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Department of Transport An Roinn Iompair

NRA An tÚdarás um Bóithre Náisiúnta National Roads Authority Archaeology

Date: February 2010
Client: Kildare County Council
Project code: KCK06

N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 – Resolution, Kilcullen to Moone and Athy Link Road.

Final Report on archaeological investigations at Site E2986, in the townland of Foxhill, Co. Kildare.

By: T.J. O'Connell
National Monuments Section Registration Number: E2986
Director: Lydia Cagney
NGR: 271885/193352

Report Status: Final

Meanma agus Mianach

HEADLAND ARCHAEOLOGY Ltd

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Executive Summary

This final report presents the results of the archaeological resolution works carried out on behalf of Kildare County Council and the National Roads Authority as part of the Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road. The works were undertaken prior to the commencement of construction of the N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. The Minister of the Environment, Heritage & Local Government, following consultation with the National Museum of Ireland, issued Directions to Kildare County Council on 8 March 2007 for archaeological resolution works relating to the road development. The registration number, E2986, was allocated by the Department for the excavation of the present site in Old Kilcullen townland under the directorship of Lydia Cagney of Headland Archaeology (Ireland) Ltd., who carried out the archaeological excavations. The report was written by T.J. O'Connell, as Ms Cagney was no longer employed by Headland Archaeology (Ireland) Ltd during the post-excavation phase of the project.

An Environmental Impact Assessment was published in 2003 for the Kilcullen to Powerstown Scheme, with Valerie J Keeley Ltd preparing the Archaeological, Architectural and Cultural Heritage Assessment. This formed Chapter 10 of the EIS produced by the Roughan and O'Donovan - Faber Maunsell Alliance. Geophysical prospection was carried out on certain areas of high archaeological potential by Bartlett-Clark Consultancy as part of the Environmental Impact Assessment, on behalf of Valerie J. Keeley Ltd/Kildare County Council.

Aerial photography was undertaken along the entire route selection as part of the non-invasive assessment after the EIA stage. This work was carried out in April 2004 by Markus Casey.

Archaeological testing carried out by IAC Ltd under N9/N10 Kilcullen to Waterford Scheme: Kilcullen to Powerstown. Archaeological Services Contract No. 1 – Test Excavations, Kilcullen to Mullamast under Ministerial Direction Numbers A021/181 on this site between 8 May and 28 August 2005 identified a figure-of-eight-shaped kiln (Bailey 2006).

Full archaeological resolution was conducted on this site between 28 August and 6 September 2007. The kiln identified during testing was re-identified along with an isolated posthole. The kiln has been dated to the Late Iron Age/early medieval transitional period.

A preliminary Report of works on the site was completed by Headland Archaeology (Ireland) Ltd in March 2009.

1 Introduction

The N9/N10 Kilcullen to Waterford Road Scheme, of which the Kilcullen to Powerstown Scheme forms part, was proposed as a High Quality Dual Carriageway/Motorway, forming the Major Inter Urban route between Dublin and Waterford. The Kilcullen to Powerstown Scheme was advanced as a single entity up to the Compulsory Purchase Order/Environmental Impact Statement and was subsequently divided into two separate construction contracts: the Carlow By-pass (Phase 1) and the Kilcullen to Carlow Scheme (Phase 3). Kildare County Council, National Roads Design Office, has responsibility for overseeing the project management of these two schemes. The entire road scheme from Kilcullen to Waterford has now been designated as Motorway.

An Environmental Impact Assessment was published in 2003 for the Kilcullen to Powerstown Scheme, with Valerie J Keeley Ltd preparing the Archaeological, Architectural and Cultural Heritage Assessment. This formed Chapter 10 of the EIS produced by the Roughan and O'Donovan - Faber Maunsell Alliance. Geophysical prospection was carried out on certain areas of high archaeological potential by Bartlett-Clark Consultancy as part of the Environmental Impact Assessment, on behalf of Valerie J. Keeley Ltd/Kildare County Council.

Aerial photography was undertaken along the entire route selection as part of the non-invasive assessment after the EIA stage. This work was carried out in April 2004 by Markus Casey.

Construction commenced on Phase 1, the Carlow By-pass, in January 2006 and the road was completed and opened in May 2008. Construction of Phase 3, the Kilcullen to Carlow Scheme, which also includes a new single carriage link road to Athy town, commenced in January 2008.

Archaeological test-trenching was undertaken in advance of Phase 1, the Carlow By-pass, by Headland Archaeology (Ireland) Ltd between June and August 2005 (Archaeological Services Contract No. 3). This work identified 64 archaeological sites, which required archaeological excavation in advance of road construction. The resolution works for these sites were undertaken by Headland Archaeology (Ireland) Ltd between January and August 2006 (Archaeological Services Contract No. 4).

Archaeological test-trenching was undertaken in advance of the construction of Phase 3, the Kilcullen to Carlow Scheme, by IAC Ltd and CRDS Ltd, between October to November 2005 and May to August 2006 (Archaeological Services Contracts No. 1 and No. 2, respectively). This work resulted in the identification of 102 archaeological sites, which required resolution in advance of construction. The resolution works for these sites were undertaken by Headland Archaeology (Ireland) Ltd between March and December 2007 (Archaeological Services Contracts No. 5 and No. 6). This report details the results of one of those excavations, undertaken under NMSR Number E2890.

The project was funded by the Irish Government and the European Union through Kildare County Council/National Roads Authority, under the National Development Plan 2000-2006 and 2007-2013.

Construction Phases 2 and 4 relate to the section of road between Powerstown, Co. Carlow and the Waterford city By-pass and are project managed by Waterford County Council, National Roads Design Office.

2 Site description and location

Site E2986 was situated in the townland of Foxhill, which is in the parish of Moone and the barony of Narragh and Reban East, *c*. 3 km east of Athy town in Co. Kildare at National Grid Reference: 271885/193352 (Figure 1). The site was located in a large, relatively flat, sub-rectangular field that was under pasture at the time of excavation.

A number of recorded monuments were present in proximity to the site, a group of which were located over *c*. 500 m away from the site to the east. They included a possible ecclesiastical enclosure (KD035-065), a church (KD035-029001) called Whitechurch and a possible graveyard (KD035-029002) in the townland of Turnerstown, a field system (KD035-051) and three enclosures (KD035-028), (KD035-051002) and (KD035-051001) in the townland of Ballycullane. In addition two enclosures (KD035-034/035) are recorded *c*. 750 m to the southeast in the townland of Bray Lower and another enclosure (KD035-040) is located 1.2 km to the northwest of the site and in the townland of Foxhill (Figure 2).

Archaeological investigations undertaken as part of Archaeological Services Contract No. 5 on the road scheme identified a number of sites in proximity to the present site. These included Site E2985 *c*. 80 m to the east and also in Foxhill townland where a Later Mesolithic pit produced a radiocarbon date range of 5480-5220 cal BC (2σ) (SUERC-25450). Reuse of that site occurred in the Early Bronze Age possibly representing domestic activity. A number of postholes were excavated; one of these contained pottery sherds from a single Early Bronze Age vase urn and the feature produced a date range of 1920-1660 cal BC (2σ) (SUERC-25449) (O'Connell, 2010a). At site E2983, located *c*. 750 m to the east in the townland of Ballycullane, seven pits were excavated. Two of these features produced date ranges of cal AD 1450-1650 (2σ) (SUERC-25903) and cal AD 1450-1650 (2σ) (SUERC-25903) respectively suggesting for activity occurring on this site during the high medieval and late medieval period (O' Connell, 2010b). Site E2991 was located *c*. 900 m to the west of the present site in the townland of Bray Upper. Two phases of activity were identified; an arc of features which produced two radiocarbon date ranges of 2860-2500 cal BC (2σ) (SUERC-25909) and 2870-2580 cal BC (2σ) (SUERC-25469) also contained pottery identified as Grooved Ware indicated initial activity on that site occurred in the Late Neolithic period. An additional pit was dated to cal AD 1050-1290 (2σ) (SUERC-25470) which indicated reuse of the site in the early medieval/ high medieval period (O' Connell, 2010c) (Figure 2).

3 Aims and methodology

The objective of the work was the preservation by record of any archaeological features that would be impacted by the proposed development, in advance of the road construction programme.

Topsoil stripping of the site was conducted using a 360° tracked machine fitted with a 1.9 m wide ditching (toothless) bucket under constant archaeological supervision. A total area of 99 m² was exposed. The resulting surface was cleaned and all potential features investigated by hand. Archaeological contexts were recorded by photograph and on *pro forma* record sheets. Plans and sections were drawn at scales of 1:50, 1:20 and 1:10. Registers are provided in the appendices (Appendices 1-5). Ordnance Datum levels and feature locations were recorded using Penmap and a total station theodolite.

A total of seven environmental samples were taken on any deposits suitable for analysis or dating as per Headland Archaeology (Ireland) Ltd environmental guidelines and following consultation with environmental archaeologist and archaeobotanist Karen Stewart. All seven soil samples taken during

the excavation underwent processing and environmental assessment/analysis (Appendix 7). Three animal bone samples were also taken during the excavation. These and additional bone recovered during the processing of environmental samples are dealt with in the report on the faunal remains (Appendix 8).

Full archaeological resolution was conducted on this site between 28 August and 6 September 2007. The crew on site E2986 consisted of 1 director, 1 deputy site manager and 2 assistants.

Following excavation, all finds and metallurgical waste recovered were analysed by the appropriate specialists and reports produced on the findings for incorporation into this report (see appendices).

4 Excavation results

Natural Geology
The earliest natural horizon identified on this site consisted of glacial till, light grey clayey sand with frequent large stone inclusions (003). This was overlain by yellowish brown silty sand subsoil (002). The topsoil consisted of moderately compact mid-brown sandy clay with occasional small stone and frequent root inclusions and measured between 0.20 m and 0.30 m deep (001).

Late Iron Age/early medieval activity
Archaeological excavation on this site uncovered a cereal-drying kiln (004) and a single, isolated posthole (005) (Figure 3).

The cereal-drying kiln (004) (Figure 4, Plates 2, 3 and 4) had a figure-of-eight-shaped in plan measuring 1.98 m long along a northwest/southeast axis. The fire-pit, located to the northwest was oval shaped in plan with a maximum width of 0.75 m and 0.65 m deep with vertical sides and a flat, oxidized base. A poorly defined linear flue measured 0.5 m long and 0.15 m deep with gradually sloping sides and a concave shaped, oxidised base was connected to an oval shaped drying chamber. This measured 0.65 m wide and 0.2 m deep with gradually sloping sides and a concave shaped base.

