches within the same field as the excavation at Site 26.05 (the plots were subsequently re-numbered so that evaluation Site 26.06 corresponds with excavation Site 26.05). These trenches are included within this report but, in summary, Trench 1 exposed three pits and yielded a piece of possible prehistoric pottery whilst the remaining trenches (Trenches 2 and 3) contained no archaeological features (CA 2009, Evaluation Site 26.06, trenches 1–3).
- 1.7 An evaluation of the field to the immediate north of the site (Evaluation Site 26.07) exposed no archaeological remains (CA 2009, Evaluation Site 26.07, trenches 1–3). However, subsequent recording during the pipeline construction works identified a Middle Iron Age burnt mound located 100m south of undated stone surfaces and an undated posthole (Site 26.06, Fig. 1; Fig. 2 inset).
- 1.8 Other remains exposed in the near vicinity during the pipeline works comprised burnt mounds 200m–800m south-west of the site at pipeline Sites 26.01, 26.02, 26.03 and 26.04 and undated pits north of the site at Sites 26.08, 26.10 and 26.11 (Fig. 1). Hearths and pits were identified during an evaluation of Site 26.04, in the field immediately west of Site 26.05. One of these hearths was radiocarbon dated to the Early Bronze Age and although the remaining features were undated and were not exposed during the subsequent pipeline works, collectively they indicate the remains of a settlement.
- 1.9 Within the wider vicinity of the site an Iron Age defended enclosure has been identified c. 1.2km to the north-west (PRN 849). Later heritage assets recorded within the vicinity of the site primarily comprise medieval, post-medieval and modern buildings. Of these, the remains of a possible medieval chapel visible on LiDAR imagery as a square building within an enclosure, and possible associated earthwork remains of an associated settlement lie between 160m–250m north of the site.

Archaeological objectives

1.10 The objectives of the archaeological works were:-

- to monitor groundworks, and to identify, investigate and record all significant buried archaeological deposits revealed on the site during the course of the development groundworks; and
- at the conclusion of the project, to produce an integrated archive for the project work and a report setting out the results of the project and the archaeological conclusions that can be drawn from the recorded data.

Methodology

1.11 The fieldwork followed the methodology set out within the *WSI* (NLM 2006). An archaeologist was present during intrusive groundworks comprising stripping of the pipeline easement to the natural substrate (Fig. 1).

1.12 The post-excavation analysis and reporting was undertaken following the production of the UPD (GA 2012) and included re-examination of the original site records. Finds, environmental and radiocarbon-dating evidence was taken from the assessment reports (NLM 2012b) except where the UPD recommended further work, in which case the updated reports were used. The archaeological background to the site was assessed using the following resources:-

- the *Archaeology and Heritage Survey* which was undertaken in advance of the pipeline construction and which examined a 1km-wide corridor centred on the pipeline centre line, including the then existing HER record (CA 2006);
- Dyfed Archaeological Trust HER data (received July 2014); and
- other online resources, such as Google Earth and Ordnance Survey maps available at <http://www.old-maps.co.uk/index.html>.

All monuments thus identified that were relevant to the site were taken into account when considering the results of the fieldwork.

1.13 A large number of features were recorded as stakeholes during the fieldwork. These did not follow any discernable plan and have been re-interpreted here as natural features. They are not discussed further in this report, and are not reproduced on the accompanying figures although a full site record is contained within the archive. A small number of features could not be located on the fieldwork plans. These are described in Appendix A but are not shown on the illustrations accompanying this report.

- 1.14 The archive and artefacts from the excavation is currently held by CA at their offices in Kemble. Subject to the agreement of the legal landowner the artefacts will be deposited with Carmarthenshire Museum under accession number CAASG 2008.0282, along with a digital copy of the paper archive. The original paper archive will be deposited with the RCAHMW.

2. RESULTS (FIGS 2–5)

- 2.1 This section provides an overview of the excavation results; detailed summaries of the recorded contexts, finds, environmental samples (palaeoenvironmental evidence) and radiocarbon dates are to be found in Appendices A, B, C and D. Full, original versions of the specialist reports are contained within the archive.

Evaluation Site 26.06

- 2.2 Evaluation trenches T2 and T3 were located outside of the area subsequently excavated for the easement and contained no archaeological remains. Trench T1 bisected the easement on a broadly east/west axis and within this trench, the natural geological substrate was cut by three circular pits (26/6/T1/4, 26/6/T1/6 and 26/6/T1/8 of which only the former lay within the area subsequently excavated, with the latter two pits located just beyond the excavated baulk). All were similar in size and shape, being 0.35m wide and 0.15m deep, and each contained a single charcoal-rich sandy silt fill. Fill 26/6/T1/5 (pit 26/6/T1/4) contained a small sherd of possible prehistoric pottery alongside a collection of hazelnut shells and other charred plant remains suggestive of a prehistoric, possibly Neolithic date. None of these pits correspond with features subsequently exposed during the excavation and it is possible that the evaluation trench was not stripped to the depth of the natural substrate, at least for parts of its length, raising the possibility that the features exposed within it were cut through the subsoil and were perhaps later than the remains found during the excavation.

Excavation

- 2.3 The natural geological substrate, yellow-grey stony-clay 265000, was overlain by up to 0.9m depth of subsoil and 0.25m depth of topsoil. A series of pits and postholes were encountered cut into the natural substrate.

Mesolithic

- 2.4 Pit 265072, located towards the southern end of the site contained a charred hazelnut shell which gave a radiocarbon date range of 6650–6450 cal. BC (Beta-257726), a range within the Mesolithic period. However, the pit also contained a crumb of possible Early Neolithic pottery and is comparable to other Early Neolithic features nearby. The Mesolithic hazelnut shell is therefore almost certainly residual but, together with a small assemblage of residual Mesolithic flints from the site, indicates Mesolithic activity in the vicinity.

Early Neolithic (4000–3400 BC)

- 2.5 A number of features contained Early Neolithic dating evidence. In some instances, this comprised crumbs of pottery likely to be of this date, but some pits and postholes contained larger assemblages of Carinated Bowl or Modified or Developed Carinated Bowl wares dateable to c. 4000–3400 BC (Gibson, Appendix B). Radiocarbon determinations from one of the pits fell within this date range.
- 2.6 Four of these features (pits 265011, 265055 and 265739 and posthole 265639) were located towards the centre of the site, within 4m of one another and collectively contained the largest assemblages of material from the site. The pits were small circular cuts with bowl-shaped profiles and were 0.55m to 0.7m wide and up to 0.15m deep, whilst the posthole had steeper sides. All contained single charcoal-rich fills which produced small assemblages of charred emmer-type grain and hazelnut shell fragments. Charred remains from posthole 265639 returned radiocarbon dates of 4040–3800, 3930–3690 and 3770–3640 cal. BC (Beta-257727 and SUERC 54561 and -62), date ranges within the Early Neolithic period. Its fill also contained flints, one of which was an Early Neolithic blade whilst the others were undateable shatter fragments and debitage as well as a few burnt flint chunks.
- 2.7 Pit 265011, 3m north-east of pit 265369, yielded 14 sherds of Early Neolithic pottery together with Mesolithic/Early Neolithic flint cores and flakes, flint microdebitage, and waste flakes. Immediately to the west, pit 265055 contained a sherd of Early Neolithic pottery, as well as flint flakes and burnt flint microdebitage. Pit 265739, just to the south of these, contained 43 sherds of Early Neolithic pottery, as well as the site's largest flint assemblage from a single context (28 flints in total). These flints included equal proportions of burnt and unburnt flints, the largest proportion of which were flakes. One blade fragment and a scraper were both closely dateable as Early Neolithic.

- 2.8 To the south, crumbs of Early Neolithic pottery were found within a small number of other features and it is likely that some of the features found on site which were technically undated were of this age.

Late Neolithic or Early Bronze Age (c.3000–1500 BC)

- 2.9 Pit 265404 yielded four Late Neolithic or Early Bronze Age pottery sherds. It is possible that some of the undated features were also of this period.

Middle Bronze Age

- 2.10 Tree-throw pit 265737/265649, towards the northern part of the site, returned Middle Bronze Age radiocarbon dates of 1370–1120 and 1390–1130 cal. BC (SUERC-54567 and -54567). Seven sherds of Early Neolithic pottery and a fragment of charcoal radiocarbon dated to 3780–3640 cal. BC (SUERC-54566) from the same tree-throw pit were probably residual items derived from the adjacent Early Neolithic features.

Undated

- 2.11 Pits/postholes with no dateable finds were found across the central part of the site. The majority were steep-sided cuts with flat bases and were up to 0.5m wide and 0.15m deep. Postholes 265036 and 265688 (Fig. 3, sections AA and BB) contained probable post-pipes and it is possible that many of these features were postholes rather than pits (Fig. 3, sections CC–FF).

Discussion

- 2.12 The single Mesolithic radiocarbon date was from an almost certainly residual item but does indicate likely Mesolithic activity in the vicinity, as also evidenced by the presence of residual Mesolithic flints. The few finds of this date are suggestive of a transient camp.
- 2.13 Early Neolithic activity was clearly attested on site, both through the pottery and flint assemblages and from radiocarbon dating. Collectively, these suggest activity towards the earlier part of the Early Neolithic and the pottery, comprising Carinated Bowl forms, is noteworthy as these are the earliest pottery forms found in Wales.
- 2.14 Although some of the features were probably pits, the presence of at least two, and probably more, postholes indicates the presence of a structure. The material

remains from the site suggest that this putative structure may have been a dwelling, including as they did pottery, food remains (animal bone, charred cereal grains and charred hazelnut shells) and hearth debris (fuelwood, fired earth and burnt stones). Challinor in Appendix C raises the possibility that some of the oak charcoal within one of the postholes may have been from a post burnt *in situ*, but there was no evidence that the surrounding substrate had been scorched and the charcoal is more likely to have been hearth debris that worked down into voids around the post when the building was in use, or entered the posthole when the post was removed during demolition of the building. Recovering the groundplans of Neolithic structures is often difficult, as they often survive only as very ephemeral structural remains and many may have left no physical remains at all, with their presence implied by open spaces between pits (for example at Kilverstone, Norfolk; Garrow *et al.* 2005). With the layout of features on the current site, a number of possible building groundplans can be reconstructed. One such groundplan is described below, although it is accepted that other interpretations are possible.

Possible Building Plan (Fig. 4)

- 2.15 This option reconstructs a small building with a square or rectangular groundplan on a north-west/south-east alignment, the south-eastern end of which was undefined (Fig. 4). This putative building would have covered an area 6m wide and at least 6m long and was defined by a south-western wall (postholes 265002, 265688, 265683, 265006 and 265065), a north-western wall (postholes 265036, 265118, 265376 and 265639) and a north-eastern wall (postholes 265202 and 265083). Posthole 265330 and pit/posthole 265072 may have defined the south-eastern end of this, been part of an internal division, or be unrelated or possibly internal or external features. Internally, this groundplan contained several features, including a one interpreted on site as a ditch (265019) but which might instead be the remains of a pit, trough or scoured out hearth (although no burning of the cut edges was noted).
- 2.16 It is also possible that a north-eastern continuation was defined by pits (in which case, postholes) 265739, 265055 and 265011, with an un-numbered and un-excavated elongated pit 3m south-east of these as a possible beam slot. In this case, the building would have had a more rectangular ground plan 10m long and 6m wide, aligned north-east/south-west, with postholes 265376, 265202 and 265083 forming part of an internal division, creating two cells within the building.

- 2.17 Across the site, a number of the features contained significant assemblages of finds and palaeoenvironmental material, producing in total some 317g of Early Neolithic, Late Neolithic/Early Bronze Age pottery. Most notable were the four pits/postholes at the north-eastern corner of the putative building (265011, 265055, 265639 and 265739). Small pits containing varying quantities of finds and charred plant remains are common on Neolithic sites. Since these pits lack evidence for storage or processing, they are being increasingly interpreted as containing closure deposits, with specially selected items representing a range of domestic activities being placed within small cuts to commemorate the end of a period of occupation (for example see Carver 2012, 111 and Thomas 2012, 2). At Kilverstone, Norfolk, radiocarbon dating of distinct pit clusters identified using conjoining pottery suggested that each cluster represented a single period of occupation, with the site overall being in long-term but episodic use (Garrow *et al.* 2005, 156). It is possible that the pits with relatively large material culture assemblages on the current site, themselves reflective of a typical range of domestic activities, including flint knapping and cooking, represent comparable closure deposits. Of particular note in this respect is the flint assemblage from pit 265739. This included a number of flakes which had been useable tools prior to being burnt, and it is conceivable that these items had been deliberately destroyed and then deposited within the pit as an act of closure (see Pannett, this report). If these pits do represent closure features, then the radiocarbon dates from pit 265369 could mark either total or temporary abandonment of the settlement.
- 2.18 The full northern extent of this settlement seems to have been exposed. The remains identified during the evaluation within Site 26.04 to the immediate west reveal that the settlement extended as far west as this but the actual western limit was not defined as the subsequent topsoil stripping within Site 26.04 during the pipeline construction works was not sufficiently deep to expose these prehistoric features. The settlement's eastern and southern limits also remain undefined. Rackham in Appendix C suggests foci of activity within the site based on the palaeoenvironmental remains and it is possible that other foci of activity lay beyond the excavated area.
- 2.19 The single dated Late Neolithic or Early Bronze Age pit is difficult to interpret but, taken with the Early Bronze Age hearth found during the evaluation at Site 26.04, which was radiocarbon dated to 2020–1770 cal. BC (Beta Analytic-222403), suggests that the site was used, or more probably, re-used during this period. A

similar explanation may pertain for the evidence of Middle Bronze Age activity. Although this was restricted to tree-throw pits, the deposition of early prehistoric material within tree-throw pits is attested elsewhere and can be seen as paralleling closure deposits within purposely dug pits (Pearce *et al.* 2011, 31; Leverett and Quinnell 2010; Smythe 2012). Together, these features post-dating the Early Neolithic settlement therefore may relate to episodic occupation into the Middle Bronze Age. In light of this, it is noteworthy that the burnt mounds at Sites 26.03 and 26.04 both returned Middle Bronze Age radiocarbon date ranges (1380–1050 cal. BC and 1530–1400 cal. BC respectively) which fall within the overall duration of use of this settlement. Although it is not known whether specific phases of the mounds and settlement were directly contemporary, these results provide a rare example of a settlement site potentially associated with burnt mounds.

