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Date: June 2010
Client: Kildare County Council
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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 E2886, in the townland of Kilgowan, Co. Kildare.

By: Liam Hackett and John Twomey
National Monuments Section Registration Number: E2886
Director: Liam Hackett
NGR: 283166/204098

Report Status: Final

Meanma agus Mianach

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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, E2886, was allocated by the Department for the excavation of the present site in Kilgowan townland under the directorship of Liam Hackett of Headland Archaeology (Ireland) Ltd.

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 for the N9/N10 Kilcullen to Waterford Scheme: Kilcullen to Powerstown. Archaeological Services Contract No. 1 – Test Excavations, Kilcullen to Mullamast under Ministerial Direction Number A021/099 on this site between 10 October and 19 November 2005 identified a burnt spread.

Full archaeological resolution was conducted on this site between 28th September, 2007 and 22nd October, 2007**.** This revealed an Early Bronze Age burnt mound site, characterised by an irregularly shaped spread of heat shattered stone and charcoal, a trough and associated pits, and post-medieval curvilinear drainage gullies and ditches. The only artefacts recovered were two lithics, retrieved during post-excavation processing of soil samples. 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 E2886.

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 E2886 was situated in the townland of Kilgowan, parish and barony of Kilcullen, and was located 5 km south of Kilcullen town, Co. Kildare and 500 m north of a tertiary road that led westwards to the existing N9 Kilcullen to Carlow road. This site was located at National Grid reference 283166/204098 (Figure 1), in the corner of a flat, low lying field, used at the time of excavation for pasture. A canalised stream was adjacent to the site, which was used to direct water to a small mill that was in use in the 19th and early 20th century on the nearby farm (Dan Fenelon, landowner, pers.comm), known as Kilgowan mill. The course of the original stream was visible in the adjacent fields as a slight linear depression, with up to three other possible burnt spreads visible on its banks after ploughing.

Four monuments were identified in the Record of Monuments and Places within 600 m of the site (Figure 2); these included a castle site (KD032:011), a standing stone (KD032:012001), a cemetery (KD032:012002) and an enclosure site (KD032:010). The site of Dún Áilline (KD028-038001), a large hillfort referred to as the seat of the kings of Leinster in early Irish literature, is located 3.4 km to the northwest.

A number of archaeological sites were excavated as part of the same road scheme in the vicinity of site E2886. Site E2878 was 800 m to the southeast, and revealed an Early Bronze Age settlement site with a hearth and structural remains (O'Malley 2009a). Site E2879 was 775 m to the southeast and revealed no archaeological features (O'Malley 2009b). Site E2880 was 600 m to the east-southeast and revealed structural remains and an early medieval stone lined cereal drying kiln (O'Malley 2009c). Site E2881 was 550 m to the southeast and revealed post-medieval/modern agricultural features (O'Malley 2009d). Approximately 500 m to the southeast were Site E2882 which revealed Neolithic pits and a hearth (O'Malley 2009e), Site E2883 which revealed Neolithic pits and modern furrows (O'Malley 2009f), and Site E2884 which revealed a Neolithic pit with pottery and lithic finds (O'Malley 2009g). Situated 300 m south, was Site E2885, a post medieval cereal drying kiln and modern ditches (Hackett, 2009a).

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 845 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 were drawn at scales of 1:50 and 1:20 and sections at 1:20 for large deposits and 1:10 for features. Registers are provided in the appendices (Appendices 1-5). Ordnance Datum levels and feature locations were recorded using Penmap and a total station theodolite.

Environmental samples, including charred/waterlogged wood, were taken of 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 and zooarchaeologist Dr. Auli Tourunen.

Full archaeological resolution was conducted on this site between 28th September, 2007 and 22nd October, 2007. The crew on site E2886 consisted of 1 director, 1 deputy site manager and 15 site assistants.

Following excavation worked waterlogged/charred wood were analysed by the appropriate specialists and reports produced on the findings for incorporation into this report (see appendices).

4 Excavation results

Excavation revealed a burnt mound and burnt spreads, a trough and associated pits, curvilinear drainage gullies and ditches and a stream course (Figure 3).

Old Stream Course
The land sloped gently downwards for approximately 10 m along the east edge of the site indicating the location of an old stream course. This depression contained a number of naturally deposited silts (Plate 2). Charcoal flecks were identified in deposits (031), (032), (033) and (063), while wood fragments were also retrieved from (031), (032) and (033) which also contained a single fragment of unretouched flint debitage (E2886:033:001) and a single unidentified burnt bone fragment. Deposit (030) was archaeologically sterile. These deposits all pre-dated the burnt mound activity (Appendix 7). As previously mentioned (see Section 2 above), other burnt mounds were visible in the nearby freshly ploughed fields adjacent to the fossilized, ancient stream bank.

Burnt Mound
The burnt mound (026) was located directly west of the old stream course (Figure 3; Plate 1). It had an irregular shape in plan and measured 9.5 m by 9 m with a maximum thickness of 0.25m. It consisted of black silty clay with heat shattered sandstone and frequent charcoal inclusions. Once preliminary recording had been completed, the spread was excavated leaving 0.5 m wide cross baulks running north/south and east/west.

Two isolated spreads of burnt material were found to the east of the burnt mound overlying the silt deposits within the old stream course and close to the present day stream (Figure 3). The first was an irregular shaped spread of light black sandy gravel with frequent heat shattered stones and occasional charcoal and unburnt bone (016) (Plate 3). It measured 7 m by 3 m and 0.1 m deep.

The second spread was located 5 m to the south. It was sub-circular in plan measuring 1.84 m by 1.73 m and 0.10 m deep and consisted of light black silty sand with frequent heat shattered stones and occasional charcoal flecks (048). Both of these spreads showed evidence of water leeching, and were adjacent to the bank of the course of the old stream, prior to the modern re-directing works in the 19th/early 20th century.

Trough and adjacent pits
Underlying the burnt mound and approximately 3.2 m east of the edge of the old stream course was a sub rectangular shaped trough (053) (Figure 3; Plates 5 & 6). It measured 2.1 m north/south by 1.7 m and 0.6 m deep with gradual to sharp sides and a flat base. On removal of the basal fill, an oval shaped arrangement of 12 alder stakes ((073) – (084)) was found, driven into the subsoil, with no visible sign in the fills above them. These ranged from 0.1 m to 0.24 m in length and were all fashioned to a point. Cut marks, reflecting the working of the wood to a point, were only visible on one of the stakes, due to the poor state of preservation (Appendix 8). The basal fill of the trough was grey silty sand with moderate charcoal flecks (056) and fragments of unburnt wood (Appendix 7). A radiocarbon date retrieved from alder charcoal from this deposit returned a date range of 2210 – 2030 cal BC (2σ) (SUERC-26269). This places the burnt mound activity firmly in the Early Bronze Age period. Sealing (056) was grey silty sand with very occasional charcoal flecks (057) and unburnt wood fragments. Overlying this deposit were 11 individual pieces of alder timber (062), two of which

showed evidence of burning, and decomposed organic material. Above this lay moderately compact black grey silty sand with charcoal flecks (058) and moderately compact dark grey silty sand with occasional fire cracked stones and charcoal (059). Next in sequence was mid black silty clay with moderate heat shattered stones and occasional charcoal (060). This also contained a single unidentified burnt bone. The upper fill of the trough was mid black silty clay with moderate heat shattered stones and occasional charcoal, burnt and unburnt bone, and wood (061).

Adjacent to the trough on its northeast side was an oval pit (034). It measured 1.5 m by 1.05 m and 0.2 m deep with gradual sides and a slightly concave base. It was filled by mid black silty clay with moderate heat shattered stones and occasional charcoal (054).

Directly northeast of the oval pit was a shallow sub-rectangular pit (003). It measured 1 m by 0.9 m and 0.1 m deep with gradual sides and a slightly concave base. It was filled by mid black silty clay with moderate heat shattered stones and occasional charcoal (004).

Pits

Three other pits were located directly under the burnt mound (Figure 3). The most southerly was a large sub-rectangular pit (049) that measured 3 m by 1.5 m and 0.5 m deep with gradual sides and an uneven base (Plate 9). Its basal fill was black silty sand with frequent heat shattered stones and charcoal (052), which was situated below a grey sandy silt with frequent small stones and occasional charcoal and burnt bone (051).

A kidney shaped pit (040) was approximately 4 m to the west. It measured 1.8 m by 1.15 m and 0.44m deep with gradually sloping sides and a slightly concave base. Its basal fill consisted of moderately compact grey clay (044). Next in sequence was mid brown silty clay (041). This was below grey sandy clay (042). The upper fill was black sandy clay with frequent heat shattered stones and charcoal (043).

The last excavated feature under the burnt mound was an oval pit (017) located approximately 5 m to the north (Plate 8). It measured 1.1 m by 0.65 m and 0.3m deep with gradually sloping sides and a concave base. Its basal fill was grey sandy clay with occasional heat shattered stones and charcoal flecks (019) below black silty sand with frequent heat shattered stones and charcoal (018).

Three pits were recorded beyond the extent of the burnt mound (Figure 3). To the southwest of the mound was an oval pit (005). It measured 2.05m by 1.4 m and 0.25m deep with steeply sloping sides and a slightly concave base. It was filled by dark brown black silty clay with frequent small stones throughout (006) and occasional inclusions of unburnt bone. Approximately 1 m to the south was an oval pit (012). It measured 1.6 m by 0.6 m and 0.2m deep with gradually sloping sides and a flat base. It was filled by dark brown grey silty clay with frequent small stones (unburnt) throughout (013).

In the northwest corner of the site was a sub circular pit (007) (Plate 7). It measured 1.7m by 1.4m and 0.3m deep with steeply sloping sides and a concave base. Its basal fill was a mottled mix of grey black and yellow sandy clay with frequent charcoal and occasional heat shattered stones (008). An unworked inner flint flake (E2886:008:001) was retrieved from the sample taken from this deposit during post-excavation processing. The flake presents a plain, lipped platform and has scattered edge damage at its distal end. The dorsal scar pattern seems to suggest that it could have resulted from the further modification of a large blank, during thinning and artefact shaping. This indicates that this flake was a secondary technology by-product, detached by direct percussion (Appendix 11).

This deposit (008) was below grey sandy clay (009) with frequent charcoal, moderate small heat shattered stones, and occasional burnt bone fragments. Also overlying (008) was firm mottled yellow and dark brown clayey sand (011) with occasional stones and charcoal flecking (Appendix 7). The

upper fill was dark brown sandy clay with occasional small stones, charcoal flecks and unburnt wood (010) (Appendix 7). This feature may have served as a 'pot boiler', a small scale trough, usually found in isolation from the main mound related activity.

Modern drainage
A network of connected gullies and small ditches was revealed truncating the burnt mound and surrounding areas and generally following the curve of the modern day stream bed, which places them in the context of the land works associated with the mill from the late 19th/early 20th century. These were (020), (023), (028) (Plate 4), (029) and (038), of which (029) and (038) were the major features traversing the site and truncating the mound. The fills of the gullies and ditches were virtually identical, particularly where they truncated the mound; they comprised a mottled mix of mid brown silty clay with black silty clay with charcoal and heat shattered stones. These fills were: (021) and (022) in ditch (020), (024) and (025) in ditch (023), (039) and (055) in ditch (038), (064), (065) and (066) in ditch (029), and (068), (069), (070), (071) and (072) in ditch (028). Charcoal and burnt bone fragments were recovered from a sample of (072) reflecting material disturbed from the burnt mound when this ditch truncated it. No finds were recovered from these features.

A modern drainage feature (035) was removed prior to excavation of the archaeological remains. This was a northeast-southwest running linear drain which extended beyond the CPO. It had a red clay sectioned pipe at its base, extended 28 m across the site, was 0.4 m wide, and 0.6 m deep. It was filled by a mottled mix of burnt material and mid brown silty clay (037).

5 Discussion

The results of the excavation at site E2886 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.

Site Chronology and development
Although the site was relatively small in scale, two defined phases of activity were identified. Phase I related to the burnt mound and its associated features. Radiocarbon dating results from trough (053) show that this phase relates to the Early Bronze Age, returning a date of 2210 - 2030 cal BC (2σ) (SUERC – 26269). Phase II consists of the drainage features located across the site which belong to the post medieval/modern period.

Phase I: The shallow burnt mound and the presence of a trough (053), indicate that this site, E2886, represents the remains of a *fulacht fiadh*. The burnt and heat-shattered stone within a charcoal rich silty matrix is typical of the composition of a burnt mound, or *fulacht fiadh*. Similar sites have returned dates ranging from the Bronze Age to the late medieval period. However the majority of such sites are Bronze Age in date (Waddell 2000).

Phase II: The linear and curvilinear drainage ditches traversing the site relate to the mill race for the former Kilgowan corn mill located to the east of the site and date to the 18th and 19th centuries.

Dating evidence: While the drainage features associated with Phase II can clearly be placed in the post-medieval/modern period, dating the activities associated with Phase I relies on an evaluation of the artefact assemblage and primarily the radiocarbon date obtained from context (056). The lithic material recovered from the Phase I features is certainly prehistoric in date but given the nature of the

finds and the absence of any other artefactual association no refined prehistoric chronological timeframe can be provided (Appendix 11). The radiocarbon determination returned from trough (053) in context (056) produced a date range of 2210 - 2030 cal BC (2σ) (SUERC - 26269), placing the site in the Early Bronze Age. This compares well to the dates obtained from other burnt mound sites excavated as part of the N9/N10 scheme (see Table 1).

NMSR No.	Calibrated Age Ranges (2 σ)	Dating Framework	Reference
E2858	2470 – 2200 cal BC	Early Bronze Age	Stephenson, 2009
E2867	2340 – 2140 cal BC	Early Bronze Age	Hanbidge, 2009a
E2869	2030 – 1920 cal BC	Early Bronze Age	Hanbidge, 2009b
E2871	2450 – 2200 cal BC	Early Bronze Age	Hanbidge, 2009c
E2872	2860 – 2490 cal BC	Late Neolithic	Twomey, 2009
E2873	2470 – 2290 cal BC	Early Bronze Age	Hanbidge, 2009d
E2874	1220 – 835 cal BC	Late Bronze Age	Hanbidge, 2010
E2887	2190 – 1980 cal BC	Early Bronze Age	Cagney, 2009
E2888	2290 – 2060 cal BC	Early Bronze Age	Cagney and Kozlowska, 2009a
E2993	2200 – 1980 cal BC	Early Bronze Age	Cagney and Kozlowska, 2009b

Table 1 – Radiocarbon dates returned from burnt mounds excavated in the vicinity of E2886

Burnt Mounds

Distribution and Morphology: There are over 4500 burnt mounds/*fulacht fiadh* to be found in Ireland, with new sites being identified on a regular basis due to the increase in new infrastructure work throughout the country. The majority of known *fulachta fiadh* are located in counties Cork (over 2000), Waterford, Kilkenny and Tipperary. Modern excavation and survey evidence indicates that these burnt mounds occur not as isolated monuments in the landscape but as important indicators of Bronze Age settlement (Brindley, Lanting and Monk 1990). Many contemporaneous sites have been identified and recorded in the archaeological inventory for County Kildare and a number in the landscape surrounding Kilgowan. A total of twenty two other burnt mounds were excavated between Kilcullen and Prumplestown in advance of the construction of the N9/N10 Kilcullen to Waterford Road Scheme alone. Areas suitable for *fulachta fiadh* often see a multitude of the features clustered across a locality. 'The sites are frequently found together in groups … along the banks of a stream or in a marshy area within a few metres of each other' (Ó Drisceoil 1988, 672). This *fulacht fiadh* displays many of the classic features of such a monument, including several troughs which may have served different functions such as cooking or bathing. The location of the *fulacht fiadh* in an area with a high water table (adjacent to a water course) provides the water needed for heating and the burnt stones form a flattened mound above them.