The basal fill of the fire-pit consisted of compact light grey yellow silty sand with small stone inclusions (011). The secondary fill of the fire-pit was composed of loose dark grey brown clayey silt with frequent charcoal fleck inclusions (012). Environmental processing of a sample taken from this deposit yielded a large assemblage of charred cereal grains with over one hundred recorded. These were predominately barley, followed by oat though nearly half of the cereal was too badly damaged to determine species. Wild taxa were also found including goosefoot seeds and sedge nutlets (Appendix 7). Animal bones recovered during the excavation of the deposit and the processing of soil samples taken included 26 unburnt cattle teeth, an unburnt cattle humerus, one unburnt mammal bone fragment, a fragment of a pig mandible with teeth, an unburnt pig mandible fragment and eight unidentified unburnt bone fragments (Appendix 8). A fragment of cattle bone was radiocarbon dated to cal AD 260-540 (2σ) (SUERC-27162) dating the kiln to the Late Iron Age/early medieval period transitional period (Appendix 9). The tertiary fill consisted of loose, mid grey brown clayey silt with occasional charcoal fleck and stone inclusions (007). Some charred grain was recovered from a sample taken from this deposit (Appendix 7). Burnt bone unidentifiable to element was also recovered (Appendix 8).

The next deposit in the kiln consisted of loose, mid grey brown sandy silt with frequent charcoal flecks, occasional small pieces of burnt wood and small and medium sized stone inclusions (008). A single large fragment of slag weighing 351 g was identified and retrieved during the excavation of the deposit (Appendix 12). Charred grain some of which was identified as hulled barley (Appendix 7), a

highly corroded and fragmentary ferrous object (E2986:008:001) possibly representing a nail (Appendix 11) and burnt bone unidentifiable to element were identified and retrieved from a sample taken from this deposit (Appendix 8). The next deposit within the fire-pit and filling the flue and drying chamber consisted of mid brown sandy silt with occasional fragments of charcoal (009). Charred grain some of which was identified as hulled barley, wild taxa including goosefoot seeds and sedge nutlets (Appendix 7), an unburnt cattle tooth and distal humerus and unburnt bone not identifiable to element (Appendix 8) were all identified and retrieved from a sample taken from this deposit. One blue glass object (E2986:009:001; Plate 7) was also recovered. It comprised a slim glass rod which did not appear to be perforated (Appendix 10) and may represent a portion of a broken bangle.

The upper fill of the kiln consisted of moderately compact dark greyish brown sandy silt with occasional charcoal fleck and small stone inclusions (010). Some charred grain some of which was identified as hulled barley and wild taxa including goosefoot seeds and sedge nutlets (Appendix 7) and two unburnt fragments of tooth, probably pig and burnt unidentifiable bone (Appendix 8) were all identified and retrieved from a sample taken from this deposit.

The isolated posthole (005) (Figure 5, Plate 5) was located 3.7 m north of the kiln (004). It had a sub-circular shape in plan measuring 0.35 m long, 0.27 m wide and 0.16 m deep with vertical sides and an uneven base. It was filled with compact light greyish brown sandy silt (006).

5 Discussion

The results of the excavation at Site E2887 are discussed here following stratigraphic, environmental, dating and artefactual analysis. The site is then discussed on a local level and related to other sites known in the vicinity (including those discovered on the current scheme). Finally the site is discussed on a national level in an attempt to place it in context and assess how it contributes to the archaeological record in general

Late Iron Age/early medieval activity

The dating evidence from the present site fits a proposed sequence for the development of cereal-drying kilns (Monk and Kelleher 2005). It suggests that figure-of-eight and dumb-bell-shaped kilns are among the earliest examples, dating to the early medieval period, while keyhole-shaped types have been dated to the high medieval period, *c.* AD 800-900 up until the early 20th century. Radiocarbon dating undertaken on a sample of cattle bone recovered from the basal fill of the kiln on the present site returned a calibrated date range of cal AD 260-540 (2σ) (SUERC-27162) providing a Late Iron Age/early medieval framework for the cereal drying activity on site (Appendix 9).

Identifiable cereal-drying kilns consist of three components, i.e. a firespot, a flue and a bowl (Monk and Kelleher 2005), with heat being transferred from the fire-spot, through the flue to the drying chamber or bowl. The fire-spot is often recognized by the presence of fire-reddened clay on the base and sides at one end of the kiln. The kiln on the present site was earth cut with a northwest/southeast axis. The fire-pit which was located to the northwest was connected by a poorly defined linear flue to an oval shaped drying chamber. Both the fire-pit and flue had evidence for oxidisation along their sides and base. With the exception of a single isolated posthole located 3.7 m north of the kiln no associated structural evidence such as post holes, drying platform or 'wind breaks' were detected during the excavation. Cereal-drying kilns are classified according to their shape in plan with the five main categories being; keyhole-shaped, L-shaped, figure-of-eight-shaped, dumb-bell-shaped and irregular (Monk and Kelleher 2005, 79).

Tillage played an essential role in the early medieval Irish economy and cereals were by far the most important element of crop husbandry (Edwards 1990, 60). Charred barley grain, oat grains and cereals of indeterminate species were recovered from a number of fills from the kiln; the majority of these were recovered from the basal fill, the secondary fill was found to be archaeologically sterile and a number of subsequent fills contained additional cereal remains though in much lower quantities that the basal fill (Appendix 7). Excavated cereal-drying kilns generally have a high incidence of oats, followed by barley and then wheat (Monk and Kelleher 2005, 85). The evidence suggests that main cereals cultivated in the locality of the present site during the Late Iron Age/early medieval period was barley and oat. According to eighth century law-texts such as the *Bretha Déin Chécht*, bread wheat was considered the highest status cultivar, followed by rye, with emmer wheat, barley and oats of a lesser status, more often associated with the 'middle classes', such as land-owning commoners (Kelly 1997). It is suggested that the inclusion of wild taxa in some of the kiln fills could be due to these being mixed in with the cereal grains during the cereal processing (Appendix 7)

In total 139 bone specimens, both burnt and unburnt were recovered from the kiln fills with cattle and pig species being identified which are both common in Iron Age sites in Ireland (Appendix 8). The recovery of the single large fragment of slag from one of the kiln fills, identified as fragment of small smithing hearth base is suggestive for archaeometallurgical activity occurring in the area in addition to the agricultural activity during the chronological framework outlined. Specialist assessment interpreted it as a by product of iron smithing that was probably taking place locally though no evidence was recovered to suggest it was occurring in the vicinity to the site and it is not clear if the sample represents primary and secondary smithing (Appendix 12). The recovery of the highly corroded and fragmentary ferrous object (E2986:008:001) from the same context may suggest for the possibility that the metallurgical remains represent secondary smithing (the manufacture, repair or modification of iron artefacts). Specialist analysis of the blue glass object (E2986:009:001) that was also recovered from one of the kiln fills could not determine if the artefact was an attempt at making a bead or if it was part of a larger, now broken item. Beads are relatively common finds on early medieval sites and small dark blue beads are particularly conspicuous (Edwards 1990, 94). The find in question could very possibly be part of a broken blue glass bangle or the attempted manufacture of one. The artefact, consisting of a slim glass rod had a d-shape in cross section. Like the glass artefact from the present site early medieval glass bangles have a very small diameter and a d-shaped section (*ibid*).

A similar figure-of-eight-shaped kiln was excavated on Site E2860 *c*. 6 km to the northeast of the present site, in the townland of Mullamast and as part of the same road scheme as the current site. Radiocarbon dating of emmer grains retrieved from the kiln fill there produced a date range of cal AD 340-590 (2σ) (SUERC-25459) (Clarke 2010) placing the kiln within a similar chronological framework as the present site.

The cereal-drying kiln on the present site had a figure-of-eight in plan which corresponded to an established morphology for the earliest type of medieval cereal-drying kiln in Ireland. The palaeoenvironmental evidence suggested that the main cereals cultivated in the locality during the Late Iron Age/early medieval period were barley and oat. The combinations of material within the kiln fills; animal bone, slag, the ferrous object and the glass object indicate that the kiln was used for the disposal of debris after its use for cereal drying had ended. As cereal-drying kilns are considered to features that occur ancillary to settlement, this points to the potential for a Late Iron Age/early medieval settlement or habitation site somewhere in the vicinity of site E2986, beyond the limits of the CPO.

6 Archive quantities

The site archive is comprised of the following materials:

Item	Quantity
Context Sheets	12
Plans	4
Sections	3
Photographs	23
Registers	4
Notebooks	1

The archive material is contained within 1 box.

Storage of the archive in a suitable format and location is required in order to provide for any future archaeological research. It is proposed that in addition to the paper archive a digital copy is prepared. The archive is currently stored in the offices of Headland Archaeology (Ireland) Ltd., Unit 1, Wallingstown Business Park, Little Island, Co. Cork. It is proposed that the archive is appropriately deposited in consultation with the National Museum of Ireland.

References

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Edwards, N. 1990 *The Archaeology of Early Medieval Ireland.* B.T.Batsford Ltd, London.

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Valerie J. Keeley Ltd 2003 'Architectural, Archaeological and Cultural Heritage', in Roughan and O'Donovan – Farber Maunsell Alliance (compilers) *N9/N10 Kilcullen to Waterford Scheme: Kilcullen to Powerstown: Environmental Impact Statement Vol. 1.* 10/1 – 10/154. Published report for Kildare County Council and the National Roads Authority.

Acknowledgements

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- Noel Dunne, NRA Archaeologist, Kildare County Council, National Roads Design Office.
- Project and post-excavation managers, Colm Moloney, Damian Shiels, Åsa Carlsson and Patricia Long, Headland Archaeology (Ireland) Ltd.
- Graphics department, Headland Archaeology (Ireland) Ltd.
- Dorota Kozlowska, Site Supervisor, Headland Archaeology (Ireland) Ltd.
- The excavation team.