3. PROJECT TEAM

Fieldwork was undertaken by Cambrian Archaeological Projects. This report was written by Alistair Barber and Jonathan Hart with illustrations prepared by Daniel Bashford. The archive has been compiled by Jonathan Hart, and prepared for deposition by Hazel O'Neill. The fieldwork was managed by Kevin Blockley and the post-excavation was managed for CA by Karen Walker.



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APPENDIX A: CONTEXT DESCRIPTIONS

Context	Fill of	Interpretation	Description	L (m)	W (m)	D (m)	Spot date
265001		Topsoil	Grey-brown silt-clay			0.2	
265002		Posthole	Oval with steeply-sloping sides and concave base	0.75	0.6	0.2	
265003	265002	Posthole fill	Orange-brown silt-clay with charcoal	0.75	0.6	0.2	
265006		Posthole	Oval with steeply-sloping sides and concave base	0.6	0.5	0.1	
265007	265006	Posthole fill	Orange-brown silt-clay with charcoal	0.6	0.5	0.1	?ENeo
265008		Posthole	Sub-circular with steeply-sloping sides and concave base		0.25	0.1	
265009	265008	Post-pipe fill	Orange-brown gritty clay-silt with charcoal		0.2	0.1	
265010	265011	Pit fill	Orange-brown clay-silt with charcoal		0.85	0.05	E Neo
265011		Pit	Circular with steeply-sloping sides and concave base		0.85	0.15	
265012		Posthole	Circular with steeply-sloping sides and flat base		0.25	0.1	
265013	265012	Posthole fill	Orange-brown clay-silt with charcoal (not located on plan)		0.25	0.1	
265014		Posthole	Circular with steeply-sloping sides and flat base		0.25	0.1	
265015	265014	Posthole fill	Orange-brown clay with charcoal		0.25	0.1	
265016		Posthole	Oval with moderately-sloping sides and concave base		0.2	0.1	
265017	265016	Posthole fill	Light brown silt-clay with charcoal		0.2	0.1	
265019		Pit	Irregular oval with steeply-sloping sides and concave base	2.75	0.8	0.3	
265020	265019	Pit fill	Orange-brown clay-silt with charcoal	2.75	0.8	0.3	?ENeo
265033	265012	Posthole fill	Orange-brown silt-clay		0.3	0.1	
265034	265008	Posthole fill	Mid brown clay-silt		0.15	0.1	
265036		Posthole	Sub-circular with steeply-sloping sides and flat base	0.75	0.5	0.2	
265037	265036	Posthole fill	Yellow-grey silt-clay	0.75	0.5	0.2	
265038	265036	Posthole fill	Orange clay	0.75	0.5	0.2	
265044		Posthole	Oval with steeply-sloping sides and irregular base	0.45	0.3	0.15	
265045	265044	Posthole fill	Orange-brown clay-silt	0.45	0.3	0.15	
265055		Pit	Sub-circular with steeply-sloping sides and flat base	0.6	0.5	0.2	
265056	265055	Pit fill	Orange-brown clay-silt	0.6	0.5	0.2	E Neo
265065		Posthole	Oval with steeply-sloping sides and flat base	0.25	0.25	0.15	
265066	265065	Posthole fill	Orange clay	0.25	0.25	0.15	
265072		Pit	Sub-circular with steeply-sloping sides and flat base		0.8	0.15	
265073	265072	Pit fill	Orange-yellow silt-sand		0.8	0.15	6650-6450 cal BC
265075	265072	Pit fill	Dark brown-black sand and charcoal		0.8	0.15	?ENeo
265083		Posthole and fill	Circular with steeply-sloping sides and concave base with grey clay-silt fill		0.45	0.2	
265118		Posthole	Sub-circular with steeply-sloping sides and flat base	0.65	0.5	0.25	

265119	265118	Posthole fill	Grey-brown clay-silt	0.65	0.5	0.25	?ENeo
265202		Posthole	Sub-circular with steeply-sloping sides and flat base		0.15	0.2	
265254		Pit	Circular with steeply-sloping sides and flat base		0.3	0.2	
265255	265202	Posthole fill	Grey-brown clay-silt		0.3	0.2	
265321		Posthole	Sub-circular with steeply-sloping sides and flat base	0.3	0.2	0.05	
265322	265321	Posthole fill	Orange-grey clay	0.3	0.2	0.05	
265323		Posthole	Oval with steeply-sloping sides and concave base	0.2	0.2	0.1	
265324	265323	Posthole fill	Orange-grey clay	0.2	0.2	0.1	
265376		Posthole	Sub-circular with steeply-sloping sides and flat base		0.5	0.2	
265377	265376	Posthole fill	Orange-grey clay		0.5	0.2	
265383		Pit	Oval with steeply-sloping sides and concave base	0.5	0.45	0.1	
265384	265383	Pit fill	Orange-brown clay-silt	0.5	0.45	0.1	
265385	265383	Pit fill	Light grey clay-silt	0.5	0.4	0.1	
265404		Pit	Sub-circular with gently-sloping sides and concave base.	0.7	0.6		
265423	265404	Pit fill	Not recorded.	0.7	0.6		LNeo/EBA
265430		Pit	Oval with gently-sloping sides and irregular base	0.6	0.25	0.1	
265431	265430	Pit fill	Orange-grey clay	0.6	0.25	0.1	
265450		Posthole and fill	Sub-circular with steeply-sloping sides and concave base with grey clay-silt fill	0.25	0.2	0.1	
265639		Posthole	Circular with moderately-sloping sides and flat base		0.75	0.1	
265640	265639	Posthole fill	Grey-brown clay-silt with charcoal		0.75	0.1	4040–3800 cal BC; 3990–3800 cal BC
265649		Tree-throw pit	Irregular with irregular sides and base	2.4	1.35	0.2	
265650	265649	Tree-throw pit fill	Orange-brown clay silt	2.4	1.35	0.2	1370–1120 cal BC
265668		Pit	Circular with moderately-sloping sides and flat base		0.4	0.2	
265669	265668	Pit fill	Orange-brown silt-sand		0.4	0.2	
265683		Posthole	Sub-circular with steeply-sloping sides and uneven base	0.7	0.5	0.15	
265684	265683	Posthole fill	Orange clay-silt	0.7	0.5	0.15	
265688		Posthole	Sub-circular with steeply-sloping sides and uneven base		0.3	0.2	
265689	265688	Posthole fill	Orange-brown silt-clay post-pipe		0.3	0.1	
265691	265688	Posthole fill	Orange silt-clay		0.3	0.2	
265696	265683	Posthole fill	Not recorded		0.7	0.25	
265714	265737	Tree-throw pit fill	Orange-brown silt-clay	4	1.2	0.1	1390–1130 cal BC
265737		Tree-throw pit	Irregular with irregular sides and base	4	1.2	0.1	
265738	265737	Tree-throw pit fill	Orange-brown clay-silt	4	1.2	0.1	3780–3640 cal BC
265739		Pit	Sub-circular with steeply-sloping sides and concave base	0.8	0.65	0.1	
265740	265739	Pit fill	Orange-brown clay-silt	0.8	0.65	0.1	E Neo

Evaluation

Trench 26/6/T1

Context No.	Type	Fill of	Context interpretation	Description	L (m)	W (m)	Depth/thickness (m)	Spot date
26/6/T1/1	Layer		Topsoil	Grey-brown silt			0.3	
26/6/T1/2	Layer		Subsoil	Orange-brown clay silt			0.4	
26/6/T1/3	Layer		Natural	Orange-brown sandy clay				
26/6/T1/4	Cut		Pit	Circular, moderate sides, concave base	0.4	0.3	0.05	
26/6/T1/5	Fill	26/6/T1/4	Pit fill	Dark brown silt	0.4	0.3	0.05	
26/6/T1/6	Cut		Pit	Circular, steep sides, flat base	0.35	0.3	0.15	
26/6/T1/7	Fill	26/6/T1/6	Pit fill	Mid brown-orange sandy silt	0.35	0.3	0.15	
26/6/T1/8	Cut		Pit	Sub-circular, shallow sides, flat base	0.35	0.3	0.1	
26/6/T1/9	Fill	26/6/T1/8	Pit fill	Light grey-brown sandy silt	0.35	0.3	0.1	

Trench 26/6/T2

26/6/2-01	Layer		Topsoil	Light yellow-grey silt			0.25	
26/6/2-02	Layer		Subsoil	Mid yellow-brown silt			0.55	
26/6/2-03	Layer		Natural	Mid orange-brown sandy silt				

Trench 26/6/T3

26/6/3-01	Layer		Topsoil	Light yellow-brown silt			0.2	
26/6/3-02	Layer		Subsoil	Mid orange-brown silt			0.4	
26/6/3-03	Layer		Natural	Light yellow-grey clay				

APPENDIX B: THE FINDS

The pottery (Gibson 2013)

Weight (g)	No of Contexts	Periods Represented
317	10	Early Neolithic, Late Neolithic/Early Bronze Age

Early Neolithic

P1 – 265007: 1 sherd (1g). Hard, fine grey fabric, averaging 4mm thick. Possibly Early Neolithic

P2 – 265010 (1): 3 sherds (6g). Well-fired but pitted fabric with brown outer surface, black inner surface and core. The fabric averages 6mm thick. Early Neolithic.

P3 – 265010 (2): 6 sherds (6g). Hard well-fired fabric with black burnished outer surface, black/brown inner surface and black core. The fabric is slightly pitted and averages 6mm thick. Early Neolithic.

P4 – 265010 (3): 5 sherds + crumbs (5g). Hard well-fired fabric with light brown surfaces. The fabric averages 5mm thick and contains abundant crushed quartz inclusions up to 3mm across. Early Neolithic

P5 – 265056: 1 sherd (9g). Hard well-fired fabric with red-brown outer surface, black inner surface and core. The fabric is pitted and averages 8mm thick. Early Neolithic

P6 – 265738 (1): 4 sherds (20g). Hard well-fired black fabric with burnished but slightly pitted outer surface and a smooth, similarly pitted inner surface. The fabric averages 8mm thick. Early Neolithic.

P7 – 265738 (2): 3 sherds + crumbs (8g). Hard well-fired fabric with light brown surfaces. The fabric averages 5mm thick and contains abundant crushed quartz inclusions up to 3mm across. Early Neolithic

P8 – 265740 (1):



28 sherds + crumbs (102g). Hard well-fired fabric with light brown to light grey-brown surfaces. The fabric averages 5mm thick and contains abundant crushed quartz inclusions up to 4mm across. One rim sherd is rounded and strongly everted. It is well-finished with horizontal smoothing marks visible (though some may be cleaning marks). Early Neolithic.

P9 – 265740 (2):



11 sherds (58g). Hard well-fired fabric with smooth, well-finished light brown to light purple-brown surfaces. The fabric averages 7mm thick and contains abundant crushed quartz inclusions up to 7mm across. One rim sherd is rounded and strongly everted. It is well-finished with horizontal smoothing marks visible (though some may be cleaning marks). The fabric is very similar to 265740(1) and the sherds may be from the same vessel however the present sherds seem slightly harder, have slightly larger inclusions and have a slightly different surface finish. Early Neolithic.

P10 – 265740 (3):



13 sherds+ crumbs (62g). Hard well-fired pitted fabric with grey to black surfaces and a black core. Despite the pitting, the surfaces are smooth and well-finished, even burnished in places. The fabric averages 7mm thick. Three rim sherds exhibit a rounded, slightly thickened and everted rim with an estimated diameter of 240mm. Early Neolithic.

265020, 265075, 265119, 265714: Small featureless crumbs. Early Neolithic?

Discussion

Five vessels occur in a pitted but hard, well-finished and well-fired Fabric. (P2, P3, P5, P6 & P10) and probably all represent Early Neolithic Carinated Bowls. Carinated Bowls in a similar vesicular fabric are well known in Wales, in particular from Clegyr Boia, Pembrokeshire (Williams 1953) where, like the present assemblage, the vessels' surfaces were smooth and well-finished. The voids at Clegyr Boia are formed from leached out sea-shell but it is impossible to tell if this is also the case with the present material without microscopy. Vesicular fabrics have also been noted in the assemblages from Ty Isaf and Gwernvale, Brecknock (Grimes 1939; Darvill in Britnell & Savory 1984) but despite microscopy at the latter site the exact opening agent was not identified though it has subsequently been identified as plant material by Peterson (2003). At Dyffryn Ardudwy, Gwynedd, it was suggested that charcoal had been used as the opening agent (Lynch 1969) and again the pottery is fine and well made with good smooth surfaces, brown in colour and with the characteristic 'corky' appearance. The similarly pitted pottery from Llandegai, Gwynedd, was considered to owe its voided nature to the leaching out of calcitic inclusions (Williams & Jenkins in Lynch & Musson 2004) and the same conclusion has been reached for similar pitted pottery from Carreg Coetan Arthur (Rees forthcoming). It is from Clegyr Boia that these sherds have their closest parallels. Though fragmentary, the rim form of P10 can be paralleled in the Clegyr Boia assemblage. It is an essentially simple everted rounded rim characteristic of Carinated Bowls. Radiocarbon dates for this corky Carinated Bowl from Llandegai and Gwernvale suggest it is primary to the Welsh Neolithic spanning c.4000-3700 cal. BC however it has been pointed out that these dates may suffer from the old wood effect. Dates from the rectangular structures at Parc Bryn Cegin, Llandygai, which have produced similar pottery with corky fabric, suggest c. 3760-3620 cal. BC (Kenney, 2009). Nevertheless, Carinated Bowl appears in western Britain at the advent of the Neolithic in the first two centuries of the 4th millennium (Whittle *et al.* 2011). The fabric type has also been identified in Modified Carinated Bowl as defined by Alison Sheridan (2007) and therefore would not be regarded as primary, at least in Scotland. Nevertheless, the radiocarbon dates suggest that the development of this modified material was rapid and the degree of overlap between Carinated Bowl and Modified Carinated Bowl is considerable. Despite the potential relative chronological difference, the actual absolute chronological difference may be minimal and the two were undoubtedly in contemporary use at Cwmifor.