The shape of burnt mounds often varies from the 'classic' crescent/kidney shape to completely irregular. Often it depends on the features underneath as the debris from the burning process would initially be dumped away from the features. At Kilgowan the trough (053) was the most centrally located feature under the burnt mound, and the smaller quantity of burnt mound material to its east would suggest that as the mound grew following various episodes of use, it continued to be reused and accessed from this direction. This would suggest that it may have been the primary trough on the site, as the mound would usually form up as an arc or crescent to one side of the main trough or pit. The size of a mound is often taken as an indicator of the number of uses or length of occupation. However, modern farming practises and field clearance often remove all or part of mounds so that all that is left is a few burnt stone spreads and a series of pits or troughs.

The first site of this type to be scientifically dated was at Ballyvourney in Co. Cork. The site consisted of two burnt stone mounds which were excavated in the 1950s by M.J. O'Kelly (1954). Underneath one of these mounds, Ballyvourney I, was a wood-lined trough, two hearths, a stone lined pit/oven and a number of postholes which were part of a small hut structure. This site became the classic example of a *fulacht fiadh,* but excavations of burnt stone mound sites since Ballyvourney have shown that it was the exception rather than the norm (Ó Néill 2003-4, 89). Other burnt stone sites from around the country show that these site types were very diverse with the main similarities being the presence of a mound of burnt stone, a trough or pit feature underneath and a nearby water source.

Troughs were often, though not always, lined with some impervious material such as clay, wood, stone or leather. Eleven pieces of alder wood (062), recovered in deposit (058) the tertiary fill of trough (053), may represent the fragile remains of a fragmented wood lining. These pieces were located in a cluster in the southeast of the trough with no discernible pattern to their layout, suggesting any lining had been disturbed and fractured before the feature was abandoned. A series of twelve alder stakes were identified along the base of the trough following the outline of its base and forming a ring within the feature. One stake consisted of a whole fragment of alder roundwood, the others being half hewn roundwood. All were driven vertically into the ground and were located at a distance of between 0.16 m and 0.46 m centre to centre from the nearest stake. The stakes had an average diameter of 0.02 m and measured between 0.1 m and 0.41 m in length. All were fashioned to a point, although, due to the poor state of preservation cut marks were only identifiable on one. These stakes may have acted as a structural support for the wood lining in the trough and possibly held it in place. The use of alder is likely to reflect the utilisation of the local flora for this trough lining and the stakes, as its habitat is along the sides of water courses. It has frequently been identified as a construction material for *fulacht fiadh* troughs, being one of the mains native timbers used for construction in wet environments (Appendix 8). At the site of Clashroe in Co. Cork, a partially destroyed wood lined trough was uncovered (Hurley 1987, 97). This trough was constructed utilising part of a hollowed out tree trunk to form the base and part of the sides of the trough. The remaining end of the trunk had had a groove/slot cut into it so that a plank of wood would be able to be slotted into the trunk. The other end would presumably have had a similar slot, though that was destroyed by water erosion. Other sites such as Ballyclogh in Co. Cork (Lehane 1988, 85) had troughs constructed out of flat planks which were set into a large pit. The shape of the wooden part of the trough would have been held in place at the corners by stakes. The space between the wooden part of the trough and the pit cut would then be filled by clay and stone packing material. Often the only trace visible of a trough with wooden lining would be a series of stake or postholes visible at the edges of the trough's base. Unlined troughs are known from such sites as Commons, Co. Limerick (Taylor and Bartlett 2004, 314-15) where a sub-oval trough was found under a burnt mound. The excavators thought that this trough would have naturally filled with and retained water due to the water table and the natural sub-soil making the lining of it unnecessary.

Other features are often found associated with burnt stone mounds such as pits, postholes, stakeholes, track-ways and platforms. Pits serve a number uses within the context of a burnt stone mound. They can be used as rubbish pits, roasting/cooking pits or wells. Postholes and stakeholes are often present either in the form of simple structures such as wind breaks or huts or associated with pits and troughs where they are part of a lining or racks close by. Apart from six fragments of unburnt animal bone recovered from pit (049), no other diagnostic evidence was recovered from pits (003), (017), (034), (040), or (049) under the burnt mound, or from pits (005) and (012) located to its southwest. This leaves difficulties in any interpretation of these features, though any of the above suggestions are plausible.

The isolated position of pit (007), 4.8 m northwest of the burnt mound spread raises a number of possibilities. It may be that this pit was indeed related to the burnt mound, and that, when being emptied after use; the heat shattered stones were carried to, and deposited on, the nearby mound. Alternatively, this feature may be entirely independent of the burnt mound. It may instead represent the remains of a 'pot boiler'. Such features were independent troughs which would have been used only occasionally or even for a single episode. At Kilfinning, County Limerick (Dennehy 2002, 325-26), a number of 'pot boilers' were identified beneath a burnt stone mound. Experiments have shown a trough would be filled with stone to about 70% of its capacity to boil a joint of meat in such a feature (Brindley, Lanting and Monk 1989-90). The difficulty with these pit types would be to tell them apart from roasting pits found in similar sites such as at Roberts town, County Limerick (Dennehy 2002, 343-45)The topsoil nature of the remaining upper fill of this feature may indicate natural infilling, post-use.

Nomenclature: The term *fulacht fiadh* was first used in the 9th century AD in such sources as the various saint's lives and taken to mean the cooking sites which utilised heated stones for cooking. A *fulacht* is defined to as a spit in the Yellow Book of Lecan, however, evidence for a spit would be unlikely to survive (O'Sullivan and Downey 2004). The main physical evidence recovered on sites are the by-products of the process, consisting mainly of heat-shattered stone and charcoal and commonly a hole in the natural subsoil for obtaining fresh water (*ibid*.). The term *fulacht fiadh* itself is composed of two Irish words. The first means 'recess' or 'cavity' and by extension came to be associated with pits, pits specifically used for cooking, the act of cooking and sometimes even the food itself (Ó Drisceoil 1988, 673; Ó Drisceoil 1990, 158)). The second word has two possible interpretations: *fiadh*, of the deer or of the wild, and *fian*, a roving band of hunters or warriors, occasionally "of the *Fianna* or Fionn Mac Cumhail" in reference to a mystical or pseudohistorical army who hunted and lived outdoors (Ó Drisceoil 1988, 673). Ó Drisceoil (1990, 158) cautions associating every mention of *fulacht* in the literature with the archaeological monument, given the wide range of meanings. In fact given the Bronze Age date range established for the majority of sites there are concerns over the use of the term *fulacht fiadh* to refer to these sites with many scholars favouring the more neutral term 'burnt mound'.

Function: The technology of burnt mounds/*fulachta fiadh* is well known. Stones were heated in a nearby fire and placed in a water-filled trough – sometimes lined with timber, stones, clay or reed matting– the heat from the stones would then bring the water to boil. Once cool the stones were removed from the trough and discarded, creating a characteristic burnt mound or spread of heat-shattered stones. A nearby water source would have been required in order to fill the troughs for boiling episodes. The extent of the mound in relation to the volume of the troughs would point to their being re-used on a number of occasions. However individual tip-lines were not visible within this particular mound. How the boiled water was subsequently utilised, however, is more difficult to ascertain.

There are a number of theories with regards to the function of *fulacht fiadh*/burnt mound monuments. Interpretations of *fulachta fiadh* vary from the traditional view of them as cooking sites, to alternative uses for bathing and birthing places, sweathouses, ritual, industrial uses such as dying or fulling or possibly sites for processing leather and textiles. (Grogan *et al* 2007, 99-100). Other uses have also been put forward such as brewing (Moore and Quinn 2007, 8-9). It is generally accepted that the function of *fulacht fiadh* troughs was to boil water, but how this water was subsequently utilised is notoriously difficult to ascertain. So far no specific evidence has been identified from the troughs to indicate how the hot water was used, and none of the possibilities i.e. cooking, washing, tanning, brewing etc. can be ruled out. A nearby water source would have been required in order to fill the troughs for boiling episodes. At Kilgowan it may have been available from the adjacent stream located immediately south of the burnt mound.

The theory with the most corroborating evidence is that which suggests that the sites were used for cooking. Experimental work by O' Kelly (1954) demonstrated that a joint of meat could be cooked in three to four hours using hot stones to boil water in a trough, while Allen describes an experiment in which the meat was cooked in two hours (1994, 9). It has been noted that a distinct lack of food refuse such as animal bones is characteristic of scientifically excavated burnt mound sites; however it could be that the cooking of joints of meat was subject to various sorts of ritual or hygiene controls and that any food remains were carefully disposed of (Waddell 2000, 177). Monk has recently shown, however, that although many bones are likely lost to acidic soil, an increasing number of sites are now producing preserved bone (2007, 22). A recent preliminary study undertaken by Auli Tourunen and Karen Stewart on the pH levels of *fulachta fiadh* showed that there was no correlation between the pH value of a site and bone preservation (Tourunen and Stewart 2008). They caution, however, that this information is preliminary and that a wide range of factors may have contributed to bone preservation or the lack of bone so that the use of animal products at individual sites can not be ruled out by these means alone (*ibid.*). The animal bone assemblage from E2886 is relatively small, paralleling the faunal evidence from other fulacht fiadh sites with animal remains. It comprises a mix of burnt and unburnt bone, the majority of which was unidentifiable. (Appendix 9)

Additional support is provided for the cooking hypothesis by detailing the importance of meat fat in food preservation (Monk 2007, 23). Without cooking trays, he notes, gathering the fat would have been problematic (*ibid.*). One solution, however, is to boil the meat and collect the fat from the surface of the water, an activity for which *fulachta fiadh* are ideally suited (*ibid.*). The presence of fats in the water of *fulachta fiadh* is also supported with the literary evidence in the story of Mis and Dubh Ruis (ed. Ó Kelly 1954). Although this again combines the two possible functions of cooking and bathing, the fats may have been used in this way.

The association of these sites with highly mobile groups is debated however; the use of *fulachta fiadh* is much more time intensive than roasting meat over a fire and would point to a more sedentary group but few settlements are found in the area surrounding them. This implies the food would then have to be carried large distances if it were to be consumed by more people than those who cooked it. Grogan *et al.* (2007, 91) have concluded from the quantities of heat-shattered stone forming most spreads and mounds that sites were likely used multiple times on separate occasions and that most sites would have had an extended, if periodic, use history. Using digital terrain modelling, they calculated that the average number of uses per site was approximately 250 (*ibid.*). They also noted that spoil was occasionally present on top of earlier mounds indicating that troughs had possibly been repositioned (*ibid.*).

Artefact Assemblage

It is not unusual to recover finds from Irish burnt mounds. Recent excavations in the southeast of Ireland revealed a similar pattern of very small assemblages found in association with *fulachta fiadh*, e.g. the N25 Waterford By-Pass. These assemblages are dominated by the use of beach pebble flint which is often worked using the bipolar method (Hegarty and Long 2005). This site was located in an area of intense prehistoric activity with assemblages being recovered from the adjacent sites E2878, E2882, E2883 and E2884. Two unworked flint flakes (E2886:008:001 and E2886:033:001) were recovered from pit (007) and spread (033) respectively. The lithic material recovered is typical of prehistoric material, but no refined timeframe can be assigned to the pieces (Appendix 11).

Conclusions

The evidence from the other sites in its vicinity support the notion that site E2886 should not be viewed in isolation but rather as part of a greater archaeological landscape. Situated 800 m to the southeast in Baronsland (E2878) an Early Bronze Age settlement site was uncovered as part of this road scheme. Excavations revealed the remains of two Early Bronze Age structures which were

interpreted as evidence for a possible long term settlement showing the rebuilding and reuse of the site. Finds of Bronze Age pottery, as well as chert and flint tools and debitage attest to the domestic nature of the site (O'Malley 2009a). Earlier activity in this locality was also revealed with the discovery of Neolithic pits also in Baronsland (sites E2883 and E2884). This high level of prehistoric activity in the surrounding landscape would also suggest that the flint debitage recovered from pit (007) and flood deposit (033) reflect accidental secondary deposits of these fragments. The flake from pit (007) shows evidence for the use of indirect percussion with the use of antler, bone, hard wood or soft stone in the working of a core.

Other evidence of Early Bronze Age use and occupation of the surrounding landscape has come to light during the course of these excavations in County Kildare in the form of burial sites: (E2980) Moone (Hackett 2009b), a flat cemetery with 2 cremations (one urned), 13 pit burials, 1 cist burial, with associated grave goods of pottery, copper jewellery and flint artefacts; (E2989) Burtown Little (Moloney 2009), two ringditches and cremation burials; and (E2873) Ballymount (McCarthy 2009), a crouched inhumation burial.

These sites show a continuation of human activity in this locality throughout the Bronze Age, and also reflect the wide range of activities being undertaken by these people.

The later truncations of the mound, and the re-directing of the water channel to provide the local mill with water was a large scale activity and is immediately obvious in the landscape around the still extant, though non-functioning, mill. All stream courses in the vicinity have been straightened into deep channels, forming a network of courses that have been channelled to direct water to the mill stream at Kilgowan mill. Small water-powered mills were once a common feature across the Irish landscape where rivers and streams could be harnessed to drive a mill wheel. Many were developed in the later half of the 19th century owning to increasing demand for corn, particularly from England with its increasing urban population, and the introduction of Foster's Corn Laws of 1784. These offered a bounty on the exportation of corn from Ireland, leading to increasing profits and corn production. The Napoleonic Wars of the early 19th century maintained high prices after the repeal of these Corn Laws. Throughout the 19th century corn prices began to fall and in 1846 the British government abandoned the protectionist policies which had been afforded to British and Irish corn growers. Subsequently the later decades of the 19th century saw the importation of cheaper North American corn into Ireland. This 'Indian maize' needed to be ground much finer than the domestic corn to make it suitable for human consumption, a process which the traditional Irish mills could not undertake. This led to the development of larger commercial mills often situated at ports, as a result mills like that at Kilgowen were no longer economically viable. This would have led to the closure of the mill, as reflected in the 2nd edition OS map no. KE032-04 of 1909, which records the building as being 'disused'.

All the archaeology related to this site within the CPO has been resolved.

6 Archive quantities

The site archive is comprised of the following materials:

Item	Quantity
Context Sheets	84
Plans	15
Sections	29
Photographs	95
Registers	5
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 following completion of post-excavation analysis, the archive is appropriately deposited in consultation with the National Museum of Ireland.

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- Graphics department, Headland Archaeology (Ireland) Ltd.
- T.J O'Connell, Site Supervisor, Headland Archaeology (Ireland) Ltd.
- The excavation team.