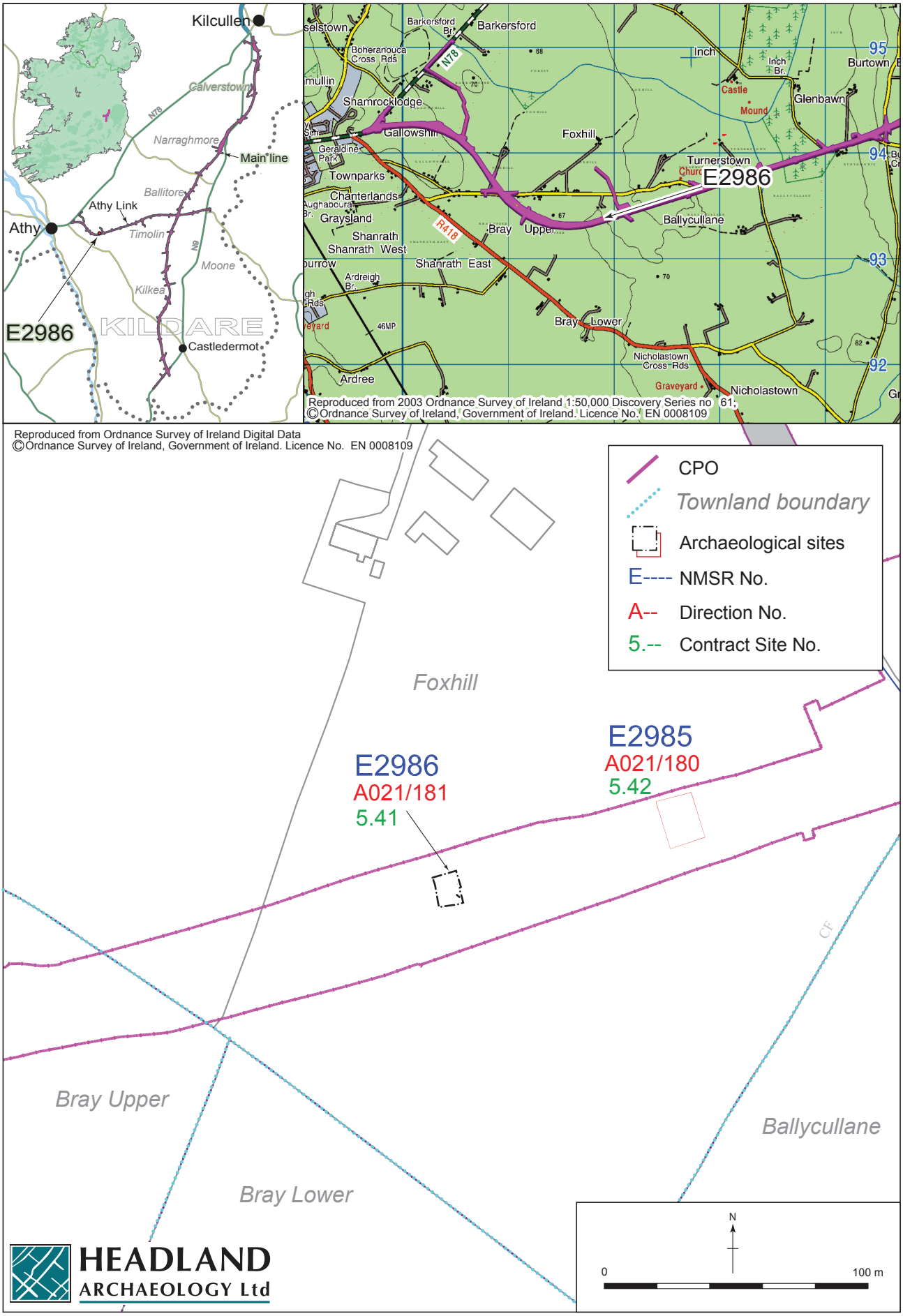


Figure 1 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2986, Site location.

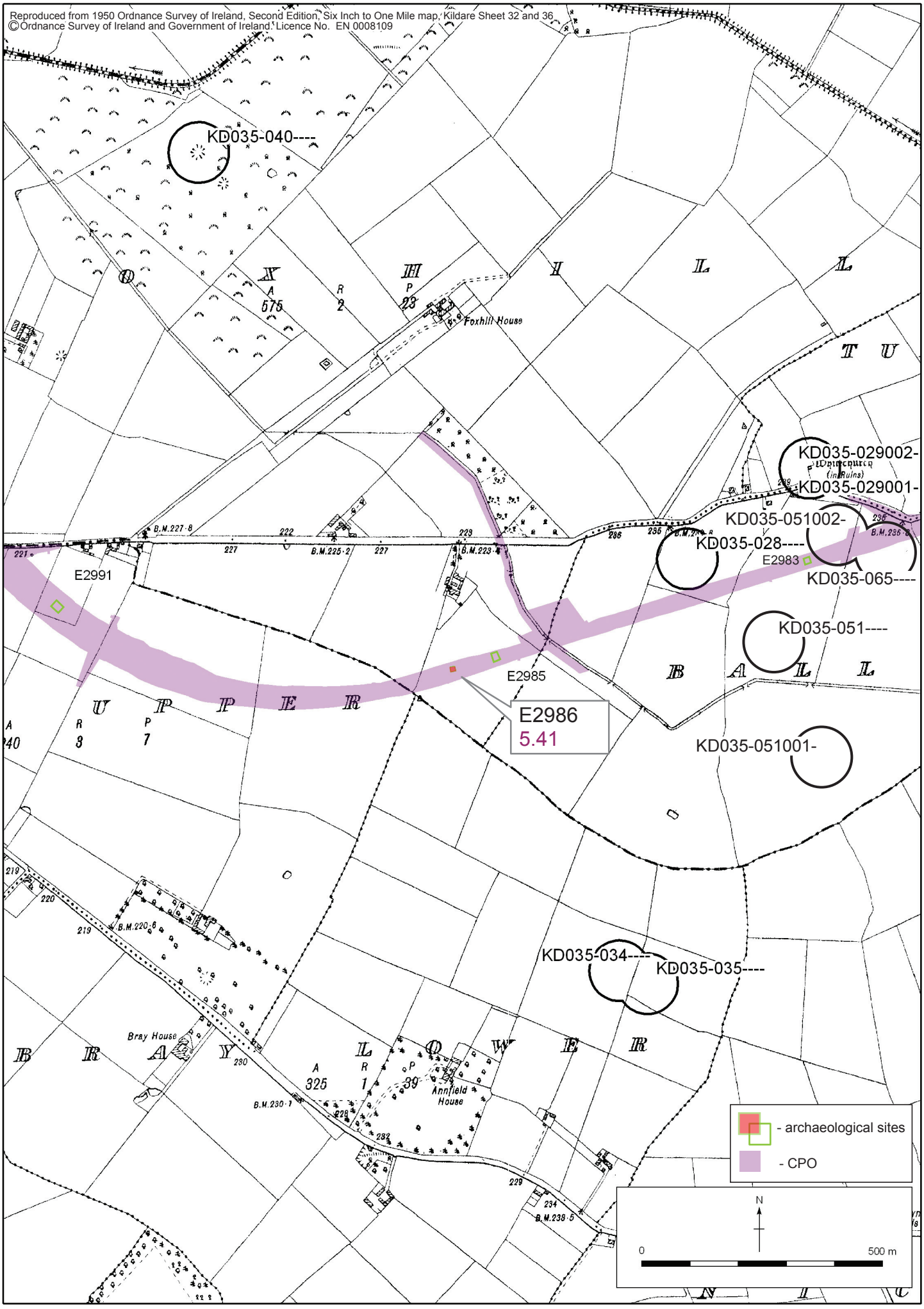


Figure 2 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2986, Extract from RMP.

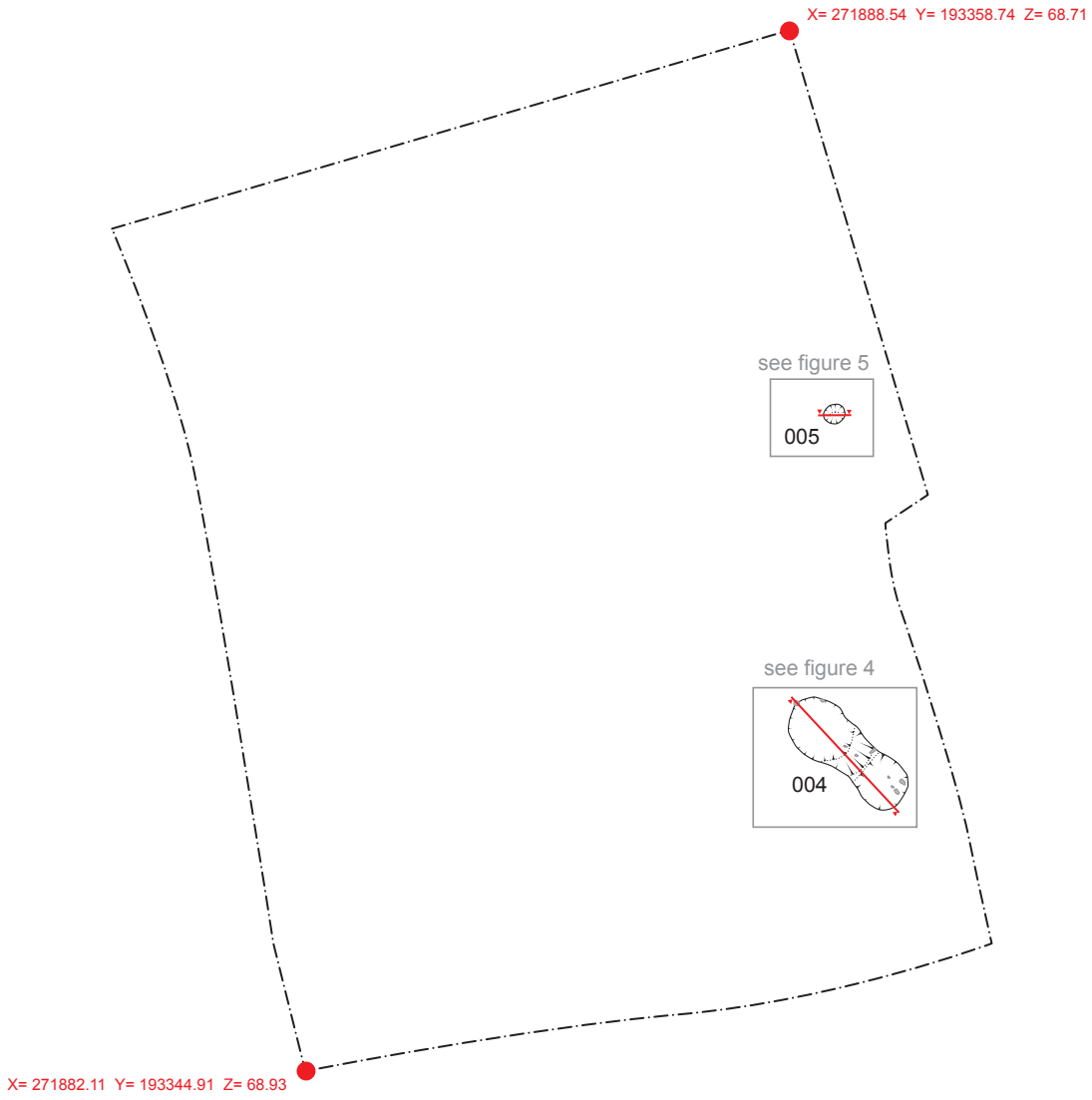
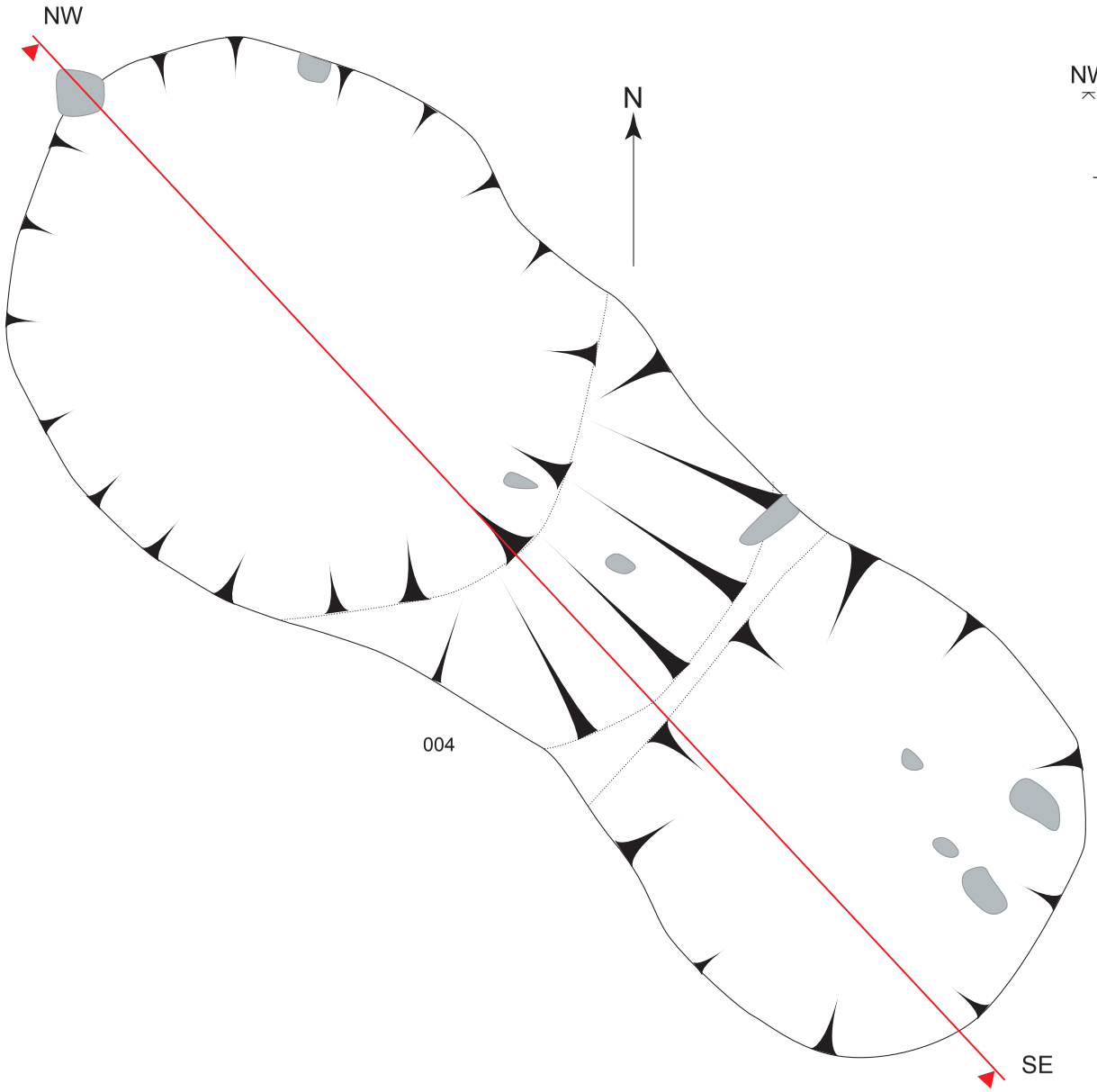