Vessels P4, P7, P8 and P9 in the quartz-filled fabric are altogether more coarse though are still hard and well-fired with good surface finish and almost certainly belong to Developed Bowls (Sheridan's Modified CB). These vessels in a comparatively coarse yet hard, well fired and well finished (at least externally) fabric may also be broadly contemporary with the earliest Neolithic bowls in Wales though recent analysis of the radiocarbon dates suggests a range of c.3800-3400 cal BC (Whittle *et al.* 2011). The strongly everted rims of P8 and P9, however might suggest classic Carinated Bowl. Although no thin section work has been undertaken, the macroscopic identification of quartz as the main opening agent might suggest the deliberate selection of this material, a

practice that continues into Impressed Ware where white stone appears to be the inclusion of choice (Gibson 1995 and sites 21.2 and 23.7 above).

Once again there are local parallels for these quartz-filled vessels. A hemispherical bowl with thickened rim comes from the floor of the chamber at Carreg Samson and this too is stone-tempered (Lynch 1975). Clegyr Boia again provides parallels, largely as a result of the size of the assemblage. Here there are not just thickened rims but also everted rims, upright and out-turned rims in this hard, quartz-filled fabric (Williams 1953). The pottery from Gwernvale and the plain bowls from Ty Isaf match the rims of P1, P3 and P7 (Britnell & Savory 1984: Grimes 1939). The strongly everted rim forms of P8 and P9 are also matched in the assemblage from the Early Neolithic house at Llandegai, Gwynedd (Lynch & Musson 2004) though in this case they occur in a vesicular voided fabric like P10 discussed above. This assemblage was associated with dates of c.4000-3600 cal BC.

The present assemblage therefore is to be regarded as early, though not necessarily primary, in the Welsh Neolithic. Shoulder sherds are, unfortunately absent but the rim forms, the concave necks and the fabric are indicative of Carinated Bowl or Modified or Developed Carinated Bowl dating to c. 4000-3400 cal BC.

Late Neolithic or Early Bronze Age

P11 – 265423: 4 sherds (46g). Sherds in a hard, well fired and black fabric. The largest sherd, which has both surfaces intact measures 22mm thick and contains grog inclusions up to 7mm across. Late Neolithic or Early Bronze Age.

Discussion

In the absence of formal or decorative features, this sherd cannot be ascribed to a specific tradition however the grog-filled fabric combined with the thickness of the sherd may suggest that it is either Late Neolithic Grooved Ware or Early Bronze Age Collared Urn, and probably from the thickened basal portions of such vessels. This permits only a broad date range from c.3000 – 1500 BC.

The Lithics (Pannett 2014)

The site produced 58 struck lithics.

Context No.	Description	No. Lithics
265056	Single fill of 265055	5
265010	Single fill of 265011	8
265020	Single fill of 265019	1
265025	Hillwash	1
265323	Single fill of 265324	1
265640	Single fill of 265639	13
265696	Lower fill of 265683	1
265740	Single fill of 265739	28
	Total	58

*Context 265056**Primary Technology*

The assemblage comprises entirely fresh flint, predominantly dark grey but with a single piece of light grey material. Cortex survives on two pieces, including one largely corticated piece that had been struck from the exterior of the pebble/nodule. The cortex on both pieces is chalky and pitted, comparable to that of nodular flint.

The assemblage comprises four complete flakes and a piece of microdebitage. The complete flakes are, on average, 20mm long, 15mm broad and 5mm thick, and one flake was struck from a single platform flake core. Two flakes retained a planar platform and one a cortical platform, while the terminations were all hinged, stepped or plunging. Bulbs of percussion are diffuse, although concoidal ripples are pronounced on three of the flakes, suggesting the use of both hard and soft hammers.

Context 265010

The assemblage comprises entirely fresh flint, both dark grey and light mottled grey. Cortex survives on five flake, and is the chalky pitted exterior characteristic of nodular flint.

The assemblage comprises five complete flakes, two distal flake fragments and two pieces of microdebitage. A planar platform is retained on one complete flake, while the complete flakes display both feathered and hinged terminations, and the distal fragment a plunging termination. The complete pieces are, on average, 16mm long, 11mm broad and 2.5mm thick. Bulbs of percussion are diffuse, but concoidal ripples are pronounced on two flakes, suggesting the use of both hard and soft hammers.

*Context 265020**Primary Technology*

A single complete flake manufactured on dark grey flint with a pitted chalky cortex was recovered. The flake measures 17mm long, 26mm broad and 5mm thick and retains a cortical platform and a plunging termination.

*Context 265025**Primary Technology*

A single piece of microdebitage manufactured on light grey flint was recovered.

*Context 265323**Primary Technology*

A single complete flake manufactured on dark grey flint with a water-rolled cortex was recovered. The flake is 17mm long, 15mm broad and 5mm thick, and retains a cortical platform and plunging termination.

Secondary Technology

The flake has a stretch of abrupt retouch along the distal end. It is not identifiable as a specific tool type and is undiagnostic.

*Context 265640**Primary Technology*

The assemblage comprises predominantly burnt flint, with four pieces of light grey and brown fresh flint.

The assemblage contains 1 complete blade, 1 proximal flake fragment, 5 pieces of indeterminate flake shatter, 3 pieces of microdebitage and 3 burnt chunks. The complete blade measures 46mm in length, 14mm broad and 5mm thick, retains a planar prepared planar platform and a hinged termination, and was struck from an opposed platform blade core.

Secondary Technology

The complete blade has a short stretch of abrupt retouch along the right hand side dorsal edge with polish caused by use along the left hand side dorsal edge. The blade has been used as a cutting tool and is Early Neolithic in date.

Context 265696

Primary Technology

A single piece of burnt flint was recovered. It comprises a piece of unidentifiable flake shatter and is undiagnostic.

Context 265740

Primary Technology

The assemblage comprises 50% burnt flint and 50% fresh, predominantly light grey, flint. Cortex survives on two pieces, one a chalky pitted exterior and the second indeterminate.

The assemblage is flake dominated, with 4 complete flakes, 2 distal flake fragments, 1 blade fragment, 4 flake fragments of indeterminate form, 7 pieces of microdebitage and 1 burnt chunk. The complete flakes were, on average, 24mm long, 15mm broad and 5mm thick. None of the complete pieces retained a platform, and the terminations comprised feathered, hinged and plunging distal ends. Bulbs of percussion were diffuse and concoidal ripples minimal, indicating a soft hammer technique. On only one piece, the blade fragment, was the dorsal surface sufficiently clear to reveal the reduction sequence, and this piece had been struck from a single platform blade core. It is diagnostically Early Neolithic.

Secondary Technology

One complete flake had been retouched, with abrupt and semi-invasive retouch forming part of a scraper edge. The scraper edge had been struck off, possibly to allow reworking of the tool, and its original form could not be determined. The scraper is likely to be Early Neolithic in date.

Discussion and Interpretation

The assemblage is largely undiagnostic in terms of date, with flakes, waste pieces, knapping debris and a small number of retouched tools. The majority of the struck lithics derive from four pits located close together. The assemblage from pit 265739 is interesting as it contains a high proportion of burnt flint. The burnt pieces comprise both angular shatter/chunks and flakes. Some of the flakes were useable pieces prior to being burnt, and it is possible that their deliberate destruction in a fire was an act of consumption, a conscious removal of pieces from circulation (Larsson 2004; Pannett 2012). This deposit may not have derived from a midden, but may instead have been placed in the pit after burning as a final act of disposal.

The most significant tool recovered from the site was the complete blade from posthole 265639. This had been struck from an opposed platform blade core and had a short stretch of abrupt retouch along one lateral edge and a smoothed, polished, edge on the opposite side. The polished edge is significant, as the processes that create this type of edge wear involve the cutting of fibrous materials such as grasses and cereals. The polish on this piece is not substantial and does not extend beyond the immediate edge of the blade, however it is clear that this piece was used for cutting and could have been used as a crude sickle. The blade retains both the platform and termination and so is unlikely to have been hafted, however the abrupt retouch on the opposite edge to the polish could have been applied to blunt the edge to allow it to be comfortably held. The piece is diagnostically Early Neolithic.

APPENDIX C: THE PALAEOENVIRONMENTAL EVIDENCE BY JAMES RACKHAM

Animal and Human Bone

A single fragment of burnt sheep sized long bone (<1g) was recovered from context 265147, the natural colluvium, by hand excavation. The piece has subsequently fragmented into nine pieces.

Five environmental samples – 2653047, 2653048, 2653616, 2653617 and 2653625 - also produced a small assemblage of burnt bone. Sample 2653047 (context 265073) produced three tiny indeterminate fragments of burnt bone (0.1g). Sample 2653048 (context 265075) produced two tiny indeterminate fragments of burnt bone (<0.1g). Sample 2653616 (context 265640) produced four tiny fragment of indeterminate burnt bone (<0.1g). Sample 2653617 (context 265640) produced 12 tiny fragments of indeterminate burnt bone (0.2g). Sample 2653625 (context 265740) produced three tiny indeterminate fragments of burnt bone (<0.1g).

Snails

A single terrestrial snail shell was recovered from sample 2653086 (context 265119). This is a juvenile of the species *Helix aspersa* and is almost certainly a modern or recent contaminant in the sample.

Environmental soil samples

A total of 629 soil samples were collected off this Neolithic site, the vast majority of these comprising very small samples from stakeholes. Of these samples one hundred and sixty eight were processed for the assessment (Table 1). The remaining samples were not available for study during the post-excavation stage of the project and are presumed to have been discarded prior to collection of the material from CAP. The samples were collected from a series of tree throws, pits, postholes and stakeholes. The latter were numerous and generally produced only very small samples (see Methodology for interpretation of the stakeholes). In addition to the samples from the excavation three samples were taken from an earlier evaluation on site (26.06.T1) (Table 1). All the dateable features have been assigned to the early Neolithic except for pit 265404 which is assigned to the late Neolithic/Early Bronze Age (but no sample was taken from this feature) and tree throw pit 265649 whose fill and overlying silting is dated by radiocarbon analysis to the middle Bronze Age (Table 1). Only a small number of samples were taken from features with positive early Neolithic dating evidence. The remaining samples are assumed to be contemporary although the presence of late Neolithic/early Bronze Age material on site raises the possibility that some features may post-date the putative early Neolithic building. So little material was recorded from any of the stakehole samples, the majority of which were less than 0.4 litres in original size that these have been left off Table 3 unless they produced something of note. Many produced a little (0.1-0.2g) magnetic material, and perhaps a few small heat damaged stones, but without specific distributional information, and even then, this has little interpretive value. One or two of the smaller posthole samples that produced no material have also been left off this table.

Table 1. Processed bulk environmental samples from Site 26.05

sample no	context no	feature	description	Processed wt kg	vol l*
2653003	265025	265026		8	12
2653014	265056	265055	Pit fill	14	20
2653027	265010	265011	Pit fill	47.5	nd
2653029	265005	265004	fill	24	20
2653030	265007	265006	Posthole fill	12.5	nd
2653031	265020	265019	Pit fill	11	10
2653047	265073	265072	Pit fill	20	30
2653048	265075	265074/72	Pit fill	2	nd
2653049	265077	265076	fill	1.5	nd
2653050	265013	265012	Post hole fill	1	nd
2653051	265033	265012	Post packing	0.9	nd
2653086	265119	265118	Post hole fill	21	nd
2653089	265015	265014	Post hole fill	4	5
2653090	265017	265016	Post hole fill	0.7	nd
2653091	265037	265036	Post hole fill	2	nd
2653092	265038	265036	Post hole fill	10	15
2653094	265066	265065	Post hole fill	3.5	4.5
2653095	265067	265068	Post hole fill	0.8	nd
2653173	265186		Stakehole fill	0.064	nd
2653174	265187		Stakehole fill	0.05	nd
2653175	265188		Stakehole fill	0.11	nd
2653176	265189		Stakehole fill	0.04	nd
2653177	265190		Stakehole fill	0.04	nd
2653178	265191		Stakehole fill	0.05	nd
2653179	265192		Stakehole fill	0.04	nd
2653180	265193		Stakehole fill	0.17	nd
2653181	265194		Stakehole fill	0.09	nd
2653182	265195		Stakehole fill	0.19	nd
2653183	265196		Stakehole fill	0.08	nd
2653184	265197		Stakehole fill	0.085	nd
2653185	265198		Stakehole fill	0.15	nd
2653186	265199		Stakehole fill	0.05	nd
2653187	265204		Stakehole fill	0.04	nd
2653188	265205		Stakehole fill	0.08	nd