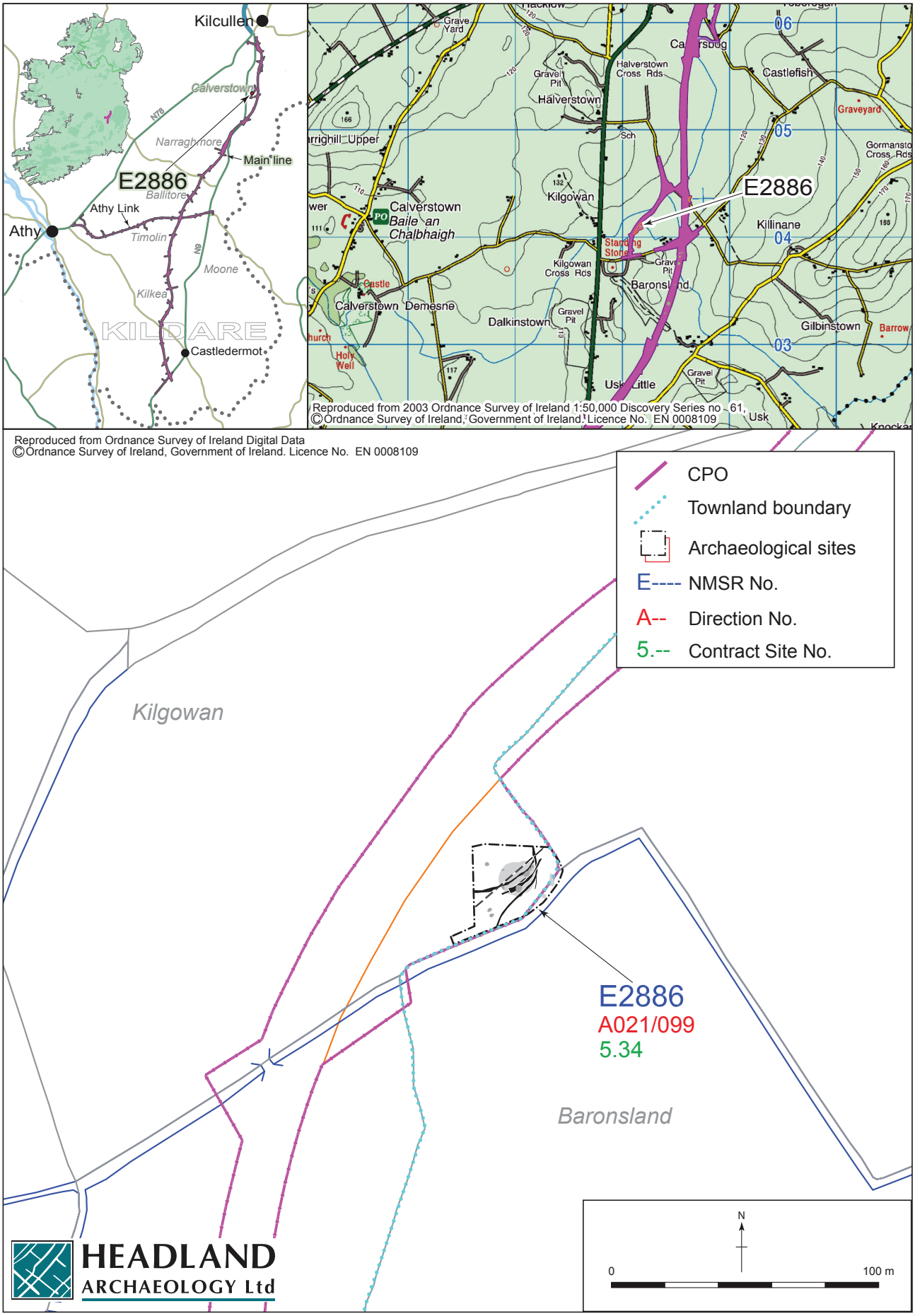


Figure 1 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 – Resolution, Kilcullen to Moone and Athy Link Road: E2886 site location.

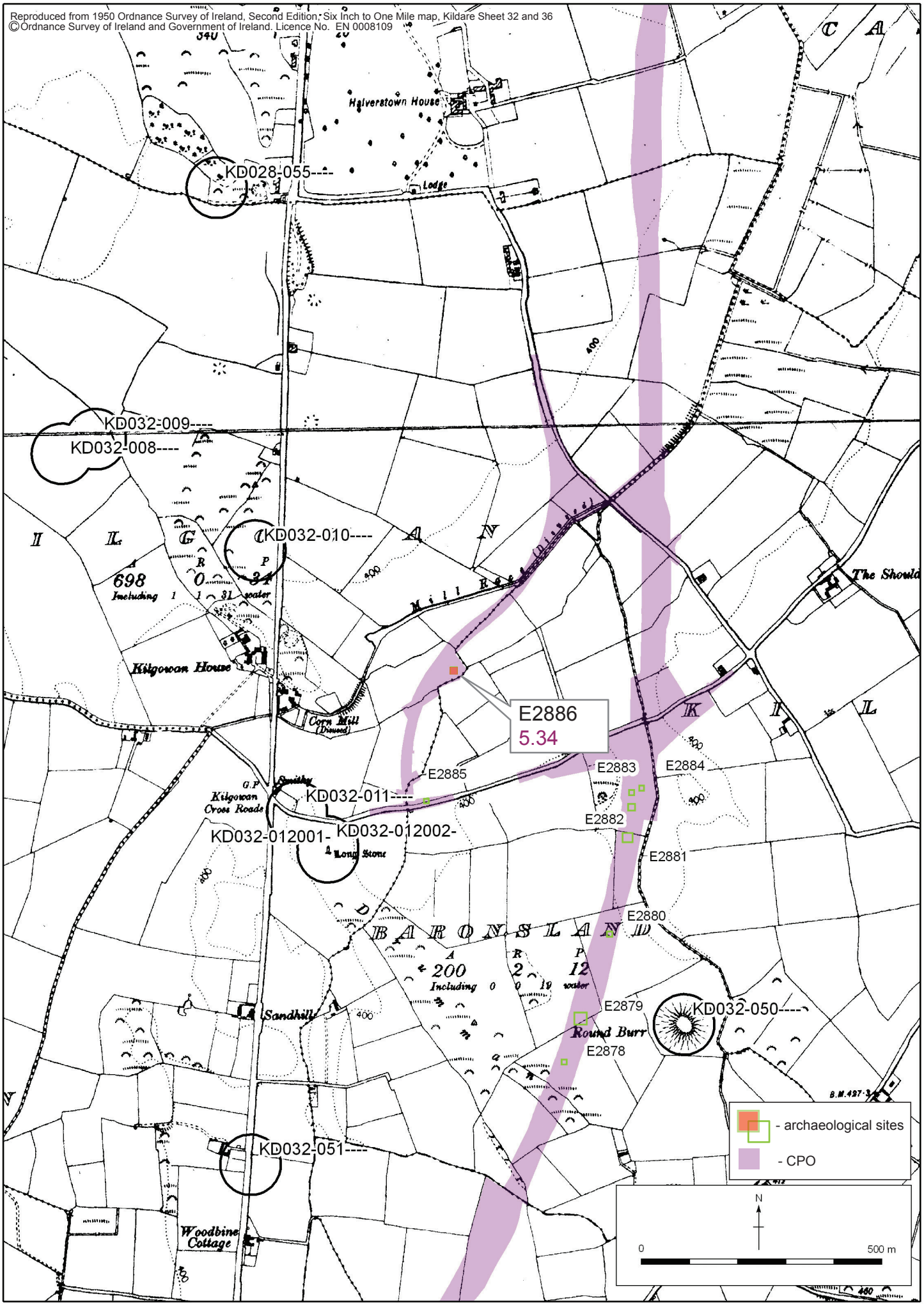


Figure 2 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2886 extract from RMP.

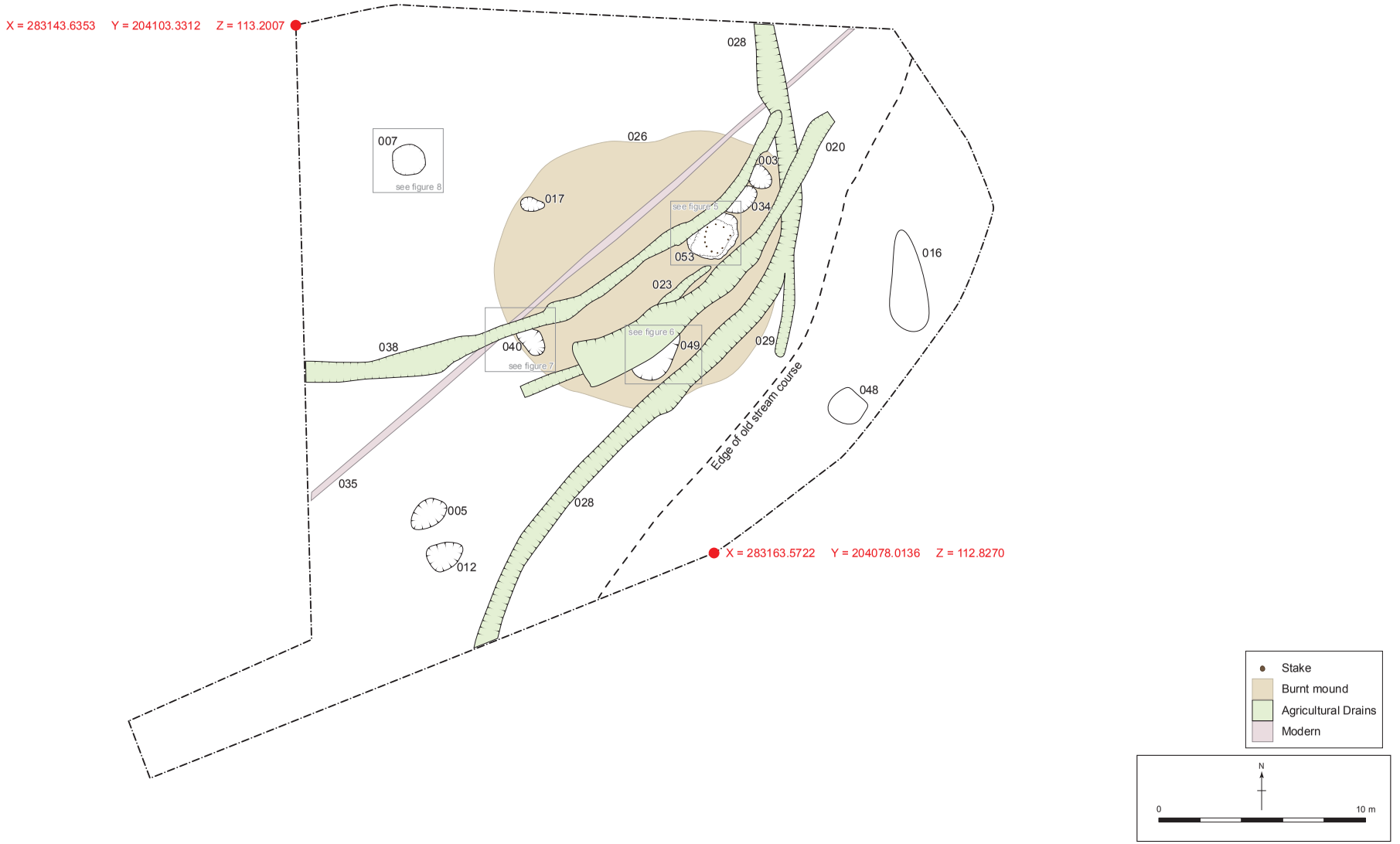


Figure 3 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road:
E2886 site layout.

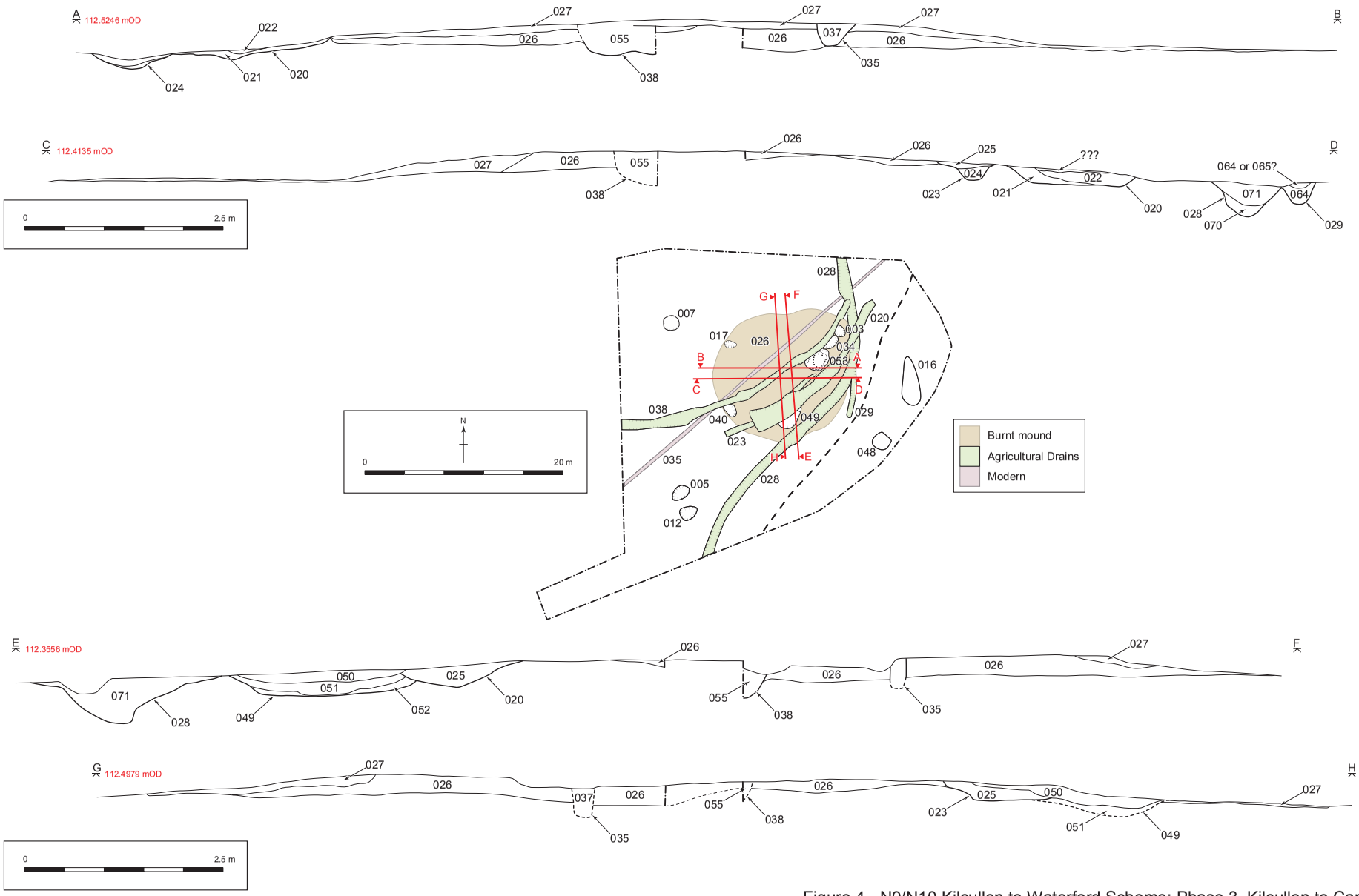


Figure 4 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road:
E2886 north, south, east and west-facing sections of mound (026).