Figure 3 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2986, Site layout.



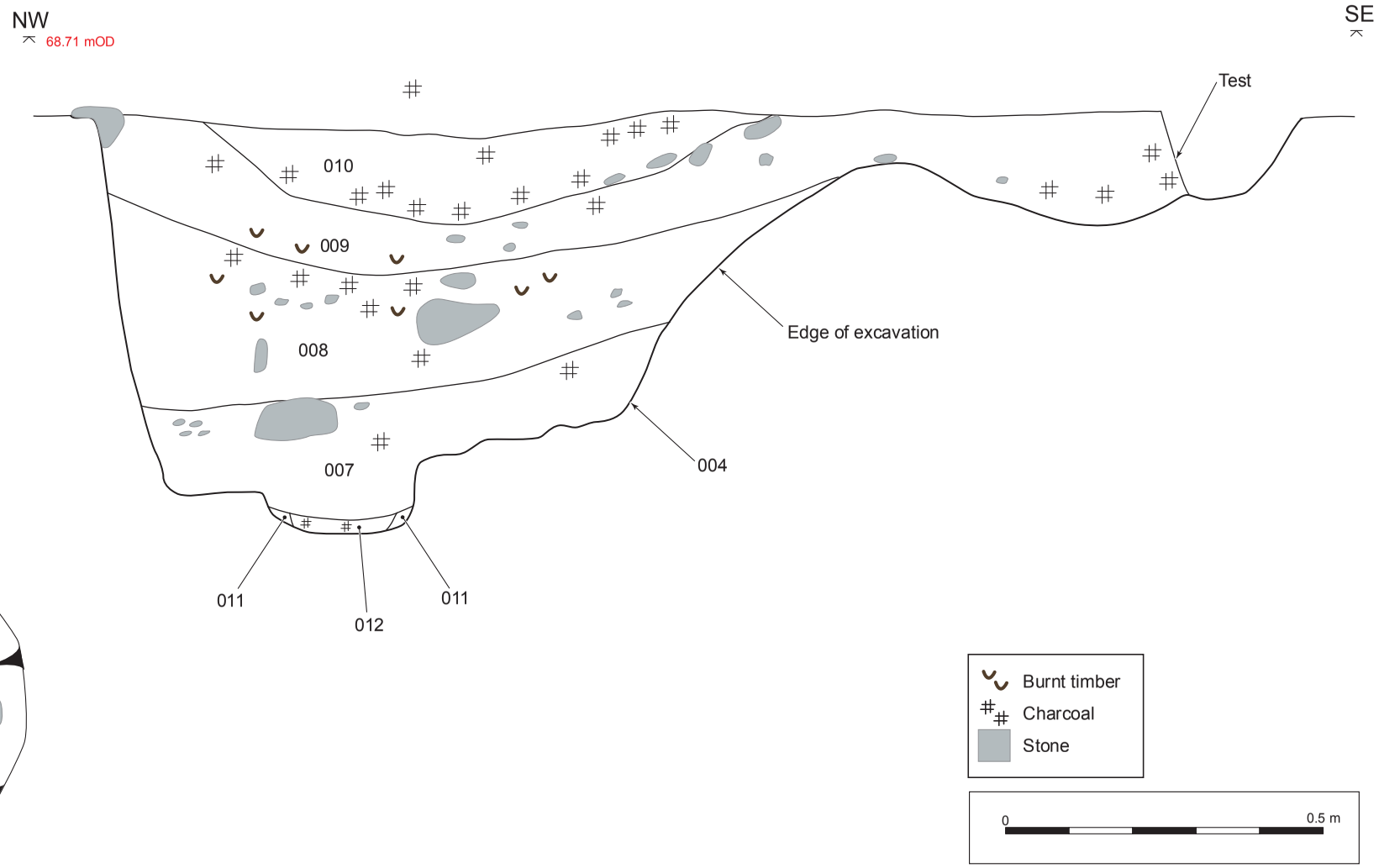
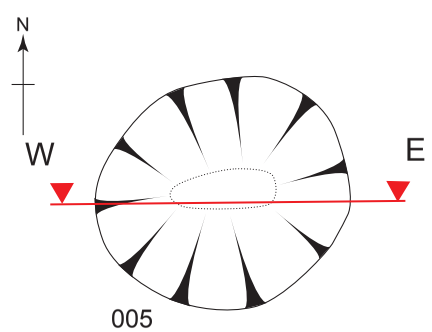


Figure 4 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2986, Post-excavation plan and Southwest facing section of kiln (004).



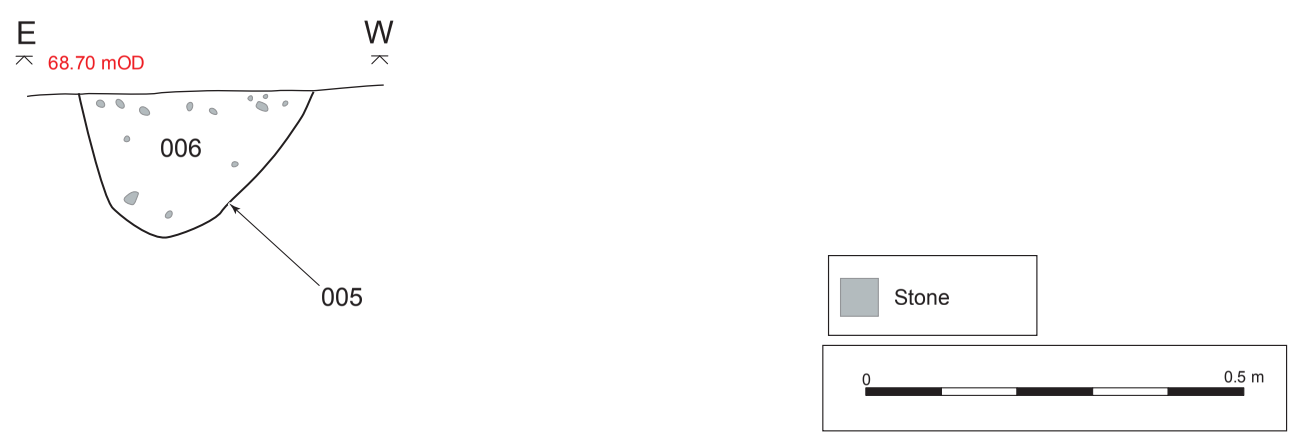


Figure 5 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2986, Post-excavation plan and north-facing section of posthole (005).

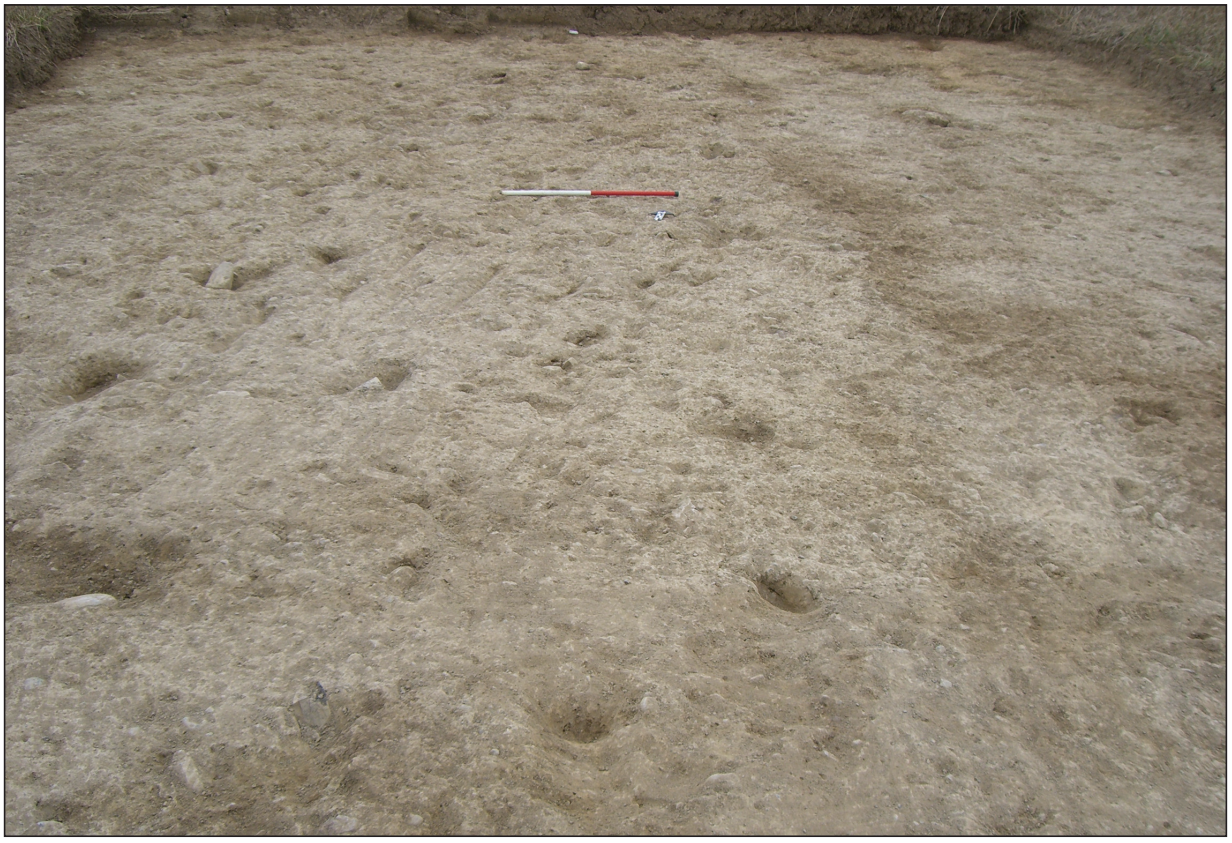


Plate 1 - Pre-excavation shot of the site, facing north.