sample no	context no	feature	description	Processed wt kg	vol l*
2653214	265249		Stakehole	0.124	nd
2653215	265250		Stakehole	0.37	nd
2653216	265251		Stakehole	0.15	nd
2653224	265253	265252	Pit fill	8	7
2653225	265255	265254	Pit fill	11	15
2653226	265278		Stakehole fill	0.25	nd
2653227	265279		Stakehole fill	0.13	nd
2653267	265303		Stakehole fill	0.13	0.15
2653268	265304		Stakehole fill	0.16	0.15
2653269	265305		Stakehole fill	0.17	0.2
2653270	265306		Stakehole fill	0.46	0.8
2653271	265307		Stakehole fill	0.16	0.2
2653272	265310		Stakehole	0.43	nd
2653273	265311		Stakehole	0.11	nd
2653274	265312		Stakehole	0.24	nd
2653275	265313		Stakehole	0.42	nd
2653276	265314		Stakehole	0.33	nd
2653277	265318		Stakehole fill	0.23	0.25
2653278	265319		Stakehole fill	0.11	0.15
2653279	265320		Stakehole fill	0.33	0.75
2653280	265325		Stakehole fill	0.34	nd
2653281	265326		Stakehole fill	0.33	nd
2653282	265327		Stakehole fill	0.4	nd
2653283	265328		Stakehole fill	0.27	nd
2653284	265329		Stakehole fill	0.37	nd
2653290	265309	265308	Fill	6	6
2653315	265354		Stakehole fill	0.26	nd
2653316	265356/355?		Stakehole fill	0.25	nd
2653317	265357		Stakehole fill	0.48	nd
2653318	265358/357?		Stakehole fill	0.22	nd
2653319	265358		Stakehole fill	0.36	nd
2653320	265322	265321	Posthole fill	2.5	nd
2653321	265324	265323	Posthole fill	2.5	nd
2653322	265363		Stakehole fill	0.32	nd
2653323	265364		Stakehole fill	0.24	nd

sample no	context no	feature	description	Processed wt kg	vol l*
2653324	265365		Stakehole fill	0.26	nd
2653325	265366		Stakehole fill	0.28	nd
2653326	265367		Stakehole fill	0.37	nd
2653326	265422		nd	0.4	nd
2653334	265377	265376	Posthole fill	10	nd
2653335	265378		Stakehole fill	0.1	nd
2653336	265379		Stakehole fill	0.28	nd
2653337	265380		Stakehole fill	0.2	nd
2653340	265384	265383	Top pit/posthole fill	7	10
2653341	265385	265383	Pit/posthole fill	12	10
2653345	265389		Stakehole fill	0.115	0.1
2653346	265401		Stakehole fill	0.2	0.2
2653347	265391		Stakehole fill	0.24	0.2
2653348	265392		Stakehole fill	0.3	nd
2653349	265393		Stakehole fill	0.34	nd
2653350	265394		Stakehole fill	0.27	nd
2653351	265395		Stakehole fill	0.53	nd
2653352	265396		Stakehole fill	0.6	nd
2653353	265397		Stakehole fill	0.22	nd
2653354	265398		Stakehole fill	0.2	Nd
2653366	265402		Stakehole fill	0.16	0.2
2653367	265403		Stakehole fill	0.21	0.2
2653368	265423	265404	Pit fill	23	nd
2653369	265414		Stakehole fill	0.095	0.2
2653370	265415		Stakehole fill	0.27	0.3
2653371	265416		Stakehole fill	0.18	0.3
2653372	265418		Stakehole fill	0.41	0.2
2653373	265419		Stakehole fill	0.72	0.4
2653374	265420		Stakehole fill	0.313	0.3
2653375	265421		Stakehole fill	0.53	0.4
2653377	265360		Posthole fill	3	nd
2653378	265361		Posthole fill	11	8
2653412	265532		Stakehole fill	0.33	0.18
2653413	265533		Stakehole fill	0.6	0.4
2653416	265536		Stakehole fill	0.45	0.2

sample no	context no	feature	description	Processed wt kg	vol l*
2653419	265537		Stakehole fill	0.27	0.15
2653420	265538		Stakehole fill	0.48	0.275
2653421	265533		Stakehole fill	0.44	0.2
2653422	265540		Stakehole fill	0.12	0.06
2653423	265541		Stakehole fill	0.083	0.04
2653424	265542		Stakehole fill	0.4	0.2
2653425	265543		Stakehole fill	0.13	0.04
2653426	265544		Stakehole fill	0.23	0.15
2653427	265545		Stakehole fill	0.46	0.2
2653428	265546		Stakehole fill	0.28	0.18
2653429	265547		Stakehole fill	0.23	0.15
2653432	265550		Stakehole fill	0.225	0.15
2653433	265551		Stakehole fill	0.4	0.5
2653434	265552		Stakehole fill	0.27	0.16
2653435	265553		Stakehole fill	0.08	0.04
2653436	265554		Stakehole fill	0.35	0.17
2653437	265555		Stakehole fill	0.18	0.1
2653439(38)	265556		Stakehole fill	0.07	0.05
2653439	265578		Stakehole fill	0.19	0.3
2653440	265558		Stakehole fill	0.04	0.05
2653441	265559		Stakehole fill	0.23	0.1
2653442	265560		Stakehole fill	0.22	0.15
2653444	265489		Stakehole fill	0.61	1
2653445	265486		Stakehole fill	0.2	0.5
2653447	265564		Stakehole fill	0.25	nd
2653449	265566		Stakehole fill	0.28	nd
2653450	265567		Stakehole fill	0.15	nd
2653451	265568		Stakehole fill	0.1	nd
2653452	265569		Stakehole fill	0.24	nd
2653454	265488		Stakehole fill	0.14	0.2
2653455	265490		Stakehole fill	1.32	1.5
2653471	265351	265371	Fill	12	14
2653537	265654		Stakehole fill	0.425	nd
2653538	265655		Stakehole fill	0.18	nd
2653539	265656		Stakehole fill	0.27	nd

sample no	context no	feature	description	Processed wt kg	vol l*
2653540	265657		Stakehole fill	0.22	nd
2653541	265658		Stakehole fill	0.2	nd
2653542	265659		Stakehole fill	0.43	nd
2653543	265660		Stakehole fill	0.23	nd
2653544	265661		Stakehole fill	0.22	nd
2653545	265662		Stakehole fill	0.41	nd
2653546	265663		Stakehole fill	0.35	nd
2653547	265664		Stakehole fill	0.445	nd
2653548	265665		Stakehole fill	0.54	nd
2653549	265666		Stakehole fill	0.3	nd
2653550	265667		Stakehole fill	2.8	nd
2653551	265026		<i>In situ</i> Burnt clay	8.5	nd
2653552	265669	265668	Fill pit base	10.5	15
2653568	265684	265683	Posthole fill	10	10
2653569	265685		Stakehole fill	0.88	nd
2653570	265686		Stakehole fill	0.24	nd
2653571	265689	265688	Posthole fill	8	10
2653572	265691	265688	Posthole fill	8.5	nd
2653575	265694		Stakehole fill	0.29	nd
2653576	265695		Stakehole fill	0.21	nd
2653578	265696	265683	Posthole fill	8.5	nd
2653583	265431	265430	Pit fill	7	nd
2653598	265703		Void?	3	4
2653616	265640	265639	Posthole fill	25.5	45
2653617	265640	265639	Posthole fill	9	nd
2653621	265645		Spread	10	15
2653622	265650	265649	Silting in tree throw	12	15
2653623	265714	265649	Tree throw pit fill	5	7.5
2653624	265738	265737	Charcoal spread/ tree throw pit?	8	15
2653625	265740	265739	Pit fill	26.5	57
2653629	265740	265739	Pit fill		nd
003	26.06.T1.05		Pit fill	4	nd
004	26.06.T1.07		Pit fill	6	nd
005	26.06.T1.09		Pit fill	4	nd

* volume recorded on site – not accurate

Location of samples from the main archaeological features

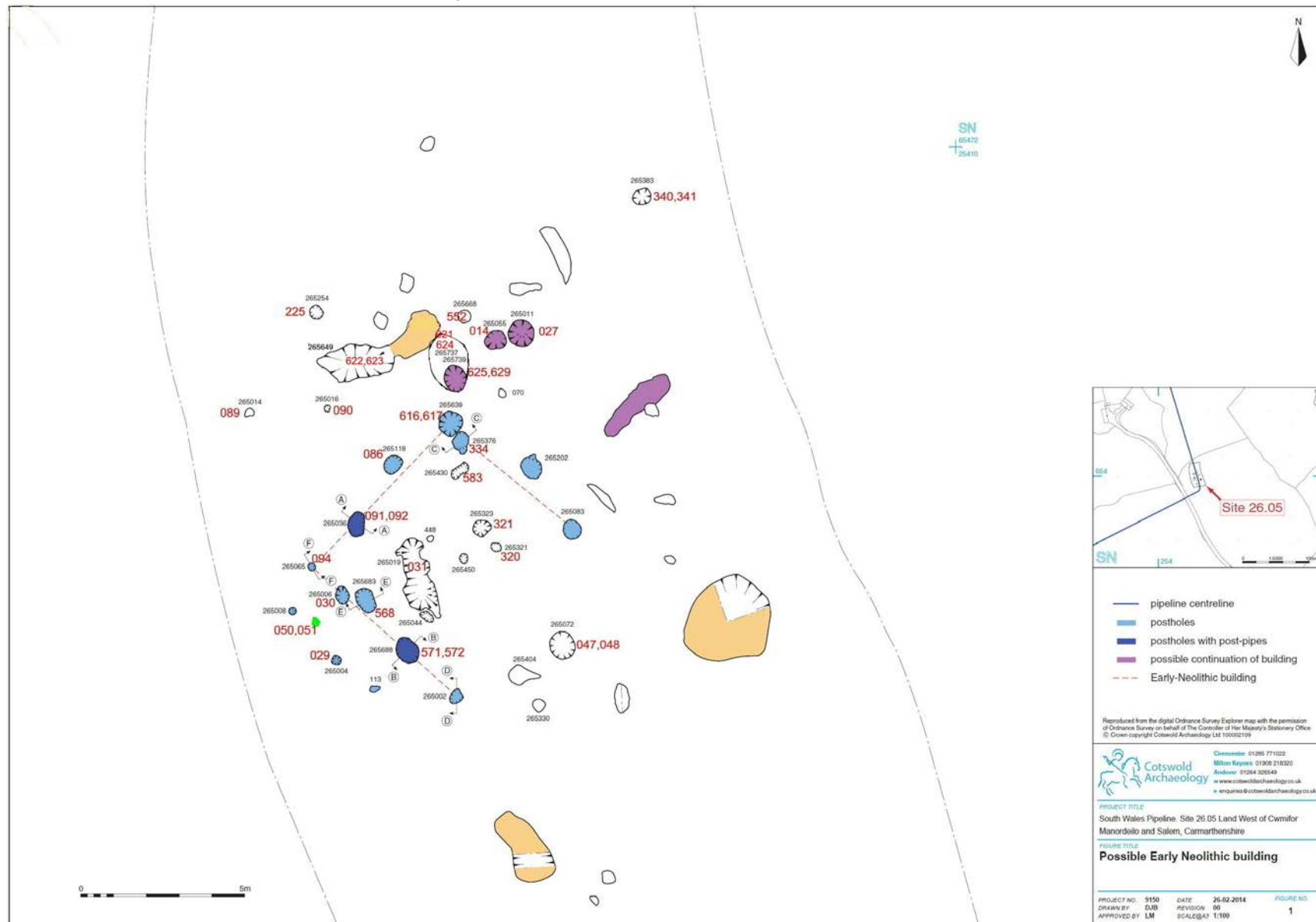


Table 2. Data for the environmental samples from Site 26.05

sample	ctxt	processed wt kg	1 st Flot Vol ml	2 nd Flot Vol	Residue wt g	pottery	Burnt clay	Burnt stone	flint	magnetic	Burnt bone	comments
2653003	265025	8	5	<1	315			36	<1g	02.4		HNSx13+3; <i>Plantago lanceolata</i> x1
2653014	265056	14	830	3	661				4g	1.6		See Table 3
2653027	265010	47.5	235	<1	2054	23g	0.6	94	5.2g	15.7		See Table 3
2653029	265005	24	7	<1	829+					0.4		Bracken pinnulex1, Poaceax1, HNSx3+1
2653030	265007	12.5	46	1	839	2g				1		See Table 3
2653031	265020	11	24	<1	485	<1g			3g	0.8		See Table 3
2653047	265073	20	20	<1	1741			42		2.2	<1g	See Table 3
2653048	265075	2	10	<1	143					0.2		See Table 3
2653049	265077	1.5	7	<1	161			43		0.8		HNSx1
2653050	265013	1	30	<1	74					0.6		See Table 3
2653051	265033	0.9	2	<1	91							HNSx3;barleyx1
2653086	265119	21	8	<1	1982	<1g		10		0.4		See Table 3
2653089	265014	4	13	<1	298					0.1		HNSx8
2653090	265017	0.7	0<1		51							
2653091	265036	2	<1	<1	243					0.2		HNSx1
2653092	265036	10	18	<1	733					0.4		See Table 3
2653094	265065	3.5	2	<1	283							HNSx5

sample	ctxt	pro- cessed wt kg	1 st Flot Vol ml	2 nd Flot Vol	Residue wt g	pottery	Burnt clay	Burnt stone	flint	magnetic	Burnt bone	comments
2653224	265253	8	2	<1	587				+			HNSx9
2653225	265255	11	1	<1	712							
2653290	265309	6	3	<1	292							HNSx16+6
2653315				<1								HNSx1
2653320	265321	2.5	1	0	149							HNSx5
2653321	265323	2.5	<1	<1	204					0.2		HNSx5
2653334	265377	10	13	<1	608			2		0.6		HNSx10+1
2653336				<1								HNSx2
2653340	265384	7	30	<1	347							
2653341	265385	12	2	<1	1091			1.8				
2653368	265423	23	10	1	1793	<1g		41		2		iron nail - 1g, HNSx3, whe at/barleyx1 indet ; indet grainx3
2653372	265418	0.41	2	-								HNSx1
2653377	265360	3	10	<1	258							<i>Galium aparine</i> x1; HNS+2
2653378	265361	11	1	1	1362			66				
2653421	265533	0.44	40		107							HNSx1
2653424	265542	0.4	50		98					0.2		HNS