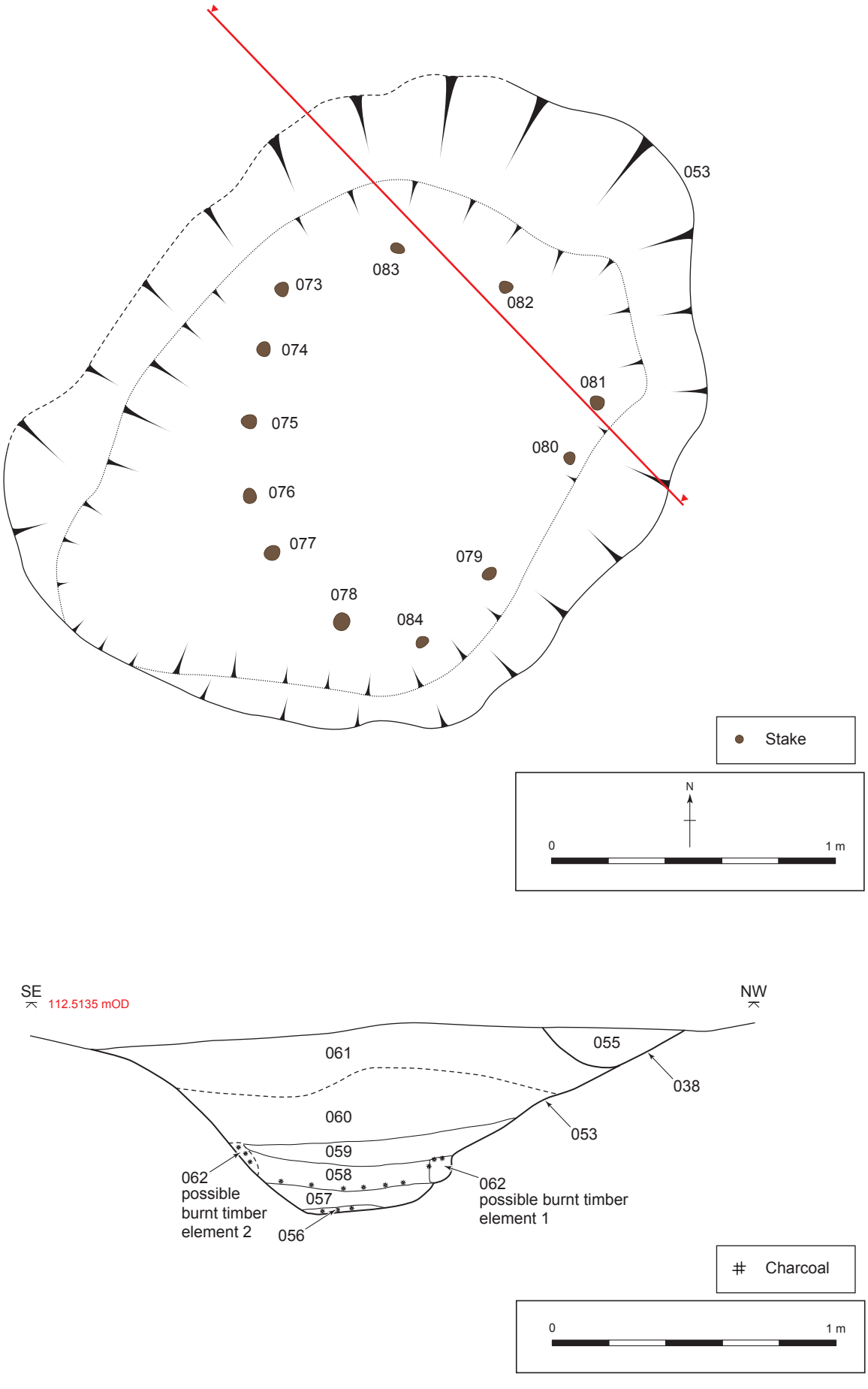


Figure 5 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road: E2886 plan and northeast-facing section of trough (053).

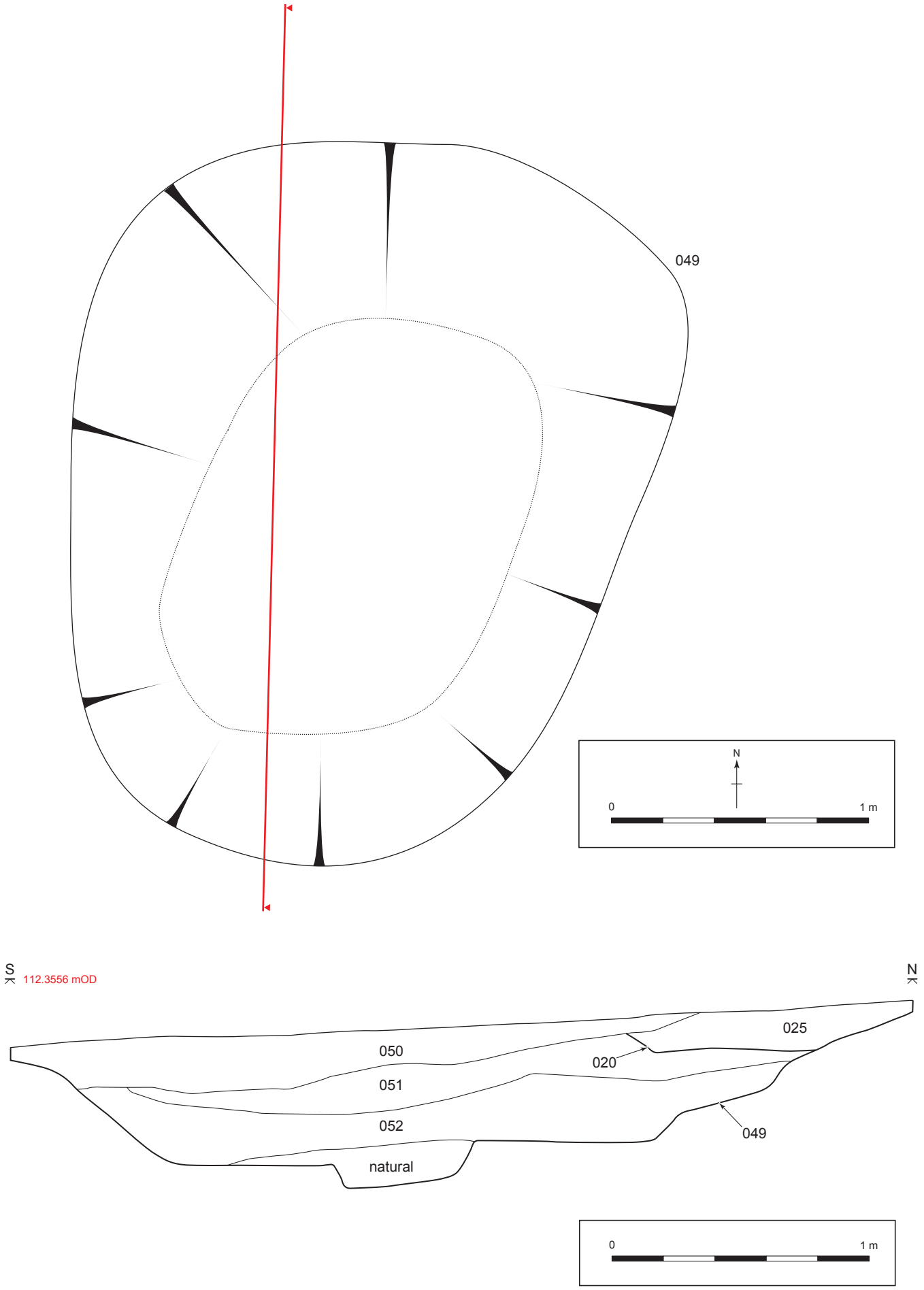


Figure 6 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 – Resolution, Kilcullen to Moone and Athy Link Road: E2886 plan and east-facing section of pit (049).

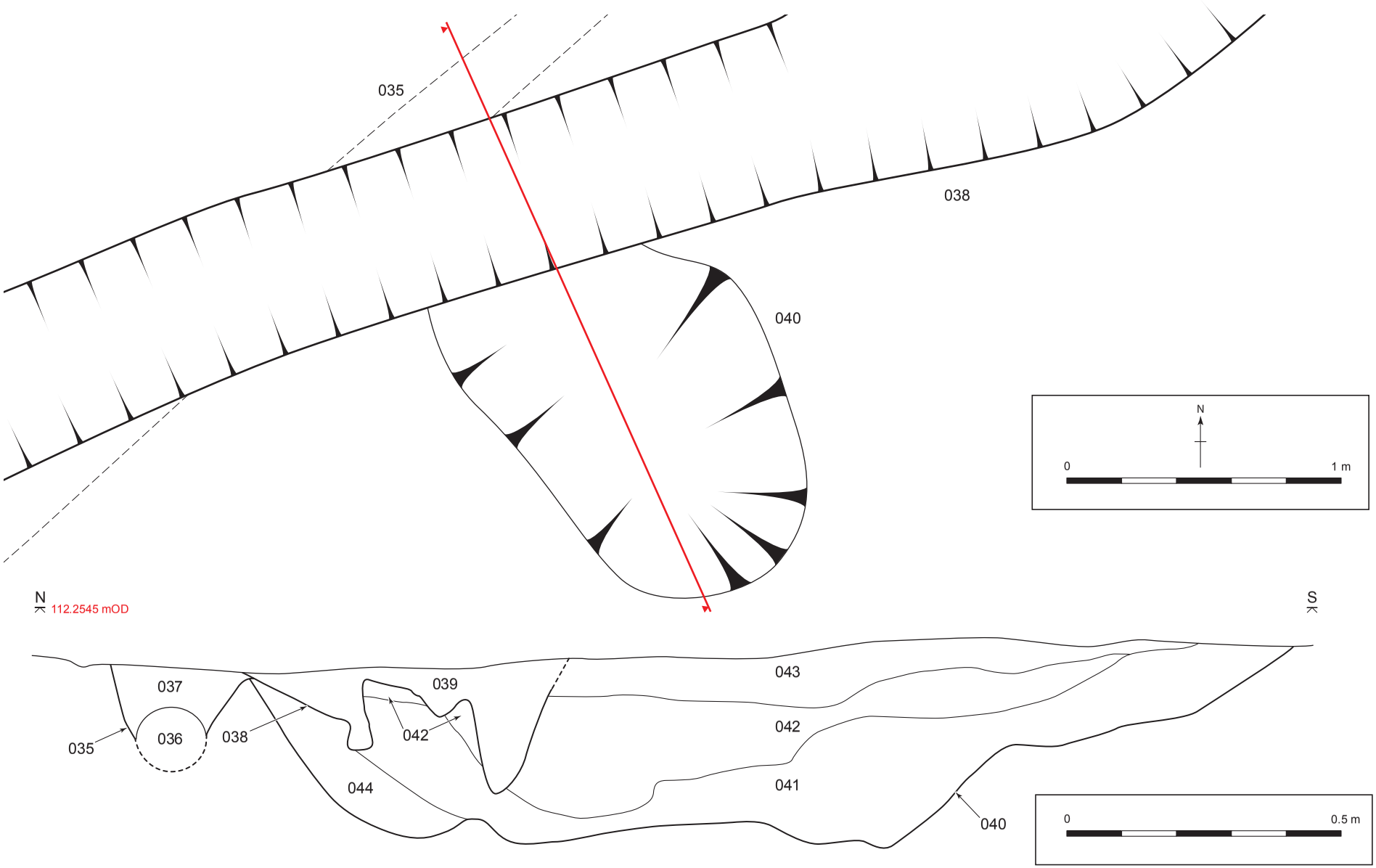


Figure 7 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2886 plan and west-facing section of pit (040).

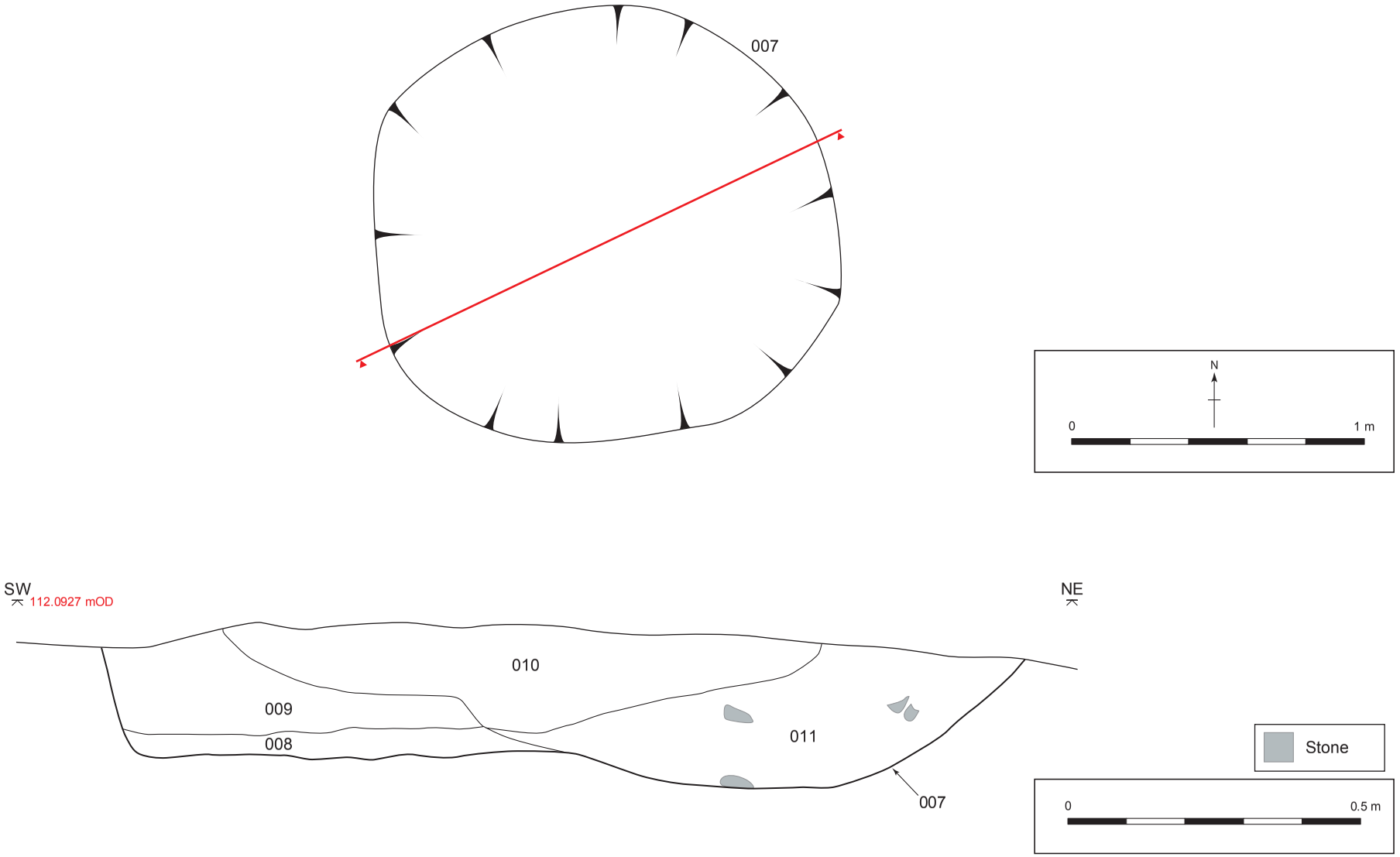


Figure 8 - N9/N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow.
Archaeological Services Contract No. 5 - Resolution, Kilcullen to Moone and Athy Link Road.
E2886 plan and southeast-facing section of pit (007).