Plate 2 - Mid-excavation shot of kiln, facing northeast.

Plate 3 - Post-excavation shot of kiln (004), facing southwest.

Plate 4 - Post-ex shot of kiln (004), facing southeast.

Plate 5 - Post-excavation shot of posthole (005), facing south.

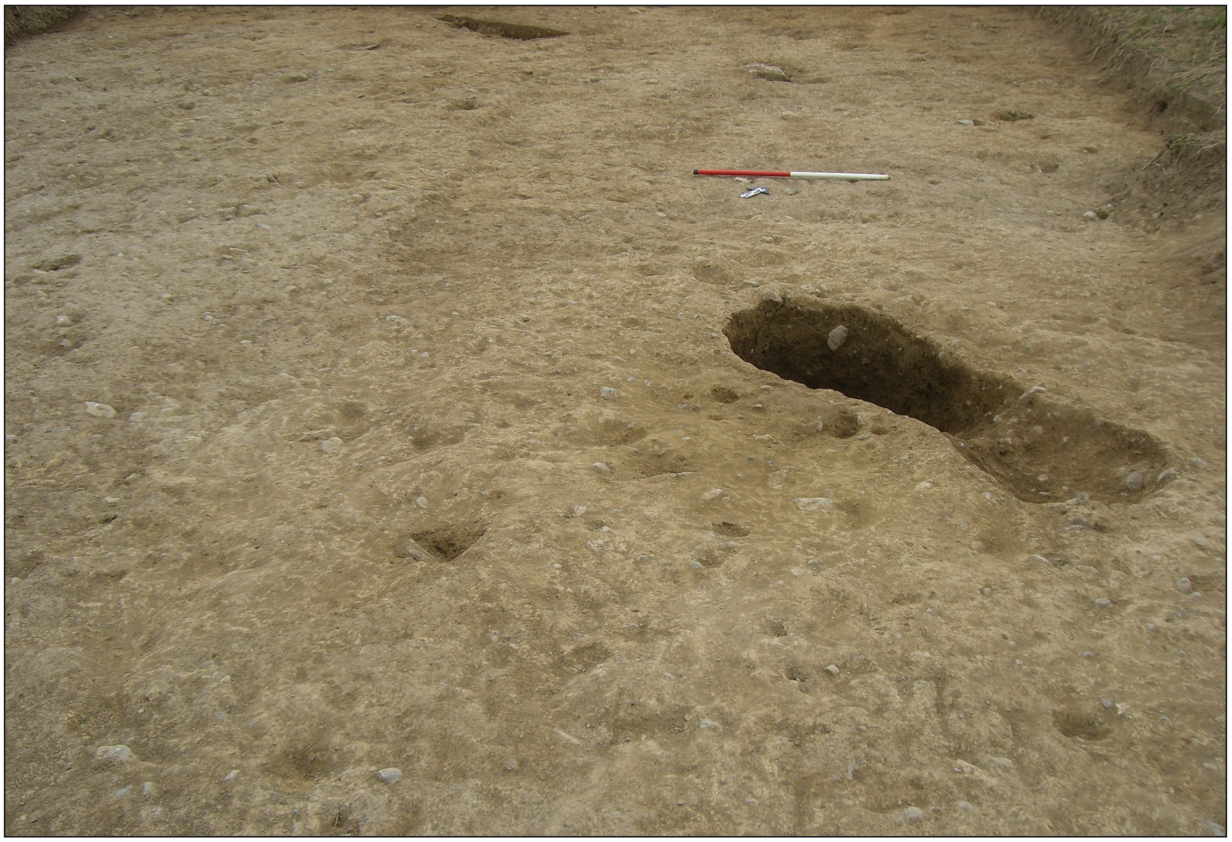


Plate 6 - Post-excavation shot of the site, facing northwest.

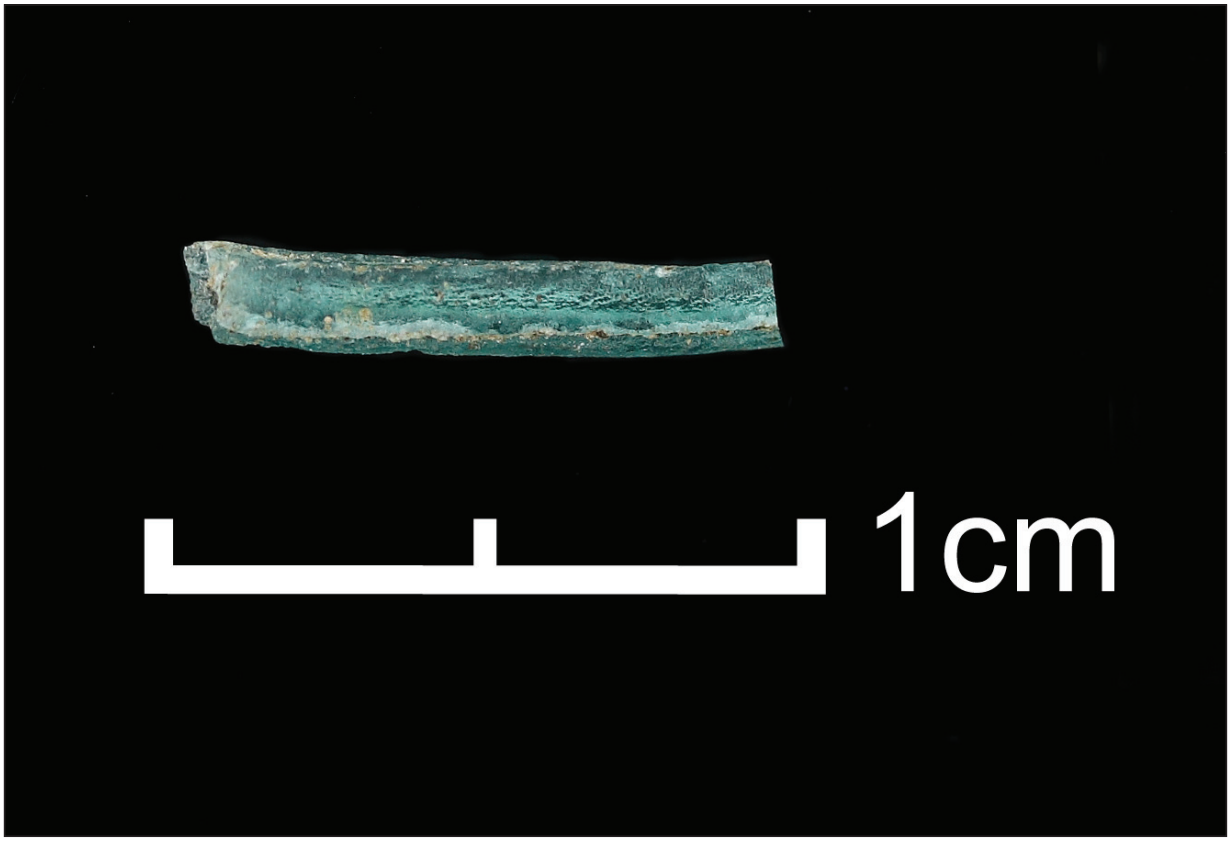


Plate 7 - Blue glass object (E2986:009:001).

Appendix 1 – Context Register for Site E2986

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
001	Deposit	-	-	-	-	0.20 – 0.30	moderately compact mid-brown sandy clay with occasional small stone and frequent root inclusions	Topsoil
002	Deposit	-	-	-	-	-	Yellowish brown silty sand subsoil	Subsoil
003	Deposit	-	-	-	-	-	Glacial till, light grey clayey sand with frequent large stone inclusions	Natural
004	Cut	(003)	(007), (008), (009), (010), (011), (012)	1.98	0.75	0.65	Figure-of-eight-shaped in plan, oval shaped fire-pit, to the northwest with vertical sides and a flat, oxidized base, a poorly defined linear flue with gradually sloping sides and a concave shaped, oxidised, oval shaped drying chamber with gradually sloping sides and a concave shaped base.	Cereal Drying Kiln
005	Cut	-	(006)	0.35	0.27	0.16	Sub-circular shape in plan with vertical sides and an uneven base.	Posthole
006	Deposit	(005)	-	0.35	0.27	0.16	Compact light greyish brown sandy silt	Fill of posthole
007	Deposit	(004)		0.84	-	-	Loose, mid grey brown clayey silt with occasional charcoal fleck and stone inclusions	Fill of Kiln
008	Deposit	(004)	-	0.95	0.8	0.3	Loose, mid grey brown sandy silt with frequent charcoal flecks, occasional small pieces of burnt wood and small and medium sized stone inclusions	Fill of Kiln
009	Deposit	(004)	-	1.73	0.7	0.18	Mid brown brown sandy silt containing occasional fragments of charcoal	Fill of Kiln
010	Deposit	(004)	-	0.89	0.5	0.14	Moderately compact dark greyish brown sandy silt with occasional charcoal fleck and small stone inclusions	
011	Deposit	(004)	-	0.68	0.48	0.06	Compact light grey yellow silty sand with small stone inclusions	Fill of Kiln
012	Deposit	(004)	-	0.17	-	0.03	Loose dark grey brown clayey silt with frequent charcoal fleck inclusions	Fill of Kiln

Appendix 2 – Finds Register for Site E2986

Find no.	Material	Type	Identification	Description
E2986:008:001	Metal	Miscellaneous	Miscellaneous	Highly corroded and fragmentary ferrous object
E2986:008:002	Quartz	Non-archaeological	Natural	Quartz fragment
E2986:009:00	Glass	Misc	Misc	Incomplete blue glass object