sample	ctxt	pro- cessed wt kg	1 st Flot Vol ml	2 nd Flot Vol	Residue wt g	pottery	Burnt clay	Burnt stone	flint	magnetic	Burnt bone	comments
2653447	265564	0.25	2	-								Barleyx1
2653471	265351	12	2	1	851					0.2		Hulled barleyx1;HN Sx1+2
2653542	265659	0.43	4	-								HNSx1
2653543	265660	0.23	3	-								HNSx2
2653545	265662	0.41	60		122							cf barleyx1
2653547	265664	0.445	60		136							Barleyx1
2653550	265667	2.8	500		828	2.2g						Cereal grain indetx1
2653551	265026	8.5	1	<1	518					0.1		HNSx3+2
2653552	265669	10.5	15	1						0.2		HNSx2+4
2653568	265684	10	2	-	nd							HNSx3, hulled barleyx2; barleyx1, indet grainx3
2653571	265689	8	8	1	526			101		2.4		See Table 3
2653572	265691	8.5	1	<1	841					0.2		Barleyx1
2653575	265694	0.29	50		83					0.8		
2653578	265696	8.5	3	1	817							HNSx7+1, barleyx1
2653583	265431	7	4	<1	489							
2653598	265703	3	1	0	123							HNSx4

sample	ctxt	pro- cessed wt kg	1 st Flot Vol ml	2 nd Flot Vol	Residue wt g	pottery	Burnt clay	Burnt stone	flint	magnetic	Burnt bone	comments
2653616	265640	25.5	4000	<1	1298	+?		184	2g	3	<1g	Fex1. see Table 3
2653617	265640	9	>1000	<1	474			3.4	1g	4.6	<1g	possible worked stone, see Table 3
2653621	265645	10	40	1	668					0.6		HNSx8+1
2653622	265650	12	35	1	753			373	0.4	2.6		HNSx4+1
2653623	265714	5	5	<1	482	<1g		164		0.1		HNS+
2653624	265738	8	53	<1	1518	32g		129		1.6		See Table 3
2653625	265740	26.5	3000	<1	2060	100g		510+	6g	16.6	1g	possible worked stone, see Table 3
2653629	265740		500	2								HNS++++(+3), Barley+, emmer/spelt +
003	26.06.T1.05	4	200	-	nd	nd	nd	nd	nd	nd	nd	HNSx423, Emmerx2; cf emmerx2; wheat sp.x4, cf Wheatx2; indet grainx21, Wheat glume base

sample	ctxt	pro- cessed wt kg	1 st Flot Vol ml	2 nd Flot Vol	Residue wt g	pottery	Burnt clay	Burnt stone	flint	magnetic	Burnt bone	comments
												x1
004	26.06.T1.07	6	100	-	nd	nd	nd	nd	nd	nd	nd	HNSx50, <i>Prunus spinosa</i> x6+2 frags- rodent gnawed !
005	26.06.T1.09	4	65	-	nd	nd	nd	nd	nd	nd	nd	HNSx7

* abundance rating – += 1-10 items; ++=11-50, +++=51=100, ++++=101-200; # weight in grammes; nd=no data; HNS – hazel nutshell

The samples produced a range of finds including pottery, burnt stone, a little flint, fired earth and burnt bone, and occasionally a small magnetic component (Table 2). There is an evident concentration of activity in the northern part of the site around pits/ postholes 265739, 265639, 265011 and tree throw pits 265797 and 265649. Samples from this group of features produced pottery, burnt stone, a high magnetic fraction and an abundance of charred hazel nutshells. This would appear to have been a focus of domestic activity. Occasional small pot sherds or crumb were found in five other samples and a few other samples produced small quantities (just a few grammes) of burnt stone but nowhere else shows the same density of finds. Two features have a relatively high magnetic fraction, pits 265011 and 265739, which is composed of reddened mudstone suggestive of burning, and may indicate either burning within the pit or a greater concentration of hearth debris entering the feature.

The environmental evidence, other than charcoal, is primarily hazel nutshell fragments, but with the consistent occurrence of charred cereal grains across the site. As with the archaeological finds the hazelnut is concentrated in the same features, but interestingly the limited charred cereal assemblage shows two foci. One in line with most of the other debris and a small focus around the SW part of the site in features 265683, 265688, 265012, perhaps reflecting a second area of food processing or preparation. Outside of these two foci there is a scatter of charred hazel nutshell in samples across the site, but never in any great concentration, and a less dense scatter of occasional charred cereal grain. These two scatters would appear to reflect specific activity areas, and although the SW scatter of cereal grain is based on just a few grains it is probably still a real focus, given that so little material occurs across the rest of the site. Charcoal density in most of the samples is fairly low, but a few of the deposits are rich in charcoal, specifically those features in which other material is concentrated in the northern part of the site. The charcoal from posthole 265639 was assessed (Schmidl *et al* 2009) and proved to have 'heavily silt encrusted stemwood' of oak and a little alder/hazel. The charcoal samples from five of the early Neolithic features associated with the concentration of material in the north of the site have been studied in detail.

Charred plant remains (Wendy Carruthers)

Introduction

Site 26.05 is located on the western side of the Towy valley about 3km north-west of a site of similar date, Site 24.07, represented by a single pit. Soils in the area are seasonally wet acid loamy and clayey soils (<http://www.landis.org.uk/soilscapes/>). The area may have been suitable for arable cultivation. Site 26.05 is a little higher up the valley slopes than 24.07.

Fourteen samples from the fills of eight postholes, four pits and a tree-throw pit were fully analysed for this report, including the richest assemblages from the site. Seven of the postholes may have been associated with an Early Neolithic rectangular or square building. The radiocarbon dates (Table 1) and pottery from the sampled features indicate that the site is early Neolithic in date.

Methods

Sorting was carried out using an Olympus SZX7 stereoscopic microscope. Flots were first separated into three fractions to facilitate sorting (sieve sizes were 3mm, 1mm and 250 micron meshes). Modern material was removed prior to measuring the flot volume, although for this site only small quantities of modern rootlets and the occasional uncharred seed were present.

The principal component of the flots was hazel nutshell (*Corylus avellana*, HNS). Because this was so abundant in three of the very large flots (samples 2653014, 2653616, 2653625), subsampling had to be carried out using a riffle box (see '% flot sorted' at the bottom of Table 3). HNS fragments were counted and, where frequent,

weighed to the nearest 0.1g. This has enabled an 'index of fragmentation' to be calculated: fragment number/weight = fragments per gram or 'index of fragmentation'. This allows comparisons to be made across the sites, between different types of feature and different phases, etc.

Results

Table 3 presents the results of the analysis. Stace (2010) and Zohary and Hopf (2000) were used for nomenclature, the latter being used for cereal taxonomy. It should be noted that some changes to the identification and interpretation may be made once all of the Milford Haven site data has been gathered together.

Discussion

Efficiency of the processing, state of preservation and frequency of the remains:

The flots contained few modern contaminants (a few modern rootlets, rare slaggy fragments, occasional uncharred Chenopodiaceae seeds) so the security of the contexts appears to have been good. However, in some cases the charred plant remains were impregnated with silt, and in sample 2653617 (context 365640) yellowish, chalky concretions adhered to the charcoal. This has made identification difficult in some instances, but does not appear to have had a serious affect on the efficiency of flotation. The second flots contained relatively few charred items and in every case these consisted only of small to very small HNS fragments.

HNS was abundant in some of the flots (samples 2653014, 2653027, 2653625, 2653616), as was charcoal. In addition, in some of the samples emmer-type wheat grains were surprisingly frequent for such an early period, particularly in the fill of pit 265011 (sample 2653027, context 265010). In comparison with most Early Neolithic sites the samples were notably productive and the state of preservation was surprisingly good.



Table 3a. Identified plant macrofossils from the studied samples from Site 26.05

	Flot	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
	context type	pit fill	pit fill	PH/pit fill	PH/pit fill	PH/pit	PH/pit	PH fill	PH fill	PH fill	PH fill
	Feature no.	265019	265019	265072	265072	265072	265072	265006	265006	265688	265688
	Context no.	265020	265020	265073	265073	265075	265075	265007	265007	265689	265689
	Sample no.	265303	265303	2653047	2653047	265304	265304	265303	265303	265357	265357
CEREAL GRAINS	Period (* C14 dated)	?E Neo		residual Meso*?, SE bldg?		E.Neo SE bldg?		?E Neo bldg, west		?E Neo bldg, west	
<i>Triticum dicoccum</i> -type	emmer-type grain	1						3			
<i>Triticum dicoccum/spelta</i>	emmer/spelt wheat grain										
<i>Hordeum vulgare</i> L.	hulled barley grain										
<i>Hordeum vulgare</i> L.	indeterminate barley grain									5	
Cerealina indet	indeterminate grains									6	
CEREAL CHAFF											
<i>Triticum dicoccum</i> L. Schubl.	emmer spikelet fork										
<i>Hordeum vulgare</i> L.	barley rachis frag										
OTHER PLANT REMAINS											
<i>Corylus avellana</i> L.	hazel nutshell fragments HSW	80	6	2		1		49	22	8	10
<i>Brassica/Sinapis</i> sp.	charlock/mustard etc. CD							1			
<i>Persicaria maculosa/lapathifolia</i>	redshank/pale persicaria CD										

<i>Polygonum aviculare</i> L.	knotgrass achene CDGo										
<i>Fallopia convolvulus</i> (L.)A.Love	black bindweed achene CD										
<i>Chenopodium album</i> L.	fat hen seed CDn										
<i>Solanum nigrum</i> L.	black nightshade seed CD										
<i>Plantago lanceolata</i> L.	ribwort plantain seed Dgo										
<i>Centaurea</i> sp.	knapweed ACDG										
<i>Pteridium aquilinum</i> (L.)Kuhn	bracken frond fragments Wea										
unidentifiable heat affected material, probable bracken											
TOTAL		81	6	2	0	1	0	53	22	19	10
weight of soil processed (kg)		11		20		2		12.5		8	
CHARRED FRAGS/Kg		7.8		0.1		0.5		6		2.9	
% flot sorted		100%		100%		100%		100%		100%	
HNS index of fragmentation (frags/ g.)		86/0.7 = 123		v. small		v.small		71/0.7 = 101		med to small	
Flot vol (ml) (includes charcoal)		24	<1	20	<1	10	<1	46	1	8	<1
Charcoal vol (ml)		12		15		5		25		3	

Table 3b. Identified plant macrofossils from the studied samples from Site 26.05 (continued)

	Flot	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
	context type	PH fill	PH fill	PH fill	PH fill	PH fill	PH fill	PH fill	PH fill	pit fill	pit fill
	Feature no.	265118	265118	265036	265036	265639	265639	265639	265639	265055	265055
	Context no.	265119	265119	265037	265037	265640	265640	265640	265640	265056	265056
	Sample no.	2653086	2653086	2653092	2653092	2653616	2653616	2653617	2653617	2653014	2653014
CEREAL GRAINS	Period (* C14 dated)	?E Neo bldg, north		?E Neo bldg, north		E Neo* ?bldg, north		?E Neo bldg, north		E Neo	
<i>Triticum dicoccum</i> -type	emmer-type grain					2		4		13	
<i>Triticum dicoccum/spelta</i>	emmer/spelt wheat grain			1		2				2	
<i>Hordeum vulgare</i> L.	hulled barley grain										
<i>Hordeum vulgare</i> L.	indeterminate barley grain					1				1	
Cerealina indet	indeterminate grains			3		3		3		7	
CEREAL CHAFF											
<i>Triticum dicoccum</i> L. Schubl.	emmer spikelet fork										
<i>Hordeum vulgare</i> L.	barley rachis frag										
OTHER PLANT REMAINS											
<i>Corylus avellana</i> L.	hazel nut shell fragments HSW	5	1	3	2	895/15.8g	106/0.1g	380/8.7g	17	1490/45.8g	42/<0.1g
<i>Brassica/Sinapis</i> sp.	charlock/mustard etc. CD										
<i>Persicaria</i> <i>maculosa/lapathifolia</i>	redshank/pale persicaria CD										
<i>Polygonum aviculare</i> L.	knotgrass achene CDGo									1	
<i>Fallopia convolvulus</i> (L.)A.Love	black bindweed achene CD					1 testa				1e	
<i>Chenopodium album</i> L.	fat hen seed CDn										
<i>Solanum nigrum</i> L.	black nightshade seed CD										
<i>Plantago lanceolata</i> L.	ribwort plantain seed Dgo									1	

<i>Centaurea sp.</i>	knapweed ACDG										
<i>Pteridium aquilinum</i> (L.) Kuhn	bracken frond fragments Wea			1							
unidentifiable heat affected material, probable bracken											
TOTAL		5	1	8	2	904	106	387	17	1516	42
Volume of soil processed (l)		21		10		25.5		9		14	
CHARRED FRAGS PER Kg		0.3		1		39.6		44.9		111.3	
% flot sorted		100%		100%		20%		100%		20%	
HNS index of fragmentation (frags/gram)		v.small		small		1001/15.9 = 63		397/8.7 = 46		1532/45.8 = 33	
Flot vol (ml) (includes charcoal)		8	<1	18	<1	105^	<1	110	<1	830^	3
Charcoal vol (ml)		trace		12		50		10		?	