Plate 1 - Mid-excavation photo of burnt mound (026), southeast-facing.

Plate 2 - Southwest-facing photo of stream bed deposits to east of site.

Plate 3 - Pre-excavation photo of spread (016), east-facing.

Plate 4 - Pre-excavation photo of curvilinear ditch (028), southwest-facing.

Plate 5 - Mid-excavation photo of trough (053), northeast-facing.

Plate 6 - Mid-excavation photo of trough (053) showing timbers in (058), southeast-facing.

Plate 7 - Post-excavation photo of pot boiler (007), north-facing.

Plate 8 - Mid-excavation photo of pit (017), east-facing.

Plate 9 - Post-excavation photo of pit (049), northeast-facing.

Appendix 1 – Context Register for Site E2886

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(001)	Topsoil	-	-	-	-	0.3 m	Mid brown silty clay. A flake of struck chert was recovered from the topsoil (0E2886:001:001).	Topsoil
(002)	Natural	-	-	-	-	-	Mixed grey silt, grey gravely silt and fine yellow silt.	Natural
(003)	Cut	-	(004)	1.0 m	0.9 m	0.1 m	Sub square with gradually sloping sides and a concave base.	Pit
(004)	Fill	(003)	-	1.0 m	0.9 m	0.1 m	Fairly compact mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stones.	Fill of pit.
(005)	Cut	-	(006)	2.05 m	1.4 m	0.25 m	Sub oval NE-SW orientated with gradually sloping sides and a slightly concave base.	Pit
(006)	Fill	(005)	-	2.05 m	1.4 m	0.25 m	Loose dark brown silty clay with occasional inclusions of small stones and animal bone.	Fill of pit.
(007)	Cut	-	(008) (009) (010) (011)	1.7 m	1.4 m	0.25 m	Circular with sharply sloping sides and a flat base.	Pit
(008)	Fill	(007)	-	1.4 m	0.85 m	0.06 m	Loose mottled black, grey and yellow sandy clay with occasional inclusions of charcoal and small stones.	Fill of pit.
(009)	Fill	(007)	-	1.4 m	0.6 m	0.15 m	Fairly compact grey sandy clay with inclusions of charcoal and ash.	Fill of pit.
(010)	Fill	(007)	-	1.4 m	1 m	0.17 m	Loose dark brown sandy clay with occasional stones and charcoal.	Fill of pit.
(011)	Fill	(007)	-	1.4 m	0.6 m	0.25 m	Firm mottled yellow and dark brown clayey sand with occasional stones.	Fill of pit.
(012)	Cut	-	(013)	1.6 m	0.6 m	0.2 m	Sub oval with gradually sloping sides and a slightly concave base.	Pit
(013)	Fill	(012)	-	1.6 m	0.6 m	0.2 m	Loose mottled dark brown and grey clay with inclusions of small stones.	Fill of pit.
(014)								Void
(015)								Void

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(016)	Deposit	-	-	7 m available	3 m	0.12 m	Moderately compact black sandy gravel with inclusions of heat cracked stones and charcoal.	Burnt spread.
(017)	Cut	-	(018) (019)	1.1 m	0.65 m	0.3 m	Oval with gradually sloping sides and a concave base	Pit.
(018)	Fill	(017)	-	1.1 m	0.95 m	0.2 m	Upper fill. Moderately compact black silty sand with small stones roots and charcoal.	Fill of pit.
(019)	Fill	(017)	-	1.0 m	0.6 m	0.1 m	Basal fill. Compact grey sandy clay with small stones roots and charcoal.	Fill of pit.
(020)	Cut	-	(021) (022)	11.7 m	1.1 m	0.5 m	NE-SW running curvilinear feature with sharply sloping sides and a concave uneven base.	Ditch.
(021)	Fill	(020)	-	11.7 m	0.6 m	0.2 m	Basal fill. Moderately compact grey silt with very occasional charcoal flecks.	Fill of ditch.
(022)	Fill	(020)	-	11.7 m	1.1 m	0.3 m	Upper fill. Moderately compact dark blue black sandy clay with moderate inclusions of charcoal and fire cracked stones.	Fill of ditch.
(023)	Cut	-	(024) (025)	2.6 m	0.4 m	0.32 m	Curvilinear feature with sharply sloping sides leading to a concave base.	Gully
(024)	Fill	(023)	-	2.6 m	0.25 m	0.07 m	Basal fill. Loose grey silt.	Fill of gully.
(025)	Fill	(023)	-	2.6 m	0.4 m	0.25 m	Upper fill. Moderately compact mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stone.	Fill of gully.
(026)	Deposit	-	-	9.5 m	9 m	0.25 m	Sub circular. Moderately compact mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stone.	Burnt mound
(027)								Void
(028)	Cut	-	(068) (069) (070) (071) (072)	32.7 m	1.1 m	0.4 m	NE-SW curvilinear with step sides and a concave base.	Ditch
(029)	Cut	-	(064) (065) (066)	13.0 m	0.36 m	0.12 m	NE-SW curvilinear with step sides and a concave base.	Gully

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(030)	Deposit	-	-	15.8 m	6 m available	0.9 m	Compact grey clay.	Flood deposit.
(031)	Deposit	-	-	23.7 m	7.2 m available	0.11 m	Compact brown peaty clay.	Flood deposit.
(032)	Deposit	-	-	17.5 m	4.4 m available	0.12 m	Loose light greyish brown sandy silt.	Flood deposit.
(033)	Deposit	-	-	16.2 m	6.5 m available	0.15 m	Loose dark brown silty sand.	Flood deposit.
(034)	Cut	-	(054)	1.5 m	1.05 m available	0.2 m	Sub oval with gradually sloping sides and a concave base.	Pit
(035)	Cut	-	(037)	28.0 m	0.4 m	0.6 m	NE-SW linear	Modern drain.
(036)	Void	-	-	-	-	-	-	-
(037)	Fill	(035)	-	28.0 m	0.4 m	0.6 m	Circular clay pipe drain with mixed fill of blackish brown silty clay and re-deposited natural. Similar to burnt mound material in area of burnt mound.	Fill of modern drain
(038)	Cut	-	39,55	23.0 m	0.74 m	0.25 m	NE-SW linear with gradually sloping sides and concave base.	Ditch
(039)	Fill	38	-	13.0 m	0.74 m	0.25 m	Located in NE of 38. loose, brown grey sandy clay with occasional inclusions of small stones.	Fill of ditch.
(040)	Cut	-	(041) (042) (043) (044)	1.8 m	1.15 m	0.44 m	Oval with gradually sloping sides and an irregular base.	Pit
(041)	Fill	(040)	-	1.8 m	1.15 m	0.15 m	Moderately compact brown silty clay.	Fill of pit.
(042)	Fill	(040)	-	1.3 m	1.15 m	0.12 m	Loose grey clayey sand.	Fill of pit.
(043)	Fill	(040)	-	1.15 m	1.1 m	0.1 m	Loose black sandy clay and occasional stones.	Fill of pit.
(044)	Fill	(040)	-	1.12 m	0.8 m	0.3 m	Moderately compact grey clay.	Fill of pit.

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(045)	Void	-	-	-	-	-	-	Void
(046)	Void	-	-	-	-	-	-	Void
(047)	Void	-	-	-	-	-	-	Void
(048)	Deposit	-	-	1.84 m	1.73 m available	0.1 m	Sub circular spread of burnt mound material located in the east of excavated area.	Deposit
(049)	Cut	-	(050) (051) (052)	3.0 m	1.5 m	0.5 m	Rectangular pit with gradually sloping sides and an uneven base.	Pit
(050)								Void
(051)	Fill	(049)	-	2.6 m	2.2 m	0.1 m	Loose grey sand with frequent inclusions of small pebbles.	Fill of pit.
(052)	Fill	(049)	-	2.1 m	2.1 m	0.1 m	Moderately compact black silty clay with inclusions of charcoal and fire cracked stones.	Fill of pit.
(053)	Cut	-	(056)-(062)	2.1 m	1.7 m	0.6 m	Sub rectangular pit with sharply sloping sides and a flat to uneven base.	Trough
(054)	Fill	(034)	-	1.5 m	1.05 m	0.2 m	Moderately compact mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stones.	Fill of pit.
(055)	Fill	(038)	-	10.0 m	0.74 m	0.25 m	Located in SW of 38. Moderately compact mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stones.	Fill of ditch.
(056)	Fill	(053)	-	1.8 m	1.4 m	0.02 m	Basal fill of trough. Moderately compact grey silty clay with moderate charcoal flecks.	Fill of trough.
(057)	Fill	(053)	-	1.8 m	1 m	0.7 m	Secondary fill of trough. Moderately compact grey silty clay with very occasional charcoal flecks.	Fill of trough.
(058)	Fill	(053)	-	0.78 m	0.59 m	0.09 m	Moderately compact black grey silty sand with charcoal flecks present particularly along the bottom of this deposit.	Fill of trough.
(059)	Fill	(053)	-	2.0 m	1 m	0.09 m	Moderately compact dark grey silty sand with occasional fire cracked stones.	Fill of trough.
(060)	Fill	(053)	-	2.0 m	1.4 m	0.15 m	Moderately compact mid black clayey silt with moderate inclusions of fire cracked stones and charcoal flecks.	Fill of trough.

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(061)	Fill	(053)	-	2.1 m	1.7 m	0.21 m	Moderately compact mid black silty clay with moderate inclusions of fire cracked stones and charcoal flecks.	Fill of trough.
(062)	Timber elements	(053)	-	1.0 m	1 m	0.3 m	Numerous pieces of worked wood primarily located in the southwest part of the trough.	Fill of trough.
(063)	Deposit	-	-	5.2 m	4.2 m	0.6 m	Loose dark brown peaty clay with occasional charcoal.	Flood deposit.
(064)	Fill	(029)	-	4.0 m	0.34 m	0.6 m	Basal fill of (029) Compact grey brown sand.	Fill of gully.
(065)	Fill	(029)	-	3.0 m	0.34 m	0.08 m	Located at S end of (029). Loose brown clay with orange flecks and occasional charcoal.	Fill of gully.
(066)	Fill	(029)	-	1.0 m	0.34 m	0.15 m	Located at N end of (029). Loose brown silty sand.	Fill of gully.
(067)	Void	-	-	-	-	-	-	-
(068)	Fill	(028)	-	8.5 m	1.2 m	0.2 m	Loose orangey brown silty sand with frequent inclusions of small stones.	Fill of ditch.
(069)	Fill	(028)	-	13.2 m	0.8 m	0.1 m	Located in N part of (028). Loose dark grey sand with occasional charcoal.	Fill of ditch.
(070)	Fill	(028)	-	14.0 m	0.5 m	0.12 m	Located in N part of (028). Loose light grey sand.	Fill of ditch.
(071)	Fill	(028)	-	9.6 m	1.2 m	0.6 m	Located in centre of (028). Loose black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stone.	Fill of ditch.
(072)	Fill	(028)	-	10.0 m	0.9 m	0.6 m	Located at S end of (028). Loose brownish grey silty clay with occasional animal bone.	Fill of ditch.
(073)	Cut	-	Sample 45	0.02m	0.02m	0.18 m	Sub-square in plan with vertical sides leading to a tapered point.	Stake.
(074)	Cut	-	Sample 46	0.03 m	0.02 m	0.24 m	Sub-oval in plan with vertical sides leading to a tapered point.	Stake.
(075)	Cut	-	Sample 47	0.03 m	0.02 m	0.1 m	Sub-oval in plan with vertical sides leading to a tapered point.	Stake.
(076)	Cut	-	Sample 48	0.03 m	0.03 m	0.19 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.

Context no.	Type	Fill of:	Filled by:	Length (m)	Width (m)	Depth (m)	Description	Interpretation
(077)	Cut	-	Sample 42	0.02m	0.02 m	0.15 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.
(078)	Cut	-	Sample 49	0.02m	0.02 m	0.17 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.
(079)	Cut	-	Sample 50	0.02m	0.02 m	0.13 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.
(080)	Cut	-	Sample 51	0.03 m	0.02 m	0.1 m	Sub-oval in plan with vertical sides leading to a tapered point.	Stake.
(081)	Cut	-	Sample 52	0.03 m	0.02 m	0.13 m	Sub-oval in plan with vertical sides leading to a tapered point.	Stake.
(082)	Cut	-	Sample 44	0.03 m	0.02 m	0.15 m	Sub-rectangular in plan with vertical sides leading to a tapered point.	Stake.
(083)	Cut	-	Sample 43	0.02m	0.02 m	0.15 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.
(084)	Cut	-	Sample 41	0.02m	0.02 m	0.1 m	Sub-rounded in plan with vertical sides leading to a tapered point.	Stake.

Appendix 2–Finds Register for Site E2886

Find no.	Material	Type	Identification	Description
E2886:008:001	Stone	Flint debitage	Prehistoric	Complete, unretouched fragment of flint debitage
E2886:033:001	Stone	Flint debitage	Prehistoric	Fractured, unretouched fragment of flint debitage

Appendix 3 – Sample Register for Site E2886

Sample no.	Context no.	Description
E2886:001	(006)	Fill of pit (005). Dark brown silty clay with animal bone.
E2886:002	(008)	Fill of pit (007). Mottled black, grey and yellow sandy clay with occasional inclusions of charcoal.
E2886:003	(009)	Fill of pit (007). Grey sandy clay with inclusions of charcoal and ash.
E2886:004	(010)	Fill of pit (007). Dark brown sandy clay with occasional charcoal.
E2886:005	(011)	Fill of pit (007). Mottled yellow and dark brown clayey sand.
E2886:006	(018)	Upper fill of pit (017). Black silty sand and charcoal.
E2886:007	(019)	Basal fill of pit (017). Grey sandy clay and charcoal.
E2886:008	(016)	Burnt spread. Black sandy gravel with inclusions of heat cracked stones and charcoal.
E2886:009	(047)	Void
E2886:010	(026)	Burnt mound material. Mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stone.
E2886:011	(050)	Fill of pit (049). Brown sandy clay.
E2886:012	(051)	Fill of pit (049). Loose grey sand.
E2886:013	(052)	Fill of pit (049). Black silty clay with inclusions of charcoal and fire cracked stones.
E2886:014	(054)	Fill of pit (034). Mid black silty clay with occasional charcoal flecks and moderate inclusions of fire cracked stones.
E2886:015	(030)	Flood deposit. Compact grey clay.
E2886:016	(031)	Flood deposit. Compact brown peaty clay.
E2886:017	(032)	Flood deposit. Loose light greyish brown sandy silt.
E2886:018	(033)	Flood deposit. Loose dark brown silty sand.
E2886:019	(063)	Flood deposit. Loose dark brown peaty clay with occasional charcoal.
E2886:020	(060)	Fill of trough (053). Moderately compact mid black clayey silt with moderate inclusions of fire cracked stones and charcoal flecks.
E2886:021	(059)	Fill of trough (053). Moderately compact dark grey silty sand with occasional fire cracked stones.
E2886:022	(058)	Fill of trough (053). Moderately compact black grey silty sand with charcoal flecks.
E2886:023	(057)	Secondary fill of trough (053). Moderately compact grey silty clay with very occasional charcoal flecks.
E2886:024	(056)	Basal fill of trough (053). Moderately compact grey silty clay with moderate charcoal flecks.
E2886:025	(061)	Fill of trough (053). Moderately compact mid black silty clay with moderate inclusions of fire cracked stones and charcoal flecks.
E2886:026	(067)	Void
E2886:027	(072)	Animal bone from ditch (028). Loose brownish grey silty clay.