Appendix 3 – Sample Register for Site E2986

Sample No.	Context No.	Amount in Litres	Description
E2986:001	07	6L	Low fill of kiln (004)
E2986:002	08	10L	Middle fill of kiln (004)
E2986:003	09	32L	Upper fill of kiln (004)
E2986:004	10	4L	Uppermost fill of kiln (004)
E2986:005	08	N/A	Slag
E2986:006	08	N/A	Void
E2986:007	09	4L	Animal bones and tooth
E2986:008	09	4L	Animal bones
E2986:009	06	2L	Main fill of posthole (005)
E2986:010	11	2L	Secondary fill of kiln (004)
E2986:011	12	4L	Primary/ basal fill of kiln (004)
E2986:012	12	2L	Animal bones

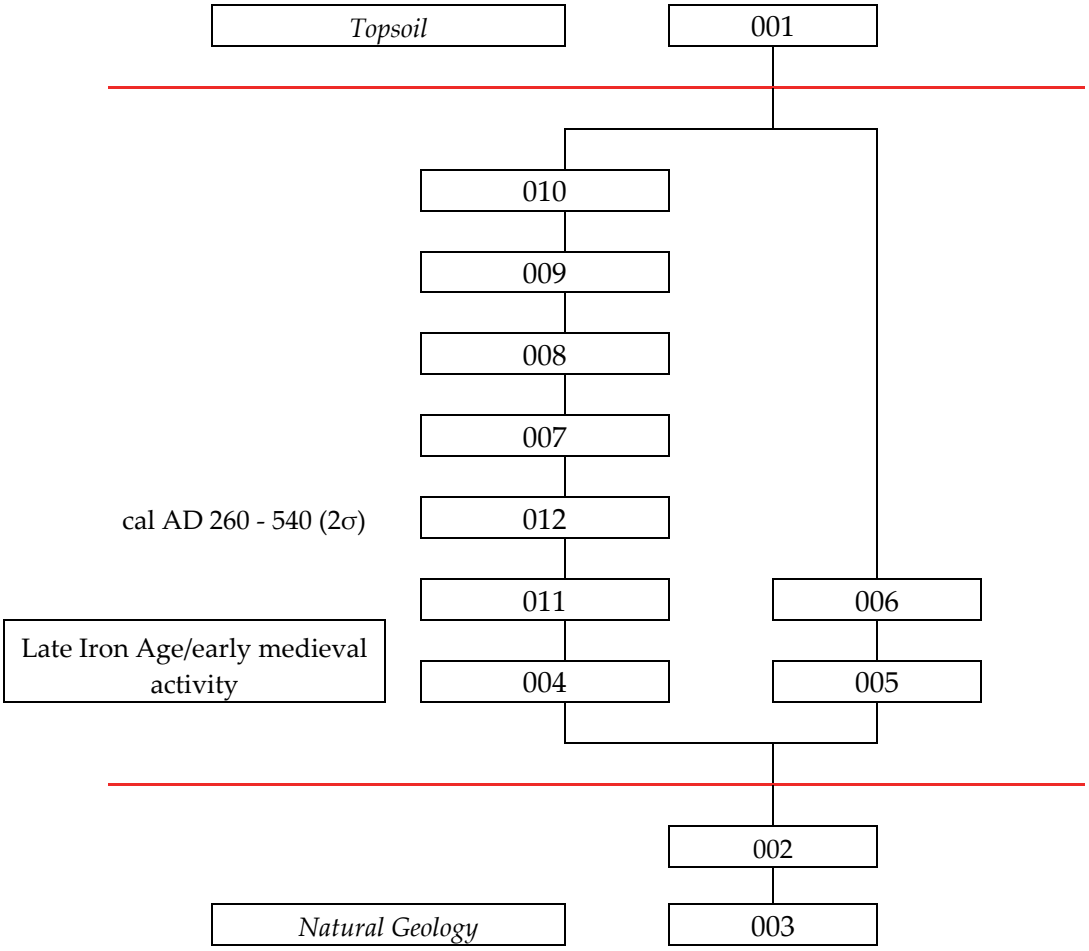
Appendix 4 – Photo Register for Site E2986

Shot No.	Direction Facing	Description
E2986:009:006	N	Pre-excavation shot of the site
E2986:009:007	E	Pre-excavation shot of the site
E2986:009:008	S	Pre-excavation shot of the site
E2986:009:009	NW	Pre-excavation shot of (004)
E2986:009:010	SW	Pre-excavation shot of (004)
E2986:009:049	NE	Mid-excavation shot of (004)
E2986:009:050	NE	Mid-excavation shot of (004)
E2986:009:051	NW	Mid-excavation shot of (004)
E2986:009:052	NW	Mid-excavation shot of (004)
E2986:009:053	NE	SW-facing section of (004)
E2986:009:054	NE	SW-facing section of (004)
E2986:009:055	NE	SW-facing section of (004
E2986:009:056	S	N-facing section of (005)
E2986:009:057	S	Post-excavation shot of (005)
E2986:009:062	SW	Post-excavation shot of (004)
E2986:009:063	NW	Post-excavation shot of (004)
E2986:009:064	SW	Post-excavation shot of (004)
E2986:009:065	SE	Post-excavation shot of (004)
E2986:009:066	NW	Post-excavation shot of (004)
E2986:009:067	SW	Post-excavation shot of (004)
E2986:010:011	NW	Post-excavation shot of the entire site
E2986:010:012	NE	Post-excavation shot of the entire site
E2986:010:013	SE	Post-excavation shot of the entire site

Appendix 5 – Drawing Register for Site E2986

Draw No.	Sheet No.	Section	Plan	Scale	Description
E2986:001	1	N/A	+	1:50	Pre-excavation plan of the site
E2986:002	4	A-B	N/A	1:10	North-facing section of (005)
E2986:003	7	A-B	N/A	1:10	SW-facing section of (004)
E2986:004	2	N/A	+	1:10	Post-excavation plan of (005)
E2986:005	2	A-B	N/A	1:10	Profile of (004)
E2986:006	2	N/A	+	1:20	Post-excavation plan of (004)
E2986:007	3	N/A	+	1:50	Post-excavation plan of the entire site

Appendix 6 – Site Matrix for Site E2986



Appendix 7 – Palaeoenvironmental sample analysis for E2986
By: Abby Mynett and Scott Timpany

Abstract

The charred plant remains recovered from site E2986 along with the archaeological evidence are indicative of medieval corn drying activity and domestic practices. The sites evidence of predominant barley and oat crops is comparative to other sites excavated in the region from the medieval period.

Introduction

Seven environmental samples were taken during the excavation at Site E2986 in the townland of Foxhill, Co. Kildare, a site consisting of a figure-of-eight kiln and an isolated posthole. All of the samples were processed to retrieve any palaeoenvironmental material that may aid in the interpretation of the site and function of the pits, seven of the samples were analysed.

Methodology

Samples of approximately 10 L were taken on site under the direction of an environmental archaeologist. Samples were processed in laboratory conditions using a standard flotation method (cf. Kenward *et al.*, 1980). This was then sorted by eye and any material of archaeological significance removed. All plant macrofossil samples were analysed using a stereomicroscope at magnifications of x10 and up to x100 where necessary to aid identification. Identifications were confirmed using modern reference material and seed atlases including Cappers *et al.* (2006).

Results

The results of those samples found to contain plant remains are presented in Table 1. All plant material was preserved by charring.

Charred plant remains
Charred plant material was recovered from five of the samples and the majority of these contained only small quantities of plant material. The preservation and condition of the remains was found to be good to poor. Species identified included oat (*Avena* sp.), probable oat (cf. *Avena)*, straight and twisted hulled barley (*Hordeum vulgare*), which may relate to 2-row and 6-row varieties, together with hulled barley, where due to poor preservation it was not possible to differentiate between the two varieties. A high proportion of grains could not be identified to a family or species due to poor preservation and abrasion and as a result were classified as indeterminate cereal (*Cerealia* indet.). Together with the charred grain wild taxa was also found in the form of sedge nutlets (*Carex* sp.) and goosefoot seeds (*Chenopodium* sp.).

Other Remains
Also present in the samples were roots, molluscs and charcoal fragments. Burnt and unburnt mammal bones were also present.

Discussion

Samples were recovered from two features, one being a kiln (004) and the other a posthole feature (005). The latter feature had no charred grain present in the sample and will therefore not be discussed further. The kiln contained six fills. The basal fill (011), from which sample (010) was taken, was found to contain no charred plant remains and archaeologically sterile. The secondary fill (012), from which sample (011) was retrieved, contained the largest assemblage of charred grains (see Table 1) with over one hundred cereals recorded. The fill (012) was composed of frequent charcoal, occasional animal bone and tooth inclusions (Cagney and Kozlowska 2009). Cereals recorded were predominantly barley (51.3%) and a lesser amount of oat with nearly half of the cereals unable to be determined to a family or species level due to being broken and abraded. Wild taxa were also found in the sample; these were chiefly goosefoots and a lesser amount of sedges and made up 20% of the charred plant remains recorded for sample (011). The further fills in the kiln, (007), (008), (009) and (010), produced very few charred grains (Table 1). The presence of grain in this feature is likely resultant from regular cleaning out and ploughing of the kiln.

The kiln was located in the southeast of the excavation extent. The presence of charred grain may be resultant from accidental charring from the drying areas. They are likely to have come from the destruction or from damage to the kiln, resulting in its abandonment. The presence of wild taxa in the samples could be due to these being mixed in with the cereal grains whilst processing. Ireland's damp, wet climate would support the growth of such taxa, however the poorly draining landscapes hindered the processing procedure, thus drying kilns are commonly found on sites such as these (Kelly 2000).

This specific type of kiln has been recorded across Irish excavations in the locality and is cited as being one of the earliest types of corn-drying kilns recorded for the early medieval period (Monk and Kelleher, 2005). It is composed of one chamber for the drying of grains and another to produce the open fire needed to execute heat. Parallels are identified regionally and nationally across Ireland and the UK. Local sites that also have evidence of the use of kilns include E2972, Mullamast Co. Kildare, where an hour-glass shaped kiln was recorded with similar cereal remains and from which a radiocarbon date of cal AD 540-690 (SUERC-25851; 1420±50 BP) was obtained (O'Connell and Hackett 2009). Likewise, on Site E2983 in the same townland evidence of agricultural activities were identified (Cagney 2009). Excavation works on the M3 in County Meath revealed substantial numbers of kiln features, indicating that agriculture played an important role from the early medieval period in Ireland (Kinsella 2008, 106).

Conclusions

- The kiln feature and charred grains recovered from it suggests that the society was practicing agricultural and domestic activities, predominantly of oat and barley crop type.