Table 3c. Identified plant macrofossils from the studied samples from Site 26.05 (continued)

	Flot	1st	2nd	1st	2nd	1st	2nd	1st	2nd
	Feature no.	265011	265011	265739	265739	265737	265737	265012	265012
	Context no.	265010	265010	265740	265740	265738	265738	265013	265013
	Sample no.	2653027	2653027	2653625	2653625	2653624	2653624	2653050	2653050
CEREAL GRAINS	Period (* C14 dated)	E Neo		E Neo		?		?	
<i>Triticum dicoccum</i> -type	emmer-type grain	132		4		3			
<i>Triticum dicoccum/spelta</i>	emmer/spelt wheat grain	21		4		3			
<i>Hordeum vulgare</i> L.	hulled barley grain							2	
<i>Hordeum vulgare</i> L.	indeterminate barley grain			1				15	
Cerealia indet	indeterminate grains	51		3		5		7	
CEREAL CHAFF									
<i>Triticum dicoccum</i> L. Schubl.	emmer spikelet fork	3							
<i>Hordeum vulgare</i> L.	barley rachis frag							1	
OTHER PLANT REMAINS									
<i>Corylus avellana</i> L.	hazel nut shell fragments HSW	2562/43g	68/<0.1g	720/17	109/1	424/6.2		3	
<i>Brassica/Sinapis</i> sp.	charlock/mustard etc. CD								
<i>Persicaria</i> <i>maculosa/lapathifolia</i> <i>a</i>	redshank/pale persicaria CD			1e				2	
<i>Polygonum aviculare</i> L.	knotgrass achene CDGo								
<i>Fallopia convolvulus</i> (L.)A.Love	black bindweed achene CD	1		1e					
<i>Chenopodium album</i> L.	fat hen seed CDn							2 + 1e	
<i>Solanum nigrum</i> L.	black nightshade seed CD							1	
<i>Plantago lanceolata</i> L.	ribwort plantain seed Dgo								
<i>Centaurea</i> sp.	knapweed ACDG	cf.1							

<i>Pteridium aquilinum</i> (L.) Kuhn	bracken frond fragments							cf.15	
	Wea								
unidentifiable heat affected material, probable bracken								177	
TOTAL		2771	68	734	109	435	0	226	0
Volume of soil processed (l)		47.5		26.5		8		1	
CHARRED FRAGS PER Kg		59.8		31.8		54.4		226	
% flot sorted		100%		33%		100%		100%	
HNS index of fragmentation (frags per gram)		2630/43 = 61		829/18 = 46		424/6.2 = 68		small	
Flot vol (ml) (includes charcoal)		235	<1	200^	<1	53	<1	30	<1
Charcoal vol (ml)		30		10^		3		10	

Character of the assemblages:

Hazelnut shell was the dominant component of the samples, occurring in all of the selected samples. Cereal grains occurred in eleven of the fourteen samples, the three samples with no cereal remains being from postholes belonging to the putative building. The most frequent cereal type was a long-grained, deeply hump-backed emmer-type hulled wheat (*Triticum dicoccum*; 8 samples). The presence of emmer was confirmed by the recovery of three well-preserved emmer spikelet forks from context 265010, pit 265011. Poorly preserved wheat grains were identified as hulled wheat (*T. dicoccum/spelta*). Barley grains (*Hordeum vulgare*) were also present (5 samples), but they were generally poorly preserved making it difficult to determine whether they were hulled or naked, straight or twisted.

One sample stood out from the others as being slightly different in character; sample 2653050, context 265013, posthole 265012. Barley grains were more frequent in this sample (17 grains with two clearly hulled), HNS was not frequent and a couple of different weed taxa were present (fat hen (*Chenopodium album*) and black nightshade (*Solanum nigrum*)). In addition a black, melted, heat-affected material was common, with occasional bracken-type pinnules and frond fragments with veins visible amongst the melted, blobby fragments. This appears to have been the remains of bracken burnt while still sappy in a hot fire. Being sappy it does not seem to represent the disposal of bedding or flooring materials, but could have been the result of the burning of vegetation that had begun to die back, mixed with some domestic waste. A second sample from this feature (2653051) produced three fragments of HNS and a barley grain (Table 2). It is uncertain what the date of this feature might be as no hulled wheat remains were present and barley has been grown throughout agricultural times. Black nightshade is often present in the most productive Neolithic assemblages, perhaps due to its occurrence on rich soils along woodland edges. Both taxa are indicators of high-nutrient soils. Radiocarbon dating is the only way to resolve the question as to whether this feature fits in with the Neolithic building. Comparisons with other sites along the pipeline suggest that this feature is possibly Early Bronze Age in date, as the dominance of barley and presence of fat hen tentatively indicates (see 'Comparison with other Sites' section below), but barley has been found in nine other samples from the site (Table 2) including hulled barley (Carruthers 2008). Late Neolithic or EBA pottery was recovered from another feature on the site (pit 265404, Barber and Hart 2013).

The remaining samples can be grouped into two categories in order to describe the assemblages and their probable origins:

a) *Rich pit/posthole fills* – These four features were located in a cluster at the north-east corner of the putative Early Neolithic building, with posthole 265639 possibly holding a corner post. They have been described as containing possible closure deposits (Barber and Hart 2013), as the pits/postholes lacked evidence for storage or processing (i.e. very few chaff fragments and weed seeds were present) but contained significant quantities of finds and palaeoenvironmental material. However, since chaff fragments and weed seeds are always scarce in Early Neolithic assemblages there are no clear comparisons to make with true crop processing waste assemblages for this period. It is possible that conventional methods of detecting crop processing using the presence of charred cereal processing waste do not work for this period, perhaps because cereal waste was too precious to be thrown into fires, or perhaps because processing was carried out in a different way such that hulled grains did not come into contact with fire. Nevertheless, the four features - pit/postholes 265011, 265055, 265639 and 265739 - all produced notably rich assemblages that were fairly well preserved, suggesting that they did not consist of redeposited burnt domestic waste. The abundance of hazelnut shell, much of which was recovered as large fragments and often half shells, suggests a possible deliberately placed deposit. It is uncertain

whether whole nuts might have been burnt and then deposited, since the compaction of the soil over time would have caused fragmentation, as would excavation and soil processing. In addition, the oily kernels of hazel nuts are unlikely to survive once charred as they become soft and are easily crushed. It is interesting to note, however, that when whole nuts are burnt they have a tendency to split into two clean halves, and many of the large fragments were found in this form.

Table 4 Hazelnut fragmentation indices for different samples

Group	Feature	HNS fragmentation index (highly fragmented = higher number)
Rich pits/postholes	265055	33
	265739	46
	265639	55
	265011	61
Tree-throw pit	265737	68
Other features	pit 265019	123
	PH 265006	101

Comparing the HNS fragmentation indices across the samples (for samples that produced sufficient numbers of fragments to carry out this calculation) it can be seen that the lowest figures (i.e. largest fragments on average per gram of HNS) were found in features that were suggested to have contained closure deposits. This suggests that the deposits were less disturbed and more likely to have been deliberately placed but could equally be primary disposal deposits after hazel processing or consumption. When the data is drawn together for all of the sites it is hoped that this type of comparison can be made using a wider range of feature types to see if clearer conclusions might be drawn.

The four features also produced the highest number of well-preserved emmer grains, as well as the only emmer chaff fragments from the site, although most of this was concentrated in pit 265011. Leaving aside the tree-throw pit and unusual posthole 265012, five samples from the rich pits/postholes produced 184 hulled wheat grains (132 from pit 265011) whilst seven samples from the remaining postholes/pits produced only 5 hulled wheat grains. Barley grains were fairly infrequent in both groups of samples (3 grains in the rich features, 5 grains in the poor features), although found more commonly than wheat as isolated grains in other samples across the site.

Weed contaminants were scarce in the rich samples, as was chaff, so this probably indicates that the cereals had been fully processed, with the three spikelet forks being accidental contaminants. However, once again, there is very little comparative data for this period. Arable weed floras appear to have been very limited at this time, possibly because some of the more aggressive weed taxa took longer to become established in this relatively new habitat. Typical weeds of this period are black bindweed (*Fallopia convolvulus*) and other common weeds of disturbed ground in the Polygonaceae family such as persicary (*Persicaria maculosa/lapathifolia*). Black bindweed occurred in low numbers in all four features, but the other three weed taxa were single records.

b) Low level background waste – Apart from the sample from the tree-throw pit described below, the remaining samples produced very low numbers of remains which generally included some small fragments of HNS and occasional cereal grains (emmer-type wheat and barley). The only non-food plant remains were one brassica seed (*Brassica/Sinapis* sp.) which could have been growing as a weed, and one bracken pinnule. Bracken is an

invasive plant of acidic, fairly dry, sandy soils so it is likely to have been common in open woodlands, scrub and grasslands close to the site. For the postholes that could have made up an Early Neolithic building, small amounts of burnt waste from flooring materials, bedding, thatch, and ash from hearths are likely to have accumulated in the postholes, trickling down through the fills over time.

c) Three throw pit/charcoal spread in 265737 – This relatively small soil sample (8 litres) produced a surprising concentration of HNS fragments and a few emmer-type grains. The low fragmentation index (some half nuts were present) and high concentration of charred plant remains (54.4 frags per litre) is more similar to the rich pits than the unproductive postholes. Since the sampled deposit is a charcoal spread located over pit 265739 and adjacent to the other rich pits (Fig. 1) it is possible that it was receiving similar assemblages. Radiocarbon dating shows that it is contemporary with posthole 265639, that underlies it, confirming its allocation to the early Neolithic.

Comparisons with other sites:

Comparing sites from the immediate locality, Site 24.07 is the closest early Neolithic site, located down the valley 3km south of Site 26.05. A single sample from a pit fill contained abundant HNS with a fragmentation index (FI) of 106. A small number of emmer-type grains with traces of emmer and emmer/spelt chaff were present, in addition to several crab apple (*Malus sylvestris*) seeds and core fragments.

Sixty three kilometres west along the Pipeline, close to the Pembrokeshire coast Site 245 produced two Early Neolithic pits containing frequent HNS and occasional emmer/spelt wheat, cf. barley and cf. oat grains. Dock and cleavers were the only weed seeds and a single einkorn/emmer glume base was recovered (Rackham *et al* 2015). Thirty seven kilometres to the east, close to Brecon, Site 51.07 produced 8 Early Neolithic pits (HNS > Pit [304] ; 3510-3350 cal BC) containing abundant HNS, and in two cases frequent cereal grains. Einkorn/emmer, emmer, a single possible free-threshing-type wheat grain and naked barley was identified. The density of charred plant remains reached a maximum of over 800 items per litre in pit [302] (Giorgi 2014).

In the central area of the pipeline, close to Carmarthen, Site 501 produced early Bronze Age dates from two features. Five other features possibly dated to the Neolithic/EBA. HNS fragments were not at all frequent and both naked and hulled barley were the principal remains from the radiocarbon dated EBA samples. Interestingly, weed taxa indicating nutrient-enrichment of the soil were present at this site, suggesting that the change to barley may have required changes in husbandry practices that included manuring. The Neolithic/EBA samples were less productive and poorly preserved.

Further afield on a different range of soils in the East of England two notable Early Neolithic sites have produced important charred plant assemblages. At Kilverstone, Norfolk, large numbers of pits were thought to have contained closure deposits consisting of HNS, emmer and occasional barley grains, with only traces of chaff and weed seeds. Located on the poor, sandy Breckland soils the weed taxa included the acid indicator sheep's sorrel as well as black nightshade and grasses (Ballantyne 2006). In Kent the site at Thanet Earth produced a few well preserved assemblages from Early Neolithic pits dated to the late 4th millennium BC. This site stands out as producing the first British evidence for the cultivation of free-threshing tetraploid wheat, as well as emmer. A free-threshing wheat grain was radiocarbon dated to 3944-3668 cal BC (UBA No. 22207). HNS was present but not frequent and apple was present. Traces of free-threshing chaff were present and occasional weed seeds, including cleavers, black bindweed, woody nightshade, vetch and dock (Carruthers, forthcoming). The soils at Thanet Earth are more varied and fertile, ranging from lime-rich loams to clays. Being close to continental Europe this may have been a chosen area of settlement for Early Neolithic incomers.

Once the Neolithic evidence from the Welsh pipeline sites is drawn together a clearer picture of the degree of dependence on gathered foods versus cultivated crops in South Wales should begin to emerge.

Charcoal (*Dana Challinor*)

The following samples were selected for detailed analysis of the charcoal assemblages – 2653014, 2653027, 2653616, 2653617, 2653625 – because of their size and secure dating to the Early Neolithic. Standard identifications procedures were followed for these samples; additionally, sample 2653624 from tree throw fill or charcoal spread 265738 was scanned at low magnification, which provides a characterisation of species diversity without quantification or detailed analysis.

The samples produced abundant and rich assemblages of charcoal, in reasonable condition. Three taxa were recorded: *Quercus* sp. (oak), *Alnus glutinosa* (alder) and *Corylus avellana* (hazel) (Table 5). Only one fragment was confirmed as alder, although the possibility that this taxon is represented in the undifferentiated category cannot be discounted. Tyloses were frequently observed in the oak fragments, and many exhibited slow growth - where rings were dominated by large early wood pores, with little late wood pores visible. Some infusion of sediment and low levels of vitrification were observed. Charred fungal hyphae were also noted in the fragment of alder and some hazel in sample 2653616. Many of the hazel fragments exhibited strong or moderate ring curvature indicating that the material derived from branch or small stem wood, and there were several fragments of 1-3 year old twigs in 2653027.

The charcoal assemblages from site 26.05 are remarkably similar, dominated by mature oak trunkwood, with small quantities of hazel roundwood. This probably reflects the ubiquity of oak-hazel woodland, and the presence of alder shows some wetland type resource. The assemblages from the pits probably represent spent fuelwood from domestic sources and it is interesting that there is so little distinction in taxonomic diversity and character of wood used between these pit assemblages and those from other feature types. Posthole 265639 formed part of a possible Neolithic structure, but it is unclear whether there was evidence for *in situ* burning and whether the charcoal might represent structural remains. Large oak posts and hazel withies would have been suitable for construction purposes, but the similarity of the charcoal assemblage to the pit ones suggests that they may equally have derived from domestic fire waste.