Sample no.	Context no.	Description
E2886:028	(072)	Fill of ditch (028). Loose brownish grey silty clay.
E2886:029	(062)	Timber element from trough (053)
E2886:030	(062)	Timber element from trough (053)
E2886:031	(062)	Timber element from trough (053)
E2886:032	(062)	Timber element from trough (053)
E2886:033	(062)	Timber element from trough (053)
E2886:034	(062)	Timber element from trough (053)
E2886:035	(062)	Timber element from trough (053)
E2886:036	(062)	Timber element from trough (053)
E2886:037	(062)	Timber element from trough (053)
E2886:038	(062)	Timber element from trough (053)
E2886:039	(062)	Timber element from trough (053)
E2886:040	(062)	Timber element from trough (053)
E2886:041	(084)	Stake fragments
E2886:042	(077)	Stake fragments
E2886:043	(083)	Stake fragments
E2886:044	(087)	Stake fragments
E2886:045	(073)	Stake
E2886:046	(074)	Stake
E2886:047	(075)	Stake
E2886:048	(076)	Stake
E2886:049	(078)	Stake
E2886:050	(079)	Stake
E2886:051	(080)	Stake
E2886:052	(081)	Stake

Appendix 4 – Photographic Register for Site E2886

Shot no.	Direction facing	Description
E2886:001	South	Pre excavation of site.
E2886:002	South	Pre excavation of site.
E2886:003	South	Pre excavation of site.
E2886:004	Southeast	Pre excavation of burnt mound (026) & (027).
E2886:005	Northeast	Pre excavation of flood deposits (030 - 034 & 063).
E2886:006	Southwest	Pre excavation of area south of burnt mound.
E2886:007	Southeast	Pre excavation of area southeast of burnt mound.
E2886:008	North	Pre excavation of pit (007).
E2886:009	Northeast	Southwest facing section of ditch (028).
E2886:010	East	Southwest facing section of ditch (028).
E2886:011	Southeast	Mid excavation of burnt mound (026) & (027).
E2886:012	East	Mid excavation of northwest quadrant under burnt mound (026) & (027).
E2886:013	East	Mid excavation of southwest quadrant under burnt mound (026) & (027).
E2886:014	Northwest	Mid excavation of southeast quadrant under burnt mound (026) & (027).
E2886:015	Southwest	Mid excavation of northeast quadrant under burnt mound (026) & (027).
E2886:016	Northeast	Pre excavation of modern drain (035).
E2886:017	Southwest	Pre excavation of ditch (038).
E2886:018	Southwest	Pre excavation of ditch (028).
E2886:019	Northeast	Pre excavation of ditch (028).
E2886:020	Southeast	Pre excavation burnt spread (016).
E2886:021	West	E facing section of pit (017).
E2886:022	South	NE facing section of burnt spread (016).
E2886:023	Northeast	SW facing section of ditch (020) & gully (023).
E2886:024	East	W facing section of modern drain (035) ditch (038) and pit (040).
E2886:025	Southeast	Section through flood deposits (030)-(034) & (063).
E2886:026	South	Pre excavation trough (053) pit (034) and ditch (038).
E2886:027	Northeast	West facing section of pit (049) and burnt mound (026) & (027).
E2886:028	Southwest	Post excavation of ditch (028) and gully (029).
E2886:029	East	West facing section of ditch (028).
E2886:030	Northeast	Southwest facing section of pit (034) and ditch (038).
E2886:031	North	South facing section of ditch (028).
E2886:032	west	East facing section of pit (049).
E2886:033	East	West facing section of pit (049).
E2886:034	Southwest	Post excavation of pits (03) (034) Ditch (038).
E2886:035	Southwest	Northeast facing section of trough (053).
E2886:036	Southwest	Mid excavation of Stake hole (073).

Shot no.	Direction facing	Description
E2886:037	Southwest	Post excavation of pit (049).
E2886:038	Northeast	Post excavation of pit (049).
E2886:039	Northeast	Pre excavation trough (053).
E2886:040	Northeast	Mid excavation flood deposits (030)-(034) & (063).
E2886:041	Southwest	Mid excavation flood deposits (030)-(034) & (063).
E2886:042	Southwest	Mid excavation flood deposits (030)-(034) & (063).
E2886:043	North	Post excavation pit (017).
E2886:044	Southwest	Post excavation ditch (020) gully (023).
E2886:045	North	Post excavation pit (07).
E2886:046	Northeast	Mid excavation trough (053) with timber elements (062).
E2886:047	Southwest	Mid excavation trough (053) with timber elements (062).
E2886:048	Southeast	Mid excavation trough (053) with timber elements (062).
E2886:049	Southwest	Mid excavation trough (053) with timber elements (062).
E2886:050	Southeast	Mid excavation trough (053) with timber elements (062).
E2886:051	Northeast	Mid excavation trough (053) with timber elements (062).
E2886:052	Southwest	Mid excavation trough (053) with timber elements (062).
E2886:053	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:054	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:055	Southwest	Mid excavation trough (053) with timber elements (062).
E2886:056	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:057	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:058	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:059	Overhead	Mid excavation trough (053) with timber elements (062).
E2886:060	Northwest	Mid excavation of trough (053) with timber elements removed.
E2886:061	Southeast	Mid excavation of trough (053) with timber elements removed.
E2886:062	Northeast	Mid excavation of trough (053) with timber elements removed.
E2886:063	Southwest	Mid excavation of trough (053) with timber elements removed.
E2886:064	Southwest	Mid excavation of trough (053).
E2886:065	East	Mid excavation stakes (073)-(077) at base of trough (053).
E2886:066	Northwest	Mid excavation trough (053).
E2886:067	Southeast	Mid excavation trough (053).
E2886:068	Northeast	Mid excavation trough (053).
E2886:069	Overhead	Mid excavation stakes (076) & (077) at base of trough (053).
E2886:070	Northeast	Mid excavation stake (084) at base of trough (053).
E2886:071	Overhead	Mid excavation stakes (073)-(084) at base of trough (053).
E2886:072	Northeast	Post excavation of ditch (028).
E2886:073	Southwest	Post excavation of pits (05) & (012).
E2886:074	Northeast	Post excavation of ditch (038).
E2886:075	Northeast	Post excavation of pit (030).

Shot no.	Direction facing	Description
E2886:076	Southwest	Post excavation of ditch (040).
E2886:077	South	Post excavation of ditch (028).
E2886:078	Southwest	Post excavation of stream course east of site.
E2886:079	Southwest	Post excavation east of site.
E2886:080	Northeast	Post excavation east of site.
E2886:081	Northeast	Post excavation pit (049).
E2886:082	South	Post excavation of site
E2886:083	Southeast	Post excavation of site
E2886:084	Southwest	Post excavation of trough (053).
E2886:085	Southeast	Post excavation of trough (053).
E2886:086	Southeast	Post excavation of trough (053).
E2886:087	Overhead	Mid excavation of stake (073) in trough (053).
E2886:088	Overhead	Stake (073).
E2886:089	Overhead	Stake (074).
E2886:090	Overhead	Stake (075).
E2886:091	Overhead	Stake (076).
E2886:092	Overhead	Stake (078).
E2886:093	Overhead	Stake (079)
E2886:094	Overhead	Stake (080).
E2886:095	Overhead	Stake (081).

Appendix 5 – Drawing Register for Site E2886

Plans

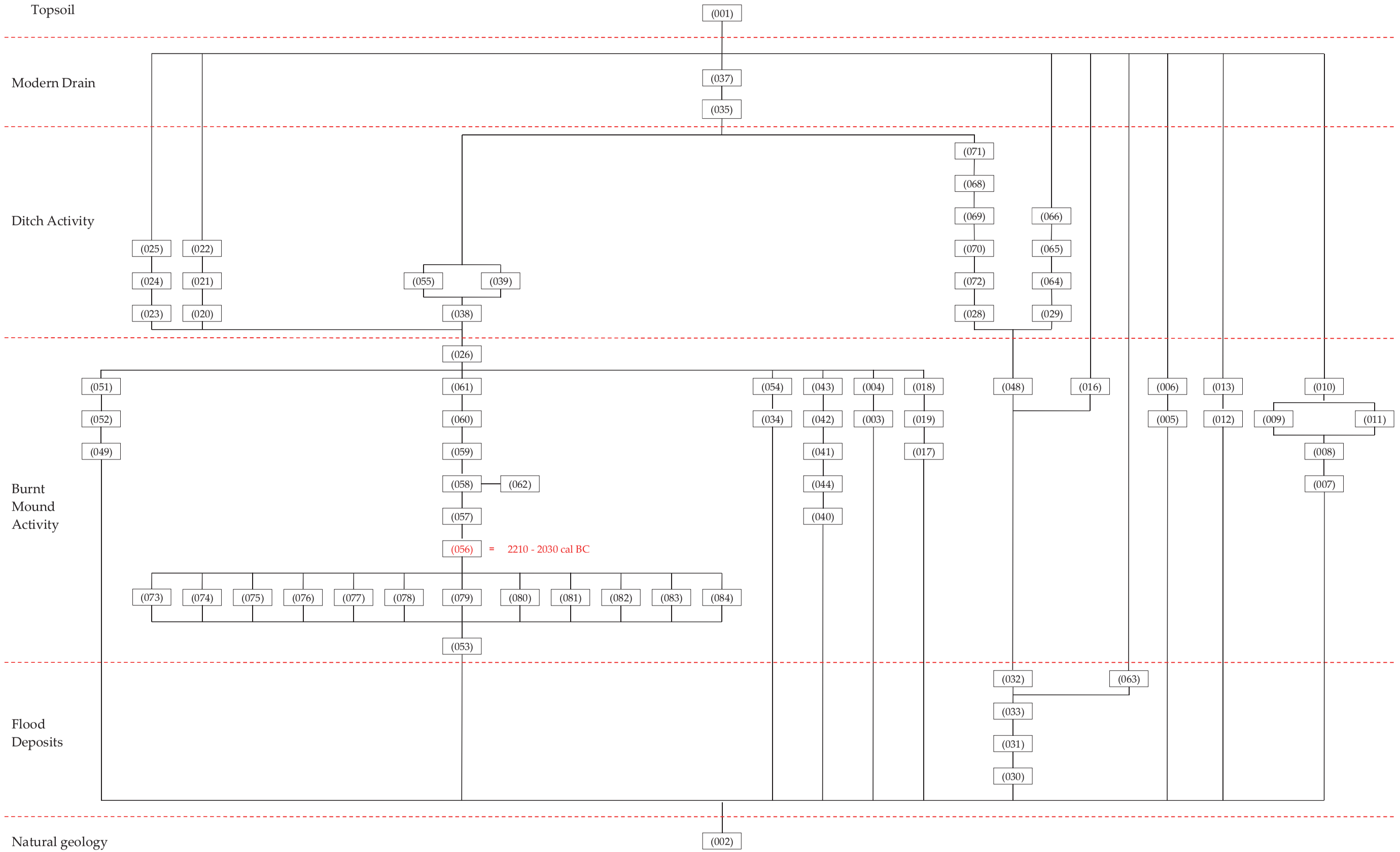
Drawing no.	Scale	Description
E2876:001	1.50	Pre excavation plan of site. Sheet 1
E2876:002	1.50	Pre excavation plan of site. Sheet 2
E2876:003	1.50	Pre excavation plan of site. Sheet 3
E2876:004	1.50	Pre excavation plan of site. Sheet 4
E2876:005	1.50	Pre excavation plan of site. Sheet 5
E2876:006	1.50	Mid excavation plan of site. Sheet 1
E2876:007	1.50	Pre excavation plan of site. Sheet 6
E2876:008	1.50	Post excavation plan of site. Sheet 1
E2876:009	1.50	Post excavation plan of site. Sheet 2
E2876:010	1.50	Post excavation plan of site. Sheet3
E2876:011	1.50	Post excavation plan of site. Sheet 4
E2876:012	1.50	Post excavation plan of site. Sheet 5
E2876:013	1.20	Mid excavation plan of site. Sheet 2
E2876:014	1.20	Mid excavation plan of site. Sheet 3
E2876:015	1.20	Post excavation plan of site. Sheet 6

Sections

Drawing no.	Scale	Description
E2876:001	1.10	South facing section of pit (05).
E2876:002	1.10	Southeast facing section of pit (012).
E2876:003	1.10	Southeast facing section of pit (07).
E2876:004	1.20	Northeast facing section of burnt spread (016).
E2876:005	1.20	East facing section of pit (017).
E2876:006	1.10	North facing section of ditch (020) and gully (023).
E2876:007	1.10	North facing section of ditch (020) and gully (023).
E2876:008	1.20	North facing section of burnt mound (026).
E2876:009	1.10	West facing truncation of pit (040) and ditch (038).
E2876:010	1.10	Profile of stone socket (014).
E2876:011	1.20	East facing section of flood deposits east of site.
E2876:012	1.10	Northeast facing section of ditch (038) and pit (034).
E2876:013	1.20	West facing section of ditch (020) and pit (049).
E2876:014	1.20	West facing section of burnt mound (026).
E2876:015	1.20	East facing section of burnt mound (026).
E2876:016	1.20	South facing section of burnt mound (026).
E2876:017	1.10	West southwest facing section of burnt mound (026), modern drain (035) and ditch (038).
E2876:018	1.10	Profile (049)
E2876:019	1.20	South facing section of ditch (028).
E2876:020	1.20	West facing section of flood deposits east of site.
E2876:021	1.10	East facing section of pit (049).
E2876:022	1.10	West facing section of pit (049).

Drawing no.	Scale	Description
E2876:023	1.10	Northeast facing section of trough (053).
E2876:024	1.20	South facing section of flood deposits east of site.
E2876:025	1.20	West facing section of flood deposits east of site.
E2876:026	1.20	Southwest facing section of flood deposits east of site.
E2876:027	1.20	North facing section of flood deposits east of site.
E2876:028	1.20	Profile of pit (034) and pit (003).
E2876:029	1.20	West facing section of flood deposits east of site.

Appendix 6 - Site Matrix for Site E2886



Appendix 7 – Palaeoenvironmental samples report for Site E2886, Kilgowen, Co. Kildare
By: Karen Stewart

Introduction

Fifty-two environmental samples were taken at Site E2886, Kilgowen, Co. Kildare, a site comprising a burnt mound, trough and associated pits (Hackett 2009). Of these, twenty six have been processed in order to recover any palaeoenvironmental or artefactual material that may aid in the interpretation of the site.

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

Results are summarised below in Tables 2 (Composition of flots) and 3 (Composition of retents). All plant material was preserved by charring. Not all samples produced both a flot and a retent. Sample 006 from the fill (018) of pit (017) and Sample 015, taken from a flood deposit (030), were found to be devoid of archaeological material and have been recorded as 'archaeologically sterile'.