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Context number	Sample number	Sample vol (L)	Context/ Sample description	Wood charcoal		Mammal Bone		Nutshell	Shell	Organic	Other	Comments
				Qty	AMS	Burnt	Unburnt					
7	1	10	Mid greyish brown clayey silty from [4]	+		+						
8	2	10	Mid greyish/ light brown sandy silt	++		+		+				Whole Retent Bagged - Seed in Flot
9	3	48	Mid brown sandy silt from [4]	++		+					+ Unknown	Whole Retent Bagged - Seed in Flot
10	4	4	Dark greyish brown sandy silt from [4]	++		+		+	+		+ Unknown (bone or charcoal)	
6	9	1.5	Light greyish brown sandy silt from [5]						+	+		
10	10	2	Light greyish yellow silty sand from [4]									Archaeologically Sterile
12	11	4	Dark greyish brown & charcoal clayey silt from [4]	+								Whole Retent Bagged - Seed in Flot

Table 1 – Composition of retent

		Feature	Kiln				
		Feature No	004	004	004	004	004
		Context No	007	008	009	010	012
		Sample No	001	002	003	004	011
		Orig. vol (litres)	10	10	48	4	4
		% of sample analyzed	100	100	100	100	100
Latin Name	**Plant Part**	**Common Name**					
Wild Taxa							
Chenopodium sp.	seed	goosefoots	-	-	4	1	16
Carex sp.	nutlet	sedge	-	-	1	3	12
Cereals							
Avena sp.	caryopsis	oat	-	-	-	-	-
cf. *Avena* sp.	caryopsis	oat	-	-	-	-	7
Hordeum vulgare	caryopsis	hulled barley	-	-	-	-	11
Hordeum vulgare L. (hulled - straight)	caryopsis	hulled barley	-	2	2	-	48
Hordeum vulgare L. (hulled - twisted)	caryopsis	hulled barley	-	-	-	-	-
Cereal indet.	caryopsis	cereal indet.	1	4	5	3	49
		Cereals (%)	100	100	58.3	42.9	80.4
		Wild taxa (%)	0	0	41.7	57.1	19.6
		Barley (%)	0	33.3	28.6	0	51.3
		Oat (%)	0	0	0	0	6.1
		Indet (%)	100	66.7	71.4	100	42.6
		Total no.of cereals per litre	0.1	0.6	0.14	0.75	28.75

Table 2 - Composition of plant remains

Appendix 8 – Final report on the faunal remains from Foxhill (2986), Co. Kildare
By: Auli Tourunen PhD and Albína Hulda Pálsdóttir MA

Introduction

This report discusses the results of the animal bone analysis from Foxhill, Co. Kildare (E2986). The resolution of the site revealed the presence of a figure-of-eight shaped kiln (004) and a single, isolated posthole (005) (Cagney and Kozlowska 2009, 2). The animal bone specimens were recovered by hand-picking and from soil sample processing. The animal bones analysed for this report derive from a low fill (007) of kiln (004), middle fill (008) of kiln (004), upper fill (009) of kiln (004), the uppermost fill (010) of kiln (004) and primary fill (012) of kiln (004).

Methodology

During the analysis each specimen was identified and recorded according to species, skeletal element, age and sex where possible. The animal bone reference collection located in Headland Archaeology (Ireland) Ltd, Unit 1 Wallingstown Business Park, Little Island, Co. Cork was utilised. The York System bone database program was used for recording (Harland *et al.* 2003). The material was quantified by using the number of identified specimens (NISP). The categories "large mammal" (lm) and "medium mammal" (mm) were used for specimens (mainly ribs and vertebrae) which could not be assigned to a species. The specimens categorised as large mammal are likely to belong to cattle; horse and red deer was absent in the assemblage. Tooth eruption and wear were recorded according to Grant (1982). Mandibles were further divided into age groups presented by O'Connor (2003, 160). In addition, during the analysis pathological changes, carnivore and rodent gnawing, signs of burning and butchery marks were recorded. All data is stored in digital and written form in Headland Archaeology (Ireland) Ltd, Unit 1 Wallingstown Business Park, Little Island, Co. Cork.

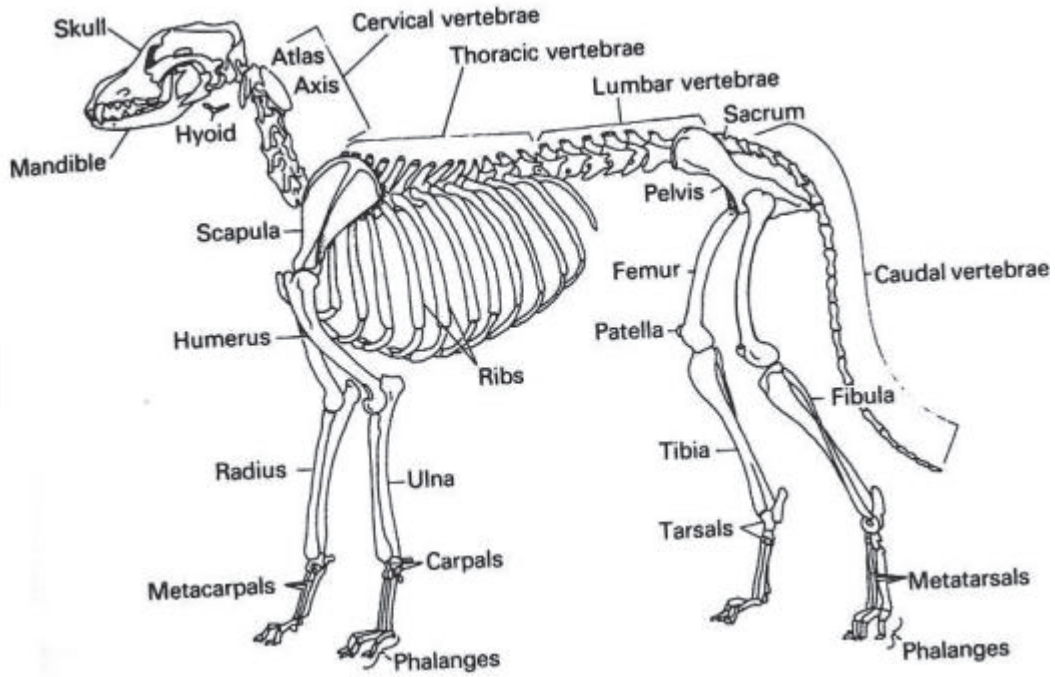

Figure 1 – Location on animal skeleton of terms referred to in text (Davis 1987, 54, in Reitz and Wing 1999)

Results

A total of 139 bone specimens were analysed from Foxhill (Table 1). The material all dates to the Late Iron Age/early medieval transitional period. The low fill (007) of kiln (004) contained burnt unidentifiable bone, the middle fill (008) of kiln (004) contained burnt unidentifiable bone, upper fill (009) of kiln (004) contained an unburnt cattle tooth and distal humerus as well as unburnt unidentifiable bone, the uppermost fill (010) of kiln (004) contained two unburnt fragments of tooth, probably pig and burnt unidentifiable bone. The primary fill (012) of kiln (004) contained 26 unburnt cattle teeth, an unburnt cattle humerus, one unburnt large mammal bone fragment, a fragment of a pig mandible with teeth, unburnt pig mandible fragment and eight unidentified unburnt bone fragments. A cattle metatarsal from primary fill (012) of kiln (004) (sample 012) returned a date range cal AD 260–540 (2σ) SUERC-27162.

Context	*Cattle*	*Large mammal*	*Pig*	*Unidentified animal*	***Total***
007				21	21
008				24	24
009	2			21	23
010				32	32
012	28	1	2	8	39
Total	30	1	2	106	**139**

Table 1 – Species representation of sample (NISP)

Due to the very small size of the assemblage from Foxhill and the poor preservation the element distribution cannot give any information about site function (Table 2).

Context	*Element*	*Cattle*	*Pig*	*Large mammal*	*Unidentified*	***NISP***
007	Unidentified				21	21
	007 Total				*21*	*21*
008	Unidentified				24	24
	008 Total				*24*	*24*
009	Teeth	1				1
009	Humerus	1				1
009	Shaft				1	1
009	Unidentified				20	20
	009 Total	*2*			*21*	*23*
010	Teeth				2	2
010	Unidentified				30	30
	010 Total				*32*	*32*
012	Mandible		2		5	7
012	Teeth	25		1	3	29
012	Atlas	1				1
012	Humerus	1				1
012	Metatarsal	1				1
	012 Total	*28*	*2*	*1*	*8*	*39*
Total		30	2	1	106	**139**

Table 2 – Element distribution of sample (NISP)

Tooth wear was recorded on one pig mandible from Foxhill (Table 3).

Context	*Sample*	*Species*	*M2*	*M3*	*Age category*
12	12	Pig	D	A	Sub-adult 2

Table 3 – Tooth wear (dp4-M3) stage of mandibles from Foxhill (Grant 1982). Age category follows O'Connor (2003, 160)

A total of 95 calcined bone specimens were recovered from the kiln fills at Foxhill. The ratio of burnt bones is unusually high at 69% (Table 4). This is most likely explained by a combination of sampling bias and bad preservation; the bones all come from kiln fills which were heavily sampled for flotation to retrieve plant macrofossils and thus tend to yield a higher number of small fragments of burnt bones than would be recovered by hand-picking. The material was not very well preserved; most of the bone are tooth fragments which preserve well and calcined bone which also preserves better than unburnt bone.

Context	*Calcined*	*Unburnt*	***Total***
007	21		21
008	24		24
009	20	3	23
010	30	2	32
012		39	39
Total	95	44	**139**

Table 4 – Burning at Foxhill

Although a portion of the material was unidentifiable as either human or animal, given that all this bone comes from the various fills (007, 008, 010) of the kiln (004) it can be assumed that they are animal (Table 4).

Context	*Calcined*	*Unburnt*	***Total***
007	21		21
008	24		24
010	30	2	32
Total	75	2	**77**

Table 5 – Contexts that have only unidentifiable bone.

Discussion

Cattle and pig were the only identified species in the faunal assemblage from Foxhill. The majority of the material was burnt and the presence of human bone cannot be ruled but since the bones were all recovered from various kiln fills they are most likely animal. From the context the faunal material was found in a ritual connection is unlikely and the bones are probably mostly deposited after the kiln fell out of use and reflect activities around the kiln. The material from the basal fill (012) could be related to the use of the kiln.

The bone material from Foxhill, Co Kildare is too small for conclusive comparison against other assemblages. However, some general observations can be made. Cattle and pig bones are common in Iron Age sites in Ireland but most of the archaeofaunas excavated from the period are connected to ritual activity (McCormick and Murray 2007, 31-35). With the increasing number of Iron Age sites that have been excavated in Ireland in recent years, some of which have yielded animal bone, our view of

animal exploitation and ritual activity in the time period is bound to become much more nuanced as more faunal assemblages from the period are studied and published.