Table 5. Charcoal from early Neolithic features

	Feature no.	265055	265011	265639		265739	265737
	Context no.	265056	265010	265640		265740	265738
	Sample no.	2653014	2653027	2653616	2653617	2653625	2653624
<i>Quercus</i> sp.	oak	26 (hs)	25 (h)	22 (h)	25h	21 (h)	X (h)
<i>Alnus glutinosa</i> Gaertn.	alder			1			
<i>Corylus avellana</i> L.	hazel	4r	3	5r	5r	9 (r)	x
<i>Alnus/Corylus</i>	alder/hazel		2r	2			x
Total		30	30	30	30	30	

h=heartwood; r=roundwood; brackets denotes presence in some frags only

Discussion

The site lies near the head of a small stream valley along which a number of burnt mounds have been recorded, dating from the early Bronze Age to the middle Iron Age, although nothing contemporary with Site 26.05. Pollen analysis at a site (RDX31) on the western slopes of the valley 10km north of the site shows the early Neolithic landscape to be dominated by oak and hazel woodland with lime (Rackham *et al* in prep.), and alder growing in wetter areas and along the streams and rivers. Traces of *Plantago lanceolata* and Poaceae indicate only limited grassland and local clearance. The charcoal analysis tends to confirm this picture with oak dominant in the assemblages, hazel roundwood common and a single fragment of alder, but no light favouring species. Streams in the modern landscape run within two fields of the site and would have afforded a source for the alder. The site sits on the edge of a slight plateau on the hillside and overlooks the Towy valley to the east and the small stream valley to the south, and the stream may have risen quite close to the site in the Neolithic.

With clear evidence for Mesolithic activity on the site, indicated by a small collection of flints and the radiocarbon date on hazelnut from pit 265072 it is clear that some of the nutshell recovered from other features could be residual from this earlier period of activity on the site. While the larger nutshell assemblages can be confidently assigned to the early Neolithic activity, one or two fragments in contexts with little other charred material, including charcoal, could easily be residual and we cannot be confident that they are all Neolithic. Interestingly pit 265072 from which the mesolithic date was obtained produced no cereal remains from over 30 litres of sediment, and apart from a 'crumb' of possible early Neolithic pottery, nothing that confidently places it into this period, so it remains a possibility that this could be a Mesolithic feature rather than the nutshell being residual in this context. One feature (not sampled) has been positively assigned to the late Neolithic or early Bronze Age (Barber and Hart 2013) on the basis of four pot sherds and two middle Bronze Age radiocarbon dates (Table 1) have been obtained from hazel charcoal in tree throw pit 265649 (see Fig.1) from contexts 265650 and 265714, so it also cannot be ruled out that some of the sampled features may post-date the main phase of early Neolithic activity. Carruthers (see above) has tentatively argued above that the barley rich posthole in the SW of the site (Fig. 1 samples 050 and 051) might fit better in the early Bronze Age but without radiocarbon dating this must remain unresolved. There is a low density scatter of barley grains in several features across the site (Table 2) but with barley being identified along with emmer wheat in several of the dated early Neolithic samples there is no reason to use special pleading, and the exclusive occurrence of barley in posthole 265012 could merely reflect debris from an activity dealing with the barley crop rather than the wheat crop. Although in terms of grain numbers wheat far exceeds the barley count on the site the ratio of barley to wheat occurrence in samples is 14:11, ie more deposits yielded barley grains. Unfortunately with a considerable lack of confidence over the early Neolithic date of 'all' these deposits it might be rash to use these figures as indications of the relative importance of the two crops. Hazelnut fragments far exceed the grain in frequency across the site, but as has been argued elsewhere (Robinson 2000; Jones 2000) nutshell is a waste product that may be casually thrown on the fire at each 'meal' while a cereal grain has potential as part of that meal and is generally only charred accidentally. Nutshell occurs in over four times as many contexts (48 samples) as wheat grain, and over 3 times as many as barley grains, but quantities of over 1 gramme of charred nutshell only occur in eight samples. These are the only deposits where we might reasonably interpret this debris as in a primary context, particularly the five contexts where the fragmentation index is quite low (Table 4) indicating the survival of larger nutshell fragments. The implication is therefore that the four pits and charcoal spreads/tree throw fill (265738) towards the north of the site is a primary area of activity where food consumption and presumably processing took place. With the concentration of other finds in these five features, as noted above, this would suggest a significant focus area for the settlement, with fire debris, food waste, flint and pottery discarded into these features, but not generally the others on the site. A possible second focus in the SW of the site has been suggested on the basis of charred grain occurrence, but

also a little pottery, although neither occurs with any frequency. The actual function of these pits is not known although it has been suggested that they could represent 'closure deposits' (Barber and Hart 2013) in which the finds and debris have been 'placed', but much more careful archaeological recording would be needed to justify the interpretation of typical domestic rubbish on a settlement site as a 'placed deposit' with this level of significance. It could reasonably be argued that the concentration of material in these features reflects the fact that most of the other significant features are postholes which would not have been open to receive the settlements rubbish during its use.

Despite the evidence for extensive woodland still covering this part of Wales it is clear that areas have been cleared in which crops were cultivated, and presumably animals were pastured, although because of the soil conditions no bone other than a few small fragments of burnt bone has survived. The scale of the clearance is unknown, but the area of relatively flat ground in front of the site (ie to the south) would have afforded a suitable area for cultivation and grazing. The two tree throw pits 265649 and 265737 offer an interesting problem. The fill of 265737 has produced an early Neolithic radiocarbon date on hazel charcoal, and the sample has an assemblage of finds and charred remains similar to those from the early Neolithic pits. This concentration of material in the tree throw fill (if this is the correct interpretation for 265737 which is described on the original context sheet as a charcoal spread, and which overlies the fill of pit 265739), similar to that in the pits, indicates the following sequence – fallen tree creates a tree throw pit which fills with early Neolithic context 265737; pit 265739 is cut into the base of the tree throw and presumably/possibly through 265737 and fills with 265740. Context 265737 perhaps continues to form and spreads across fill 265740 sealing this fill of pit 265739 (context 265740 was not seen until 265737 was cleaned off). The implication is that if this is a tree throw then it occurred immediately before the occupation. It may be that this specific location was chosen for this reason since a fallen tree can create a large clearing which would form a good start to a process of woodland clearance, offers structural and fuel wood already 'felled', and perhaps it indicates a primary Neolithic colonisation phase at this site (see Griffiths comments 2015). However the adjacent tree throw, 265649, has produced two later middle Bronze Age radiocarbon dates from the primary fill and the later silting, indicating a much later phase of activity at the site, and the similar dates from both fills suggest the material in these contexts is middle Bronze Age, and unlikely to be residual early Neolithic material. Just a few fragments of hazel nutshell are all that have been identified from the two contexts in this tree throw pit (Table 2). Once again if this is a correct interpretation of the feature it indicates that by the middle Bronze Age at least one tree had re-colonised the site suggesting that the immediate landscape was not a cleared and maintained 'field', but woodland may have regenerated on the site in the Bronze Age, or even earlier in the Neolithic.

The evaluation trench, 26.06.T1 recorded three pits, one of whose contents (26.06.T1.05) matches closely the early Neolithic assemblages in having abundant hazel nutshell fragments and emmer wheat. The assemblage from one of the other two pits (26.06.T1.09) produced the only record of blackthorn (*Prunus spinosa* – sloe) from this site as well as a small assemblage of nutshell. A few of these fruit stones had been rodent gnawed to extract the kernel prior to carbonisation, perhaps reflecting the discard of a scavenged and spoilt store. Although sloes are considered to be unpleasant when fresh, when shrivelled and partly dried they are sweet and palatable although the ratio of fruit to stone is low.

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APPENDIX D: THE RADIOCARBON DATING BY SEREN GRIFFITHS

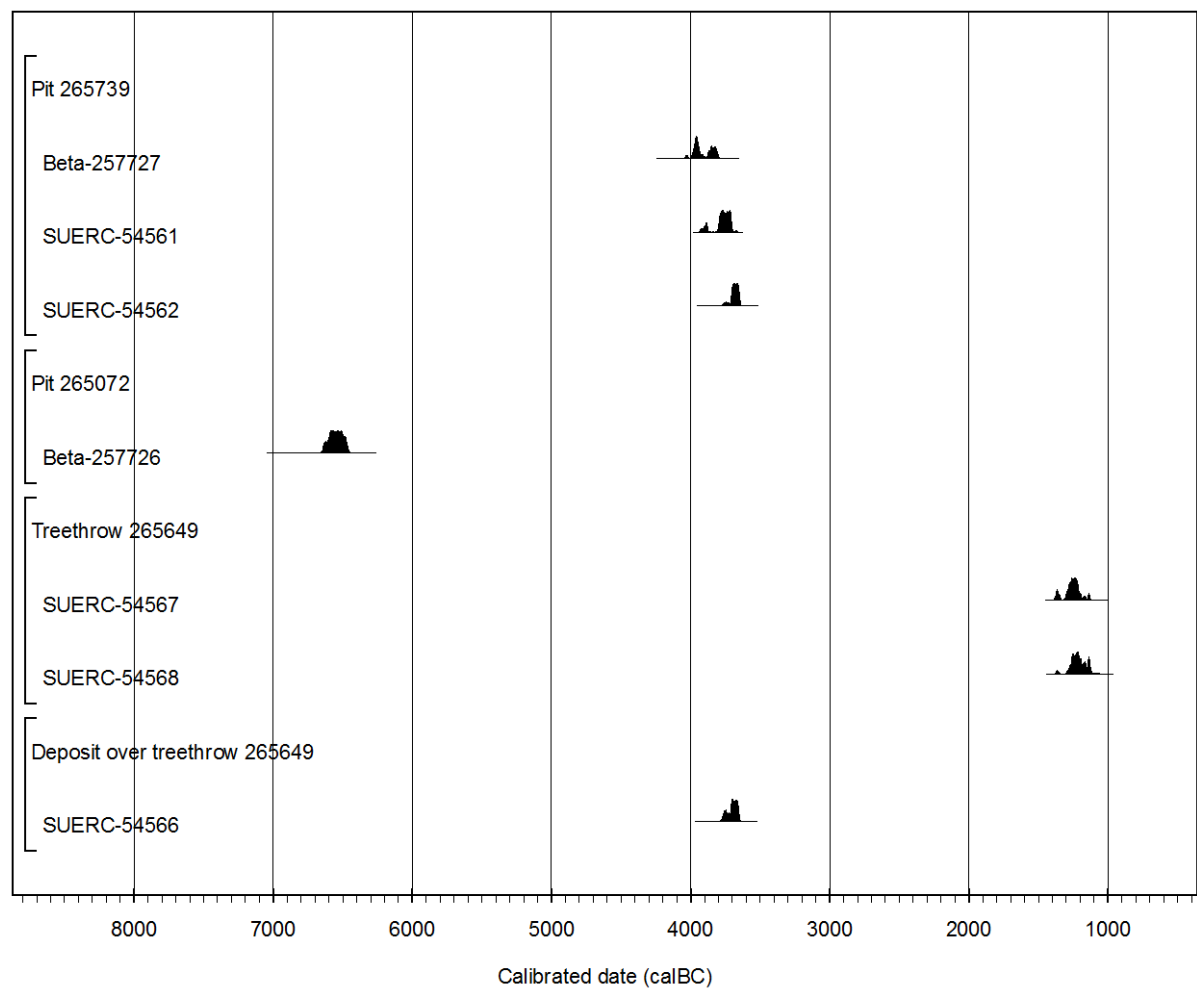
For the analysis, radiocarbon measurements were produced on short-life, single entity charred plant remains. Samples with the 'Beta-' laboratory code were pretreated as detailed here <http://www.radiocarbon.com/>. Samples with the 'SUERC-' laboratory code were pretreated using an acid-base-acid process. Samples were combusted and graphitized and then dated by Accelerator Mass Spectrometry (AMS). The results are conventional radiocarbon ages, quoted according to the international standard set at the Trondheim Convention. The results have been calibrated using IntCal13, and OxCal v4.2. The date ranges have been calculated using the maximum intercept method, and have the endpoints rounded outward to 10 years.

Seven results were produced on samples from site 26.5 (Fig. 6). Three results (Beta-257727, SUERC-54561 and -54562) were produced on samples from fill 265640 of posthole 265639. Two of these results (on hazel charcoal) are statistically consistent and could be of the same actual age ($T=3.5$; $T'3.8$; $df=1$; Ward and Wilson 1978). Beta-257727 is considerably older, which could indicate a mixed assemblage in the feature. This context contained sherds from a simple Everted Carinated Bowl and possibly sherds from two Developed Carinated Bowls (Appendix B). The later results on hazel charcoal are consistent with estimates for the start of the Neolithic in South Wales, and may provide accurate dates for the presence of Early Neolithic Carinated Bowls on the site, in the 38th or 37th centuries cal BC. The earlier result suggests the potential that the site was the presence of more complex multi-phase activity. Because the cereals grain recovered from this deposit were not directly dated, it is unclear whether these were part of any Early Neolithic activity at the site, or were associated with later presence on the site.

A single radiocarbon result (Beta-257726) from pit 265072 from a possible pit, which also contained barley, was probably produced on residual material, and does not date the presence of cereals on the site.