Wood charcoal
Wood charcoal was recovered from all samples not found to be archaeologically sterile. The concentrations recovered varied from rare (+) to abundant (++++). Sample 010, taken from a burnt mound deposit (026) and Sample 023, taken from the fill (057) of a trough (053) were found to have the highest volumes of charcoal. Samples 008, 010, 023 and 024 contained charcoal that was preserved well enough to undertake species ID for AMS (Accelerated Mass Spectrometry) dating.

Other material
Bone, both burnt and unburnt, was recovered from the samples. This is discussed in Appendix 9, the Faunal Remains Report.

Lithics were recovered from Sample 002, taken from the fill (008) of a pit (007) and from Sample 018, taken from a flood deposit (033). These are discussed in the Lithics Report, Appendix 11.

Radiocarbon date results
Hazel charcoal/alder was retrieved from Sample 26, taken from the fill (056) of a trough (053). This returned a date range of 2210 - 2030 cal BC at (2σ) (SUERC-26269), placing the burnt mound activity on the site in the early Bronze Age.

Radiocarbon dating was undertaken by Gordon Cooke at Scottish Universities Environmental Research Centre (SUERC), after Reimer *et al* (2004). Calibrated age ranges were calculated using radiocarbon calibration program CALIB REV5.0.2. The results are presented in Table 1.

Discussion

Samples 015-019 were taken from alluvial deposits associated within a stream channel. All of these, except Sample 015, were found to contain some anthropogenic material, including bone and charcoal.

The absence of any archaeobotanical material other than charcoal from *fulachtaí fiadh* is well documented (O'Neill 2000), and is also the case at other sites of this type in the locality such as at Site E2874, Busherstown, Co. Carlow (Hanbidge 2009).

The charcoal present indicates that wood was being utilised as a fuel source and that conflagration events were occurring in the vicinity of the site. However in most cases, the charcoal was very fragmented and abraded, which may indicate that it does not represent primary deposition, but may have been exposed on the surface for some time, or was transported from elsewhere and redeposited, both of which can cause the breaking down and abrasion of charcoal.

For the purposes of radiocarbon dating, one fragment of charcoal from fill (056) of trough (053) was identified to species. This derived from hazel. The presence of alder would suggest regular availability of water for successful germination (Stuijts 2005, 139). Hazel is light demanding and cannot tolerate waterlogged or acidic conditions (*ibid*) and is compatible with marginal woodland situations, close to a reliable water source. This habitat type is consistent with that commonly associated with burnt mound activity. Hazel produces good fire wood.

The identification of hazel from the radiocarbon sub-sample would, however, suggest that as it was a component of the fuel utilised and that it may have been growing locally.

Conclusions

Samples taken from alluvial deposits associated with a stream channel were found to contain some anthropogenic material in all but one case, including bone and charcoal.

The samples from the burnt mound spread had no archaeobotanical material other than charcoal and animal bone. The animal bone samples from burnt mound sites are usually relatively small. Though some samples contained a fair quantity of charcoal, most samples only contained smaller amounts. It is not believed that further analysis of this material will enhance the understanding of this site.

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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
E2886	SUERC-26269	sample 024, context 056	Hazel charcoal	-24.5	3730 ± 25	2200 - 2160 cal BC	24.0	2210 - 2030 cal BC	1
						2150 - 2120 cal BC	14.1		
						2090 - 2040 cal BC	30.2		

Table 1 - Results of radiocarbon dating

Context Number	Sample Number	Total flot vol. (ml)	Charcoal			Comments
			Quantity	Max size (cm)	AMS	
006	001	30				Archaeologically sterile
008	002	10				Archaeologically sterile
009	003	20				Archaeologically sterile
010	004	10				Archaeologically sterile
011	005	20				Archaeologically sterile
018	006	15				Archaeologically sterile
019	007	10				Archaeologically sterile
016	008	25	++	0.4		
026	010	150	+	0.1		
051	012	10				Archaeologically sterile
052	013	25				Archaeologically sterile
054	014	020				Archaeologically sterile
030	015	5				Archaeologically sterile
031	016	30				Archaeologically sterile
032	017	5				Archaeologically sterile
033	018	20	+	0.2		
063	019	20	+	0.1		
060	020	25	+	0.1		
059	021	20	+	0.1		
058	022	40	+++	0.4		
057	023	20	+	0.1		
061	025	60	+	0.5		
072	028	20	+	0.2		

Table 2 – Composition of flots
Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant
* = sufficient sized charcoal for identification and AMS dating

Context Number	Sample Number	Retent vol. (L)	Context/ Sample description	Wood charcoal		Mammal bone		Un/ Worked Stone	Comments
				Qty	AMS	Burnt	Unburnt		
006	001	0.5	Fill of pit (005)				++		
008	002	0.1	Fill of pit (007)	++				+ flint	
009	003	0.5	Fill of pit (007)	+		+			
010	004	0.45	Fill of pit (007)						
011	005	0.8	Fill of pit (007)	++					
018	006	1	Fill of pit (017)						Archaeologically sterile
019	007	0.2	Fill of pit (017)	+					
016	008	1.5	Burnt spread	++	*		+		
026	010	2	Burnt mound deposit	++++	*				
051	012	0.8	Fill of pit (049)	+			+		
052	013	1.8	Fill of pit (049)	++					
054	014	1.6	Fill of pit (034)	+					
030	015	0.2	Flood deposit						Archaeologically sterile
031	016	0.3	Flood deposit	+					
032	017	2.5	Flood deposit	+					

Context	Sample	Retent	Context/ Sample	Wood charcoal		Mammal bone		Un/ Worked Stone	Comments
033	018	2	Flood deposit	++		+		+ flint	
063	019	0.1	Flood deposit	+					
060	020	3	Fill of trough (053)	+++		+			
059	021	0.6	Fill of trough (053)	++					
058	022	0.3	Fill of trough (053)	+++					
057	023	0.8	Fill of trough (053)	++++	*				
056	024	0.75	Fill of trough (053)	++	*				
061	025	0.2	Fill of trough (053)	+++		+			
072	028	4	Fill of ditch (028)	++		+			

Table 3 – Composition of retents
Key: + = rare, ++ = occasional, +++ = common and ++++ = abundant
* = sufficient sized charcoal for identification and AMS dating

Appendix 8 - Waterlogged and Charred Wood from Site E2886 Kilgowan, Co. Kildare
By: Simon Gannon

Introduction

The wood comprised ten pieces excavated from a *fulacht fiadh* site. Analysis took place after removal from the site and a period in storage. All samples were examined for identification of species and eight were assessed for woodworking. Study of taxa may assist in the reconstruction of the local, contemporary environment, use of woodland resources and aspects of ancient woodworking and construction.

Identification of species
The results are summarized in Table 1.

Methodology

Slices or fragments were removed from individual wood pieces to reveal the transverse and, where required, also across radial longitudinal and/or tangential longitudinal plains. Identifications were made by microscopic examination of between x10 and x400. The maturity of the sample fragments was assessed and probable branchwood was recorded in the case of observed tension growth and/or the presence of microscopic anatomical characteristics indicative of branchwood. Reference material comprised samples of wood taxa from the National Botanic Gardens, Glasnevin and reference publications (Schweingruber 1990, Hather 2000).

Identifications

The results are summarized in Table 1. Classification of the taxa follows that of *Flora Europaea* (Tutin *et al* 1964-80). Anatomical characteristics do not allow for identification of individual species cases where several species share anatomical characteristics. The identifications were consistent with the following taxa.

Broadleaf taxa
Betulaceae. *Alnus* spp., alders.
The inferred native species is common alder, *Alnus glutinosa*, fearnóg.

Taxa in site context
Samples (035) and (036) were both alder (*Alnus*) brushwood and derived from context (062), the wood lining of the trough (053).

Samples (045) to (052) represented eight stakes (073) to (081), driven into the base of the trough cut (053). These were all short and small diameter, i.e. brushwood, portions probably derived from branchwood. Most of these stakes were identifiable as alder (*Alnus*) although not clearly in all cases due to their poor state of preservation. Distinct tool marks were absent, with only (048) showing remnants of possible cut marks from point production, presumably by axe, as well as compression at its point and butt end. However, all showed distinct narrowing at one end and were also probably hewn. Stake (051) was a whole roundwood portion but all others were roughly half-split roundwood.

Discussion and conclusions

Alder is often used in the structures of *fulachta fiadh,* as a species that grows along water courses it would often have been found in locations suitable for these. Also, since alder retains a degree of integrity in prolonged contact with water it is one of a small number of native species of use in watery constructions. At Johnstown, E2586, Co. Carlow and Johnstown, E2575, Co. Carlow, on the N9-N10 road scheme, alder was used alongside oak in trough structures. The wood stakes are brushwood, in many cases clearly derived from young branchwood. Stake (048) appeared to have compression at its butt end indicating that the stakes, as found, may have been close to their original intended lengths. Their measurements, at under 240mm in length together with small diameters may help to suggest a particular structural use. Their placement is notably similar to that found at Mullamast, E2858, Co. Kildare, also on the N9-N10 scheme, where three small stakes were found driven into the base of a trough, two of the stakes were alder. It is possible that an overlying structure, the main trough lining, was kept elevated from contact with the ground underneath by use of this arrangement of short stakes.

Sample number	Context number	Item size mm	Conversion/portion	Woodworking: site function	Taxa
035	062	n/a	roundwood	n/a	*Alnus*
036	063	n/a	roundwood	n/a	*Alnus*
045	073	180x20x20	branchwood halved	?splitting: stake	*Alnus*
046	074	240x30x20	branchwood halved	?splitting: stake	*Alnus*
047	075	100x20x15	branchwood halved	?splitting: stake	*Alnus*
048	076	180x28x20	branchwood halved	axe/adze shaping, splitting: stake	*Alnus*
049	078	170x20x20	branchwood halved	?splitting: stake	*?Alnus*
050	079	125x16x14	roundwood portion	none: stake	*?Alnus*
051	080	100x30x20	branchwood halved	?splitting: stake	*?Alnus*
052	081	120x25x17	roundwood portion	none: stake	*Alnus*

Table 1 – E2886. Waterlogged Wood: Identification of Species

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Appendix 9 – Final report on the faunal remains from Kilgowan (E2886), Co. Kildare
By: Albina Hulda Palsdottir MA

Introduction

This report discusses the results of the animal bone analysis from Kilgowan, Co. Kildare (E2886). The resolution of the site revealed a burnt mound and burnt spreads, a trough and associated pits, curvilinear drainage gullies and ditches (Hackett 2008, 2). The animal bone specimens were recovered by hand-picking and from soil samples by sieving. The animal bones analysed for this report derive from fill (006) of pit (005), fill (009) of pit (007), burnt spread deposit (016), flood deposit (033), fill (051) of pit (049), fill (060) of trough (053), fill (061) of trough (053) and fill (072) of ditch (028).

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 category "large mammal" (l m) was used for specimens which could not be assigned to a species. The specimens categorised as large mammal are likely to belong cattle since horse and red deer was absent in the assemblage. For ages of tooth eruption and epiphyseal fusion, Silver's (1969) figures were followed. 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.

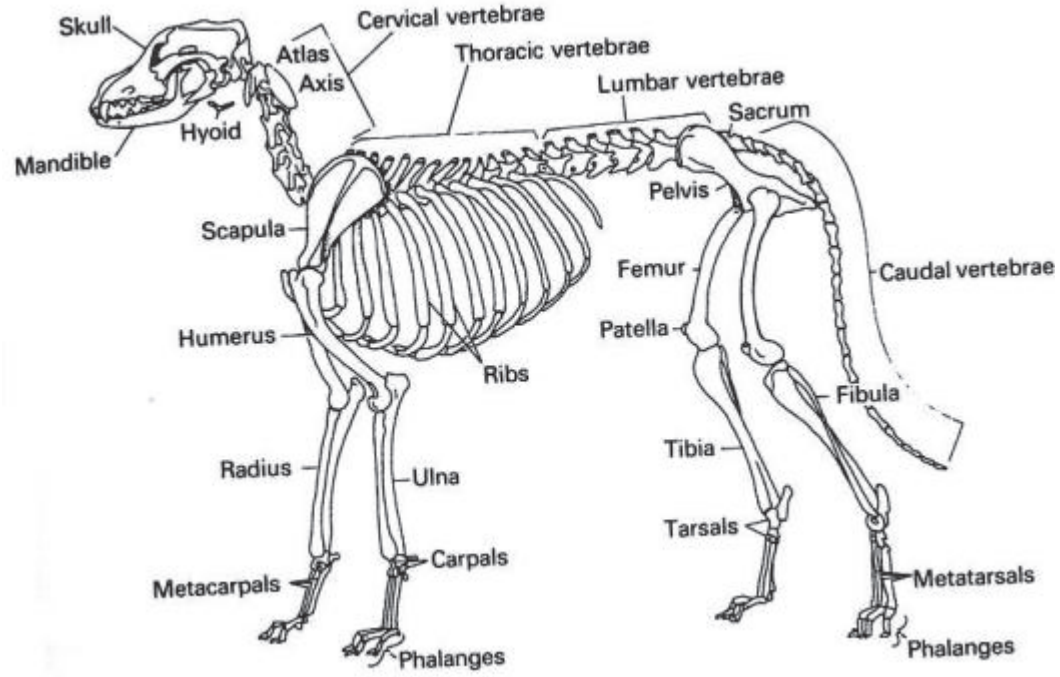

Figure 1 – Location on animal skeleton of terms referred to in text (Davis 1987, 54, in Reitz & Wing 1999)

Results

A total of 411 bone specimens were analysed from the site (Table 1). None of the bones from Kilgowan showed signs of pathology, butchery or gnawing.

Context	*Cattle*	*Large mammal*	*Unidentified*	**Total**
006	1		42	43
009			10	10
016		2	9	11
033			1	1
051			6	6
060			1	1
061			54	54
072	7	6	272	285
Total	8	8	395	**411**

Table 1 – Species representation of sample (NISP)

Flood deposit A single unidentified unburnt shaft fragment was recovered from flood deposit (033). The flood deposit (033) is part of old stream course, predating the burnt mound activity. The presence of bone in the deposit could reflect re-disposition and the bone could be either human or animal.

Burnt mound activity A total of 125 bone fragments were recovered from the Early Bronze Age contexts relating to burnt mound activity (Table 2). From fill (006) of pit (005) one broken cattle metatarsal bone with unburnt bone fragments, which probably derive from the metatarsal, were recovered. In fill (009) of pit (007), ten burnt unidentifiable bone fragments were found. Burnt spread deposit (016) contained two unburnt large mammal bones and nine unburnt unidentifiable fragments. Contexts (033 and 051) contained only unburnt unidentifiable bone fragments. Fill (060) of trough (053) contained one burnt unidentifiable bone, fill (061) of trough (053) contained one burnt unidentifiable bone and 53 unburnt unidentifiable fragments.

Context	*Element*	*Cattle*	*Large mammal*	*Unidentified*	***NISP***
006	Metatarsal	1			1
006	Unidentified			42	42
	006 Total	*1*		*42*	*43*
009	Unidentified			10	10
	009 Total			*10*	*10*
016	Skull			1	1
016	Humerus		1		1
016	Shaft		1		1
016	Unidentified			8	8
	016 Total		*2*	*9*	*11*
051	Unidentified			6	6
	051 Total			*6*	*6*
060	Unidentified			1	1
	060 Total			*1*	*1*
061	Unidentified			54	54
	061 Total			*54*	*54*
Total		1	2	122	**125**

Table 2 – Species representation of the burnt mound material (NISP)

Only twelve burnt bone fragments were recovered from contexts relating to the burnt mound (Table 3).