Context	Sample	Species	Element	NISP	Side	Gt50	Proxfus	Distfus	Age	Notes	%	Texture	Burning	Recovery
007	001	unid	ui	21									cal	1
008	002	unid	ui	24									cal	1
009	007	unid	sha	1								4		hc
009	007	cow	isoteeth	1						M maxilla				hc
009	007	cow	hum	1	r	5678		f				4		hc
009	003	unid	ui	20									cal	1
010	004	unid	ui	9									cal	1
010	004	unid	ui	21									cal	1
010	004	unid	isoteeth	2						Probably pig				1
012	012	pig	mand	1	r	1DE				Mandible broken in 3		4		hc
012	012	cow	isoteeth	1						Pm maxilla				hc
012	012	cow	isoteeth	10						M maxilla				hc
012	012	cow	isoteeth	2						M maxilla				hc
012	012	cow	isoteeth	4						M3 mandible				hc
012	012	cow	isoteeth	1						M mandible, broken in two				hc
012	012	Cow	isoteeth	7						M mandible				hc
012	012	Lm	isoteeth	1						Tooth fragment probably cow				hc
012	012	Unid	isoteeth	3						Tooth fragments				hc
012	012	Cow	hum	1	l	35678		f		Broken in 2, fresh breakage		4		hc
012	012	Cow	at	1						Broken in 2 fresh break	90	4		hc
012	012	Cow	M/t	1						Sent for C14				hc
012	012	Pig	mand	1								4		hc
012	012	Unid	mand	4								4		hc
012	012	Unid	mand	1						Broken in 2 fresh break		4		hc

Table 6 – Complete list of animal bones from Foxhill E2986

Key to complete list of animal bones:

Species
cow = cattle
lm = large mammal
unid = unidentified

Elements
Mammals:
astr = astragalus
hum = humerus
isoteeth = isolated teeth
mand = mandible
m/c = metacarpal
sha = shaft
unid = unidentified mammal
vert = vertebra

Side
r = right
l = left
b = both

GT50
For mammal and bird diagnostic zones, the York System (Harland et al. 2003) follows the Environmental Archaeology Unit's (EAU) recording protocol (Dobney, Jaques and Johnstone 1999) with minor re-coding.

Fusing proximal and distal
f = fused
u = unfused
fs = fusing

Texture
4 = poor

Burning
cal = calcified

Recovery
hc = hand-picked
1 = sieved with 1 mm sieve

References

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Appendix 9 – Radiocarbon Date and Certificate

E-Number	Lab code	Sample ID	Material	δ13C	Radiocarbon age BP	Calibrated Age Ranges (1 σ)	Relative probability	Calibrated Age Ranges (2 σ)	Relative probability
E2986	SUERC-27162	sample 012, context 012	unburnt bone - Cattle metatarsal	-21.5 ‰	1645 ± 30	cal AD 345 - 370	11.1	cal AD 260 - 280	1.3
						cal AD 375 - 435	57.1	cal AD 330 - 470	81.1
								cal AD 480 - 540	13

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RADIOCARBON DATING CERTIFICATE

22 January 2010

Laboratory Code	SUERC-27162 (GU-20515)
Submitter	Heidi Jacobsen Headland Archaeology (Ireland) Ltd. Unit 1 Wallingstown Business Park Little Island Co. Cork, Ireland.
Site Reference	KCK06 E2986
Context Reference	12
Sample Reference	12
Material	Animal bone : Cattle metatarsal
$\delta^{13}C$ relative to VPDB	-21.5 ‰
Radiocarbon Age BP	1645 ± 30

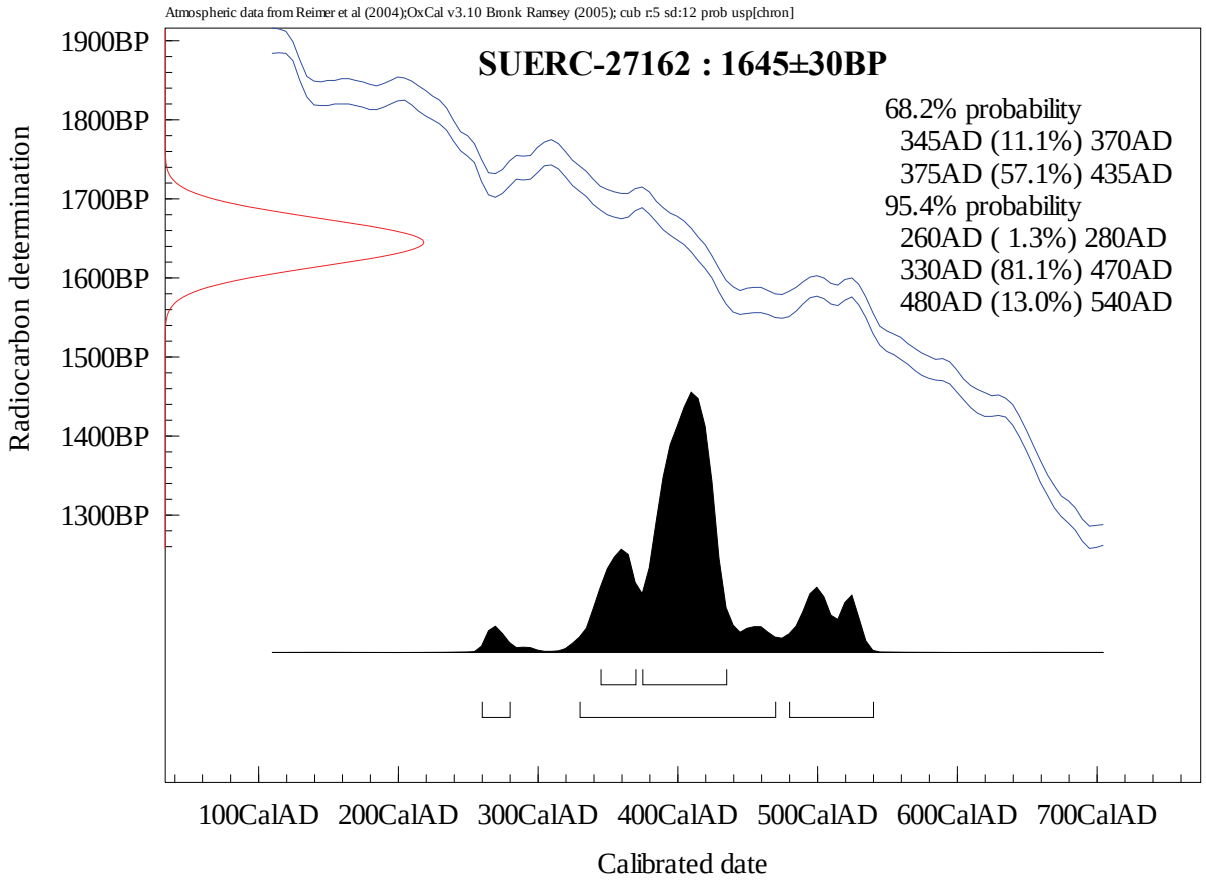
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



Appendix 10 – Report on Glass Artefact from Site E2986 at Foxhill Townland, Co. Kildare
By: Miriam Carroll and Annette Quinn, Tobar Archaeological Services

Introduction

One blue glass object (E2986:009:001) was recovered from the excavations at site E2986 in Foxhill townland, County Kildare. The item is listed under miscellaneous as it is unperforated and therefore does not appear to be a bead.

Miscellaneous

The glass artefact from Foxhill was recovered from a silting layer (009) overlying the fills of a figure-of-eight-shaped kiln (004). It is blue in colour and comprises a slim glass rod which does not appear to be perforated. It is D-shaped in cross section at one end and possibly sub-circular in section at the opposing end. An attempt at perforation may be extant at this end but does not extend through the rod. Both ends are also broken therefore it is difficult to say with any certainty if this artefact was an attempt at making a bead or if it is part of a larger, now broken, item.

Miscellaneous. E2986:009:001. *Glass*. L. 9.7 mm, W. 1.8 mm, Th. 1.3 mm, Wt. <0.1 g. Incomplete. Translucent blue glass rod. D-shaped to sub-circular in section. Slight curvature evident.

Appendix 11 – Report on Ferrous Artefacts from Site E2986 at Foxhill Townland, Co. Kildare
By: Miriam Carroll and Annette Quinn, Tobar Archaeological Services

Introduction

One ferrous object (E2986:008:001) was recovered from the excavations at site E2986 in Foxhill townland, County Kildare. The item is listed under miscellaneous as it is incomplete and could not be readily assigned a definite classification.

Miscellaneous

One highly corroded and fragmentary item (E2986:008:001) was recovered from a fill of a figure-of-eight shaped kiln (004). It may represent the remains of a nail but due to its fragmentary nature cannot be further classified.

Miscellaneous. E2986:008:001. *Fe*. L. 22 mm, W. 9.5 mm, Th. 6 mm, Wt. 1.6 g. Incomplete. Corroded iron object, rectangular in section. Possible nail fragment

Appendix 12 - Assessment of Metallurgical Remains from Foxhill, E2986 based on visual examination
By Barry Cosham BSc

Introduction
Excavation at E2986 revealed a figure-of-eight-shaped kiln and an isolated posthole (Cagney and Kozlowska 2009). A single fragment of metallurgical waste material was recovered from the kiln during excavation. The aim of this report is to determine the nature and quantity of this residue and recommend what, if any, further analyses should be undertaken.

Methods

The assemblage had a total weight of 351 grams and comprised one slag sample that was collected during excavation. A visual examination of the assemblage was undertaken, the remains were quantified and a detailed description compiled. This allowed categorisation and identification with reference to Bachmann (1982) and Bayley *et al* (2001) to be completed. The results and discussion of the assessment are presented below.

Results

The following table presents the results of the visual assessment.

Sample no.	Context no.	Weight (g)	Description	Interpretation
5	8	351	Single large fragment, c. 8-9cm diameter, mostly blackish/dark grey in colour, high density, slightly concave upper surface, much iron corrosion on all surfaces, angular breaks, recovered during excavation, fragment of small smithing hearth base	Iron smithing
	Total:	351		

The single fragment comprising the assemblage is a piece of smithing hearth base, clear evidence for iron smithing.

Discussion

Iron smithing is the working of iron, there are two types; primary and secondary. Primary smithing occurs immediately after the smelting process and turns the raw bloom into a useable piece of iron. Secondary smithing is the actual manufacture, repair or re-cycling of iron objects. Both of these processes produce very similar slag assemblages, the only major difference being the type and quantity of hammerscale produced. Both processes can produce smithing hearth bases which form as a result of reactions between the fuel, hearth wall, and oxidised iron. Slag accumulates in the base of the hearth near the blowing hole eventually forming a large spongey lump which has to be discarded if the hearth is to remain functional (Henderson 2000).

The fragment was recovered from a fill in corn drying kiln (004). Due to this, and the fact that there is no other evidence for metalworking activity either in the form of slag or features from the site, it is unlikely that the smithing activity that produced the assemblage took place on the site. It is quite probable that smithing was taking place in the locality although a small scale operation might have left behind very little evidence, particularly if the area was subsequently used for cultivation.

To summarise, the assemblage was indicative of iron smithing, although it appears that it did not originate on the site. The location of the smelting activity that was responsible for the assemblage remains unknown. It is also unknown whether the assemblage represents primary of secondary smithing.

Recommendations

Further analysis of the assemblage is possible, however as the assemblage does not appear to originate on the site it is very unlikely to provide any gainful information towards the sites interpretation. It is therefore recommended that no further analyses be undertaken on the material from this site at this time.

References

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