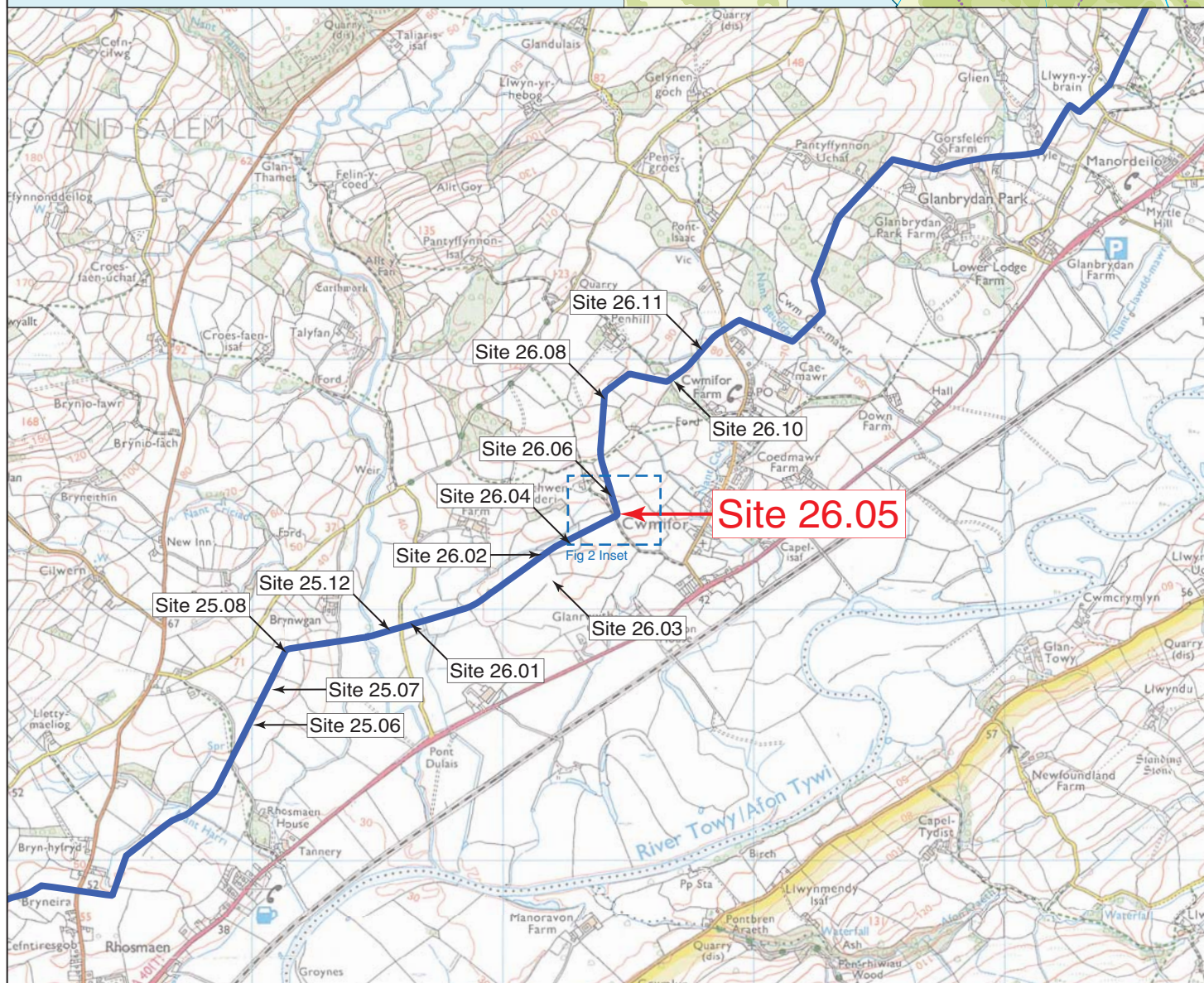
Table 6 Radiocarbon dates for Site 26.05

Context	Feature	Sampled material	Laboratory ref	Measured age	$\delta^{13}C$	Calibrated date (95%)
265073	Pit 265072		Beta-257726	7720 +/- 50		6650–6450 cal BC
265640	Posthole 265639		Beta-257727	5130 +/- 40		4040–3800 cal BC
265640	Posthole 265639	<i>Corylus</i> sp. charcoal	SUERC-54561 (GU34651)	4989 +/-30	-25.8	3930–3690 cal BC
265640	Posthole 265639	<i>Corylus</i> sp. charcoal	SUERC-54562 (GU34652)	4910 +/-30	-24.7	3770–3640 cal BC
265650	Tree throw 265649	<i>Corylus</i> sp. charcoal	SUERC-54568 (GU34655)	2988 +/-29	-24.9	1370–1120 cal BC
265714	Tree throw 265737	<i>Corylus</i> sp. charcoal	SUERC-54567 (GU34654)	3011 +/-29	-26.4	1390–1130 cal BC
265738	Tree throw 265737	<i>Corylus</i> sp. charcoal	SUERC-54566 (GU34653)	4929 +/-30	-25.2	3780–3640 cal BC

Fig. 6 The calibrated radiocarbon dates from site 26.05

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- Milford Haven to Aberdulais pipeline
- Felindre to Brecon pipeline
- 0-75m contour
- 75m contour
- 200m contour
- 400m contour
- 600m contour



0 1km

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PROJECT TITLE

South Wales Pipeline. Site 26.05 Land West of Cwmifor Manordeilo and Salem, Carmarthenshire

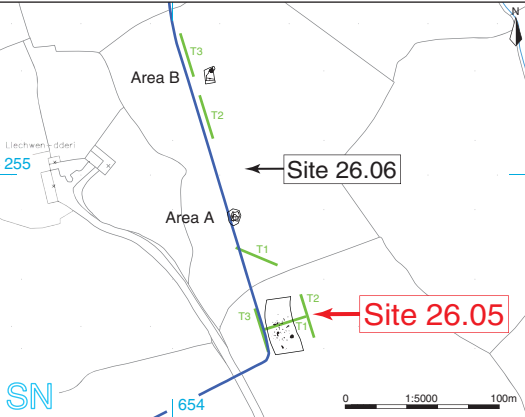
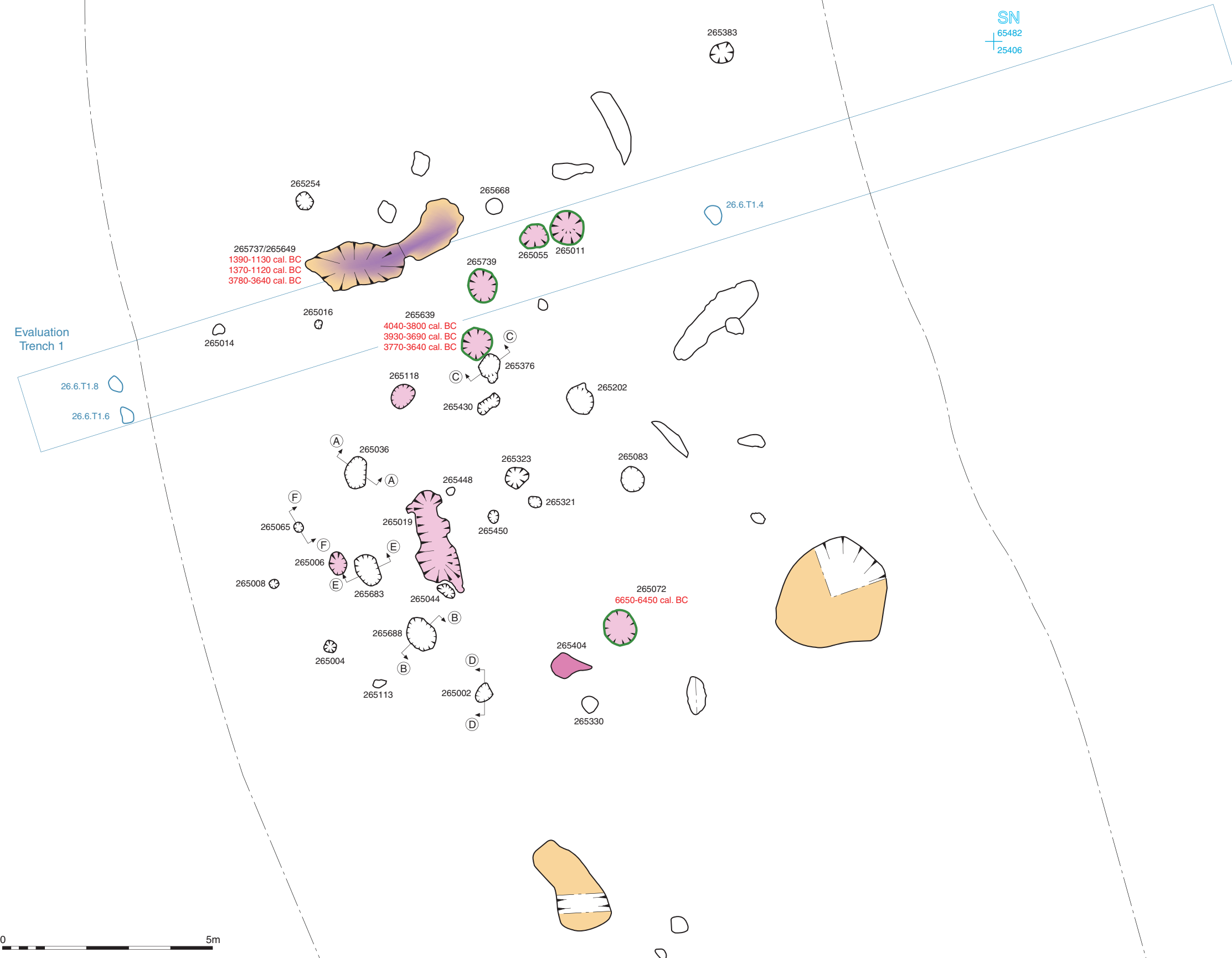
FIGURE TITLE

Site location plan

PROJECT NO. 9150 DATE 26-02-2014
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APPROVED BY LM SCALE@A4 1:25,000

FIGURE NO.

1



- pipeline centreline
- tree-throw pit
- features with Early Neolithic pottery or radiocarbon dates
- features with Late Neolithic/Early Bronze Age pottery
- features with Middle Bronze Age radiocarbon dates
- features with burnt fills
- evaluation trench

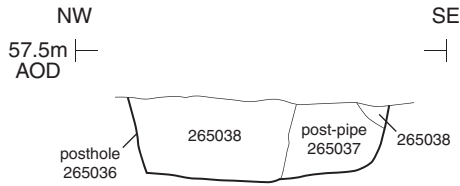
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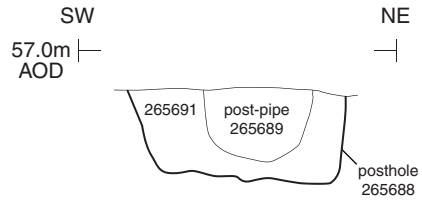
PROJECT TITLE
South Wales Pipeline. Site 26.05 Land West of Cwmifor Manordeilo and Salem, Carmarthenshire

FIGURE TITLE
Plan of archaeological features

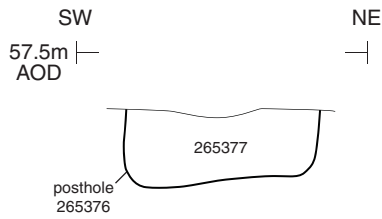
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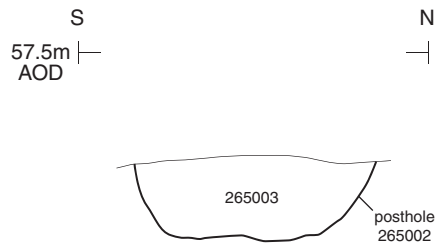
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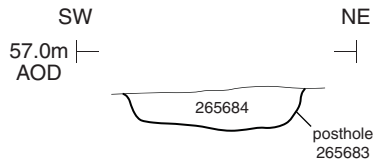
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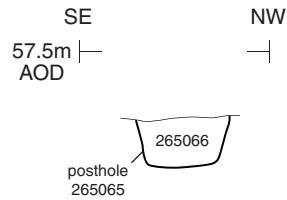
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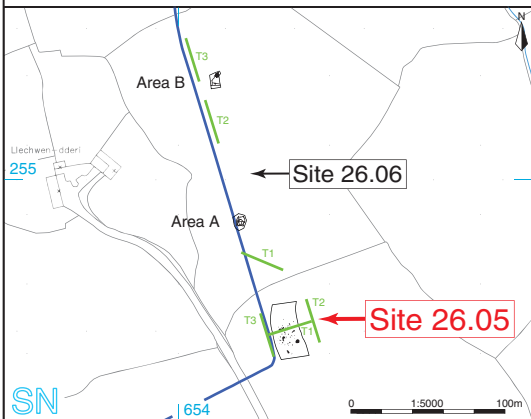
Section EE



Section FF



0 0.5m



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PROJECT TITLE

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FIGURE TITLE

Sections

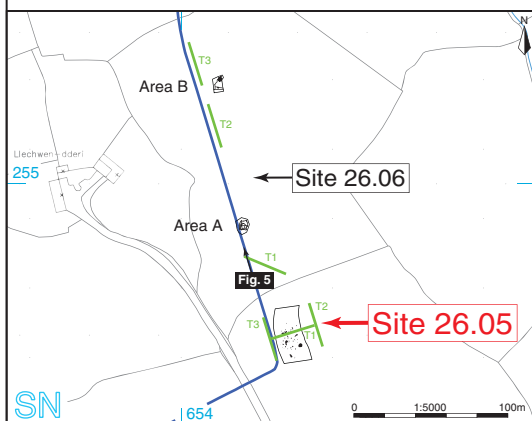
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FIGURE NO.

3



General site view, looking north-west (scales 2m)



— pipeline centreline
 Fig. 5 photograph locator

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PROJECT TITLE

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FIGURE TITLE

Photograph

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FIGURE NO.
5