Context	*Calcined*	*Unburnt*	***NISP***
006		43	43
009	10		10
016		11	11
051		6	6
060	1		1
061	1	53	54
Total	12	113	**125**

Table 3 – Burning in the burnt mound assemblage

Modern ditch In fill (072) of ditch (028) a metatarsal, tibia, femur and small leg bones, all from the right hind leg of a cattle between 16 months and 2 ½ years old were found (Table 4). The morphology of the bone suggested that the bones came from a modern breed. This deposition could reflect the discarding of a complete carcass which was subsequently disturbed or discard of butchered animal parts.

Species	*Element*	*NISP*	*Side*	*Zone*	*Proxfus*	*Distfus*	*Fusion age*
Cattle	Femur	1	r	2345678	u		Younger than 3 1/2-4 years
Cattle	Femur	1	r	9		u	Younger than 3 1/2-4 years
Cattle	Femur	1	r	A		u	Younger than 3 1/2-4 years
Cattle	Metatarsal	1	r	12345678	f	f	After 16-20 months
Cattle	Malleolus	1	r				

Species	*Element*	*NISP*	*Side*	*Zone*	*Proxfus*	*Distfus*	*Fusion age*
Cattle	T2+3	1					
Cattle	Tibia	1	r	56789A	u	f	Younger than 2-2 1/2 years
Unidentified	Unidentified	272					
Large mammal	Unidentified	6					

Table 4 – The right hind leg of a cattle between 16 months and 2 ½ years of age found in fill (072) of ditch (028). Fusion age after Silver (1969, 285-286)

Discussion

From the flood plain deposit (033) at Kilgowan only unburnt unidentified bone fragments which could be either human or animal were recovered. The bone has possibly been re-deposited and no conclusions can be drawn recarding site function for this phase based on the bone material recovered. A single cattle metatarsal was the only identified bone from the Early Bronze Age burnt mound activity at Kilgowan but a number of mostly unburnt unidentifiable bone fragments were also recovered. Most of those unidentified fragments are not identifiable as either human or animal but given the burnt mound context it is most likely that they are all animal. The cattle right hind leg from an immature individual found in the modern ditch most likely reflects discarding of a complete carcass or butchered animal.

The bone material from Kilgowan, Co Kildare is too small for conclusive comparison against other assemblages. However, some general observations can be made.

The animal bone samples from burnt mound sites are usually relatively small. In a previous study it was found that the animal bones recovered from burnt mound sites have been connected especially with slaughter, primary butchery and meat preparation (Tourunen 2008, 40). In burnt mounds excavated in the Carlow/Kildare area such as Ballybar Lower (E 2618) Co. Carlow, Busherstown (E 2584) Co. Carlow and Johnstown (E 2586) Co. Carlow, cattle dominate the samples followed by horse, deer, pig and sheep or goat (Tourunen 2008). The cattle tooth recovered from a burnt mound-related pit is therefore not unusual. The material from Ballygawley (Site 1), Co. Tyrone is also dominated by cattle bones, however no horse bones were found in the identifiable portion of the assemblage and the proportion of pig and sheep or goat bones is higher than in the samples from Carlow and Kildare (Tourunen 2009). Possible local variation across Ireland has not been fully investigated. For example, in five burnt mound sites excavated in Co. Tipperary the only identified animal was sheep or goat (Stevens 2005, 326).

Context	Sample	*Species*	*Element*	*NISP*	*Side*	*Gt50*	*Proxfus*	*Distfus*	*Notes*	*Percent*	*Texture*	*Burning*	*Recovery*
006	001	cow	m/t	1	r	5678			Broken in 4 pieces		3		1
006	001	unid	ui	42					Probably fragments from cow m/t from same sample		3		1
009	003	unid	ui	10								cal	1
016	008	lm	sha	1							3		1
016	008	unid	skull	1					Pars petrosa				1
016	008	lm	hum	1							3		1
016	008	unid	ui	8							3		1
033	018	unid	sha	1							3		1
051	012	unid	ui	6							3		1
060	020	unid	ui	1								cal	1
061	025	unid	ui	1								cal	1
061	025	unid	ui	53							4		1
072	27	cow	m/t	1	r	12345678	f	f	Part of an articulated cow hind leg?		3		hc
072	027	cow	fem	1	r	2345678	u		Broken in 4 Part of an articulated cow hind leg?		3		hc
072	027	cow	tib	1	r	56789A	u	f	Part of an articulated cow hind leg?		3		hc
072	027	unid	ui	213					Probably fragments and splinters of cow bones in context Part of an articulated cow hind leg?		3		hc
072	027	unid	ui	2								char	hc

Context	Sample	*Species*	*Element*	*NISP*	*Side*	*Gt50*	*Proxfus*	*Distfus*	*Notes*	*Percent*	*Texture*	*Burning*	*Recovery*
072	027	cow	fem	1	r	9		u	Likely to belong to unfused broken cow femur Part of an articulated cow hind leg?		3		hc
072	027	cow	mal	1	r				Part of an articulated cow hind leg?	90	3		hc
072	027	cow	tar	1					T2+3 Part of an articulated cow hind leg?	90	3		hc
072	027	cow	fem	1	r	A		u	Probably part of broken unfused cow femur Part of an articulated cow hind leg?		3		hc
072	027	lm	ui	6					Probably fragments from unfused broken cow femur and tibia Part of an articulated cow hind leg?		3		hc
072	28	unid	ui	57								cal	1

Table 5 – Complete list of animal bones

Key to complete list of animal bones:

Species
cow = cattle
lm = large mammal
unid = unidentified

Elements
Mammals:
fem = femur
hum = humerus
mal = malleolus
m/t = metatarsal
sha = shaft
tar = tarsal
ui = unidentified mammal

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. All fish diagnostic zones are taken from Barrett's fish recording system (2001).

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

Texture
1 = excellent
2 = good
3 = fair
4 = poor

Burning
cal = calcified
char = charred

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

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Appendix 10 – Radiocarbon dates and certificates

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
E2886	SUERC - 26269	context 056 , sample 024	Hazel charcoal	-24.5	3730 +/- 25	2200 – 2160 cal BC	24.0	2210 – 2030 cal BC	95.4
						2150 – 2120 cal BC	14.1		
						2210 – 2030 cal BC	30.2		

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RADIOCARBON DATING CERTIFICATE

11 November 2009

Laboratory Code	SUERC-26269 (GU-19848)
Submitter	Karen Stewart Headland Archaeology (Ireland) Ltd. Unit 1 Wallingstown Business Park Little Island Co. Cork, Ireland.
Site Reference	KCK06 E2886
Context Reference	56
Sample Reference	24
Material	charcoal : hazel
$\delta^{13}C$ relative to VPDB	-24.5 ‰
Radiocarbon Age BP	3730 ± 25

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.

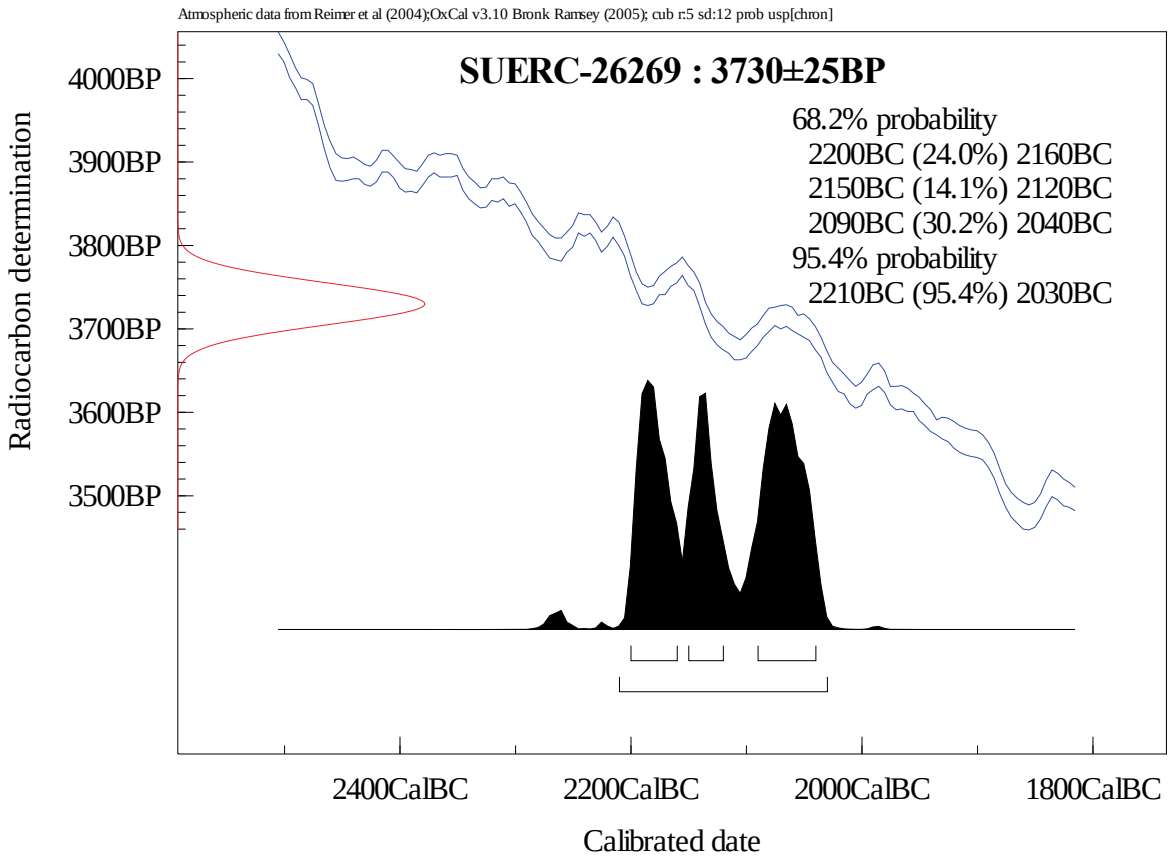
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).

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 11 - Analysis of the lithic assemblage from Kilgowan, Co. Kildare (E2886)
By: Maria Soledad Mallia-Guest

Introduction

A total of two lithic finds (E2886:008:001 and E2886:033:001) were retrieved from the retent of environmentally processed samples during post-excavation analysis following the N9/N10 Phase 3, Kilcullen to Carlow archaeological resolution work. The site consisted of a burnt mound and spreads with associated pits and a trough as well as gullies and ditches (Hackett 2009).

Methodology

A macroscopic analysis of the components was carried out based upon a techno-typological approach following categories developed by Inizan *et al.* (1999). Further contextual background is provided by Woodman *et al*. (2006).

The artefacts were visually examined with the aid of an 8x hand lens, recorded and catalogued using Microsoft Excel 2003. No minimum size criterion was applied for artefact discard; therefore, any other lithic material that may have been retrieved during sample processing was incorporated to contribute to the assemblage integrity. The variables recorded include: overall metric attributes (length, width and thickness); type of raw material; fragmentation; and artefact condition to determine if post-depositional, manufacture or use-damage was present.

In addition, when macroscopic evidence of use-wear was present, subsequent basic high-power micro-wear analysis was carried out using a reflective microscope at 200x magnification. The presence/absence of use traces such as micro-polish, motion striation and edge-scarring/rounding were recorded and discussed following Keeley (1980).

The Assemblage

The assemblage consists of two unworked flint flakes E2886:008:001 and E2886:033:001 (Table 1) recovered following the environmental processing of the samples retrieved taken from a single mottled yellowish black sandy clay deposit (008) of a circular pit (007) and from a dark black silty sand flood deposit (033) . The pit from which the lithic find was recovered, lay approximately 2.5 m northwest of the main burnt mound deposit (026), while the flood deposit (033) extended east of the mound (Hackett 2009).

Both artefacts are flint inner flakes measuring less than 20 mm in length and presenting no cortex remnant. Find E2886:008:001 presents a plain unprepared but lipped platform and scattered edge with damage (microfractures and pseudo-retouching) at the distal end. The dorsal scar pattern seems to suggest that it could have resulted from further modification of a large blank, during thinning and artefact shaping which renders this flake as secondary technology by-product detached by direct percussion.

The additional inner flint flake E2886:033:001 is also small in size (12.5 mm by 3.6 mm by 0.9 mm) but heavily fractured, also presenting a weathered surface. Due to its condition, flake sub-type and platform are indetermined and no other technological diagnostic attribute has been identified.

Discussion

Both lithic finds recovered from site E2886 can fall within the debitage category as such they are classified as knapping by-products. However given their size, they do not represent blanks for further modification and cannot be confidently attributed to either primary or secondary technology. Nevertheless, it is likely that flake E2886:008:001 could have been the result of the application of soft-hammer percussion judging by its lipped platform, an attribute which in conjunction with the presence of a diffuse bulb, tends to be a recurrent association indicating the use of bone, antler, hard wood or soft stones for their detachment (Collins 1975, Shott 1994). Furthermore, this flake would appear to be the product resulting from the shaping of a large core artefact such as an axe.

Regarding raw materials availability, the distribution of flint over the landscape is quite restricted, with a primary source in the Irish northeast and rolled beach pebbles/cobbles accounting for a secondary raw material source on coastal localities. Alternatively it is present as scattered residual nodules within glacial till (Woodman *et al*. 2006). In this particular case, the provenance of the raw material cannot be confidently concluded, if as suggested, the largest flake is the result of large artefacts shaping, rather large flint blanks would have been required due to the reductive nature of the knapping process.

Unfortunately, given the nature of the finds and the absence of any other artefactual association no refined prehistoric chronological timeframe can be provided and therefore no further recommendations are proposed.

References

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NMI Number	Raw Material	Type	Category	Length (mm)	Width (mm)	Thickness (mm)	Size	Length/Width Module	State	Condition	others	Cortex	Retouch	Blank	Type of use damage	Type of flake	Type of Platform	Preparation	Bulb	Ripples	Erailleur scar	Lip	Comments	Colour
E2886: 008:001	Flint	Inner (angular) flake	Debitage	18.3	24.6	10.2	3	G	Complete	Good	Pseudo retouch, post-depositional	No	No	No	Discontinuous pseudo-retouch, serration and half-moon fractures on distal and lateral edge	Inner angular	Plain	No	Pronounced	Diffuse	No	Yes	Inner (angular) flake with plain unprepared but lipped platform. Dorsal pattern suggests a possible secondary technology by-product derived from blank thinning and likely soft-hammer percussion by-product. Discontinuous edge damage, as pseudo-retouch and microfractures likely to be post-depositional in origin.	Mid-orangish buff opaque
E2886: 033:001	Flint	Inner (indeterminate) flake	Debitage	12.5	3.6	0.9	2	C	Fractured	Fair	Longitudinally and distally fractured, and weathered	No	No	No		Inner indeterminate	No diff.	No	No differ.	Pronounced	No	No	Inner (indeterminate) flake with no differentiated platform. It exhibits heavy longitudinal and distal fractures as well as surface weathering. No other diagnostic attribute recorded	Mid-orangish buff translucent

Table 1 Lithic assemblage from site E2886, Kilgowan Co. Kildare