

Bronze Age Burnt Mounds and Charcoal-Production Kilns at Kildimo, Co. Limerick

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An excavation near Kildimo revealed evidence of Early to Late Bronze Age activity indicating a nearby, but yet undiscovered, permanent settlement and Early Medieval industrial activity possibly related to a nearby church site.

Introduction

Burnt mounds (also referred to as *fulachtaí fia*), are one of the most common archaeological monuments in the Irish landscape, their identification is an important marker of Bronze Age settlement. Similarly common are charcoal-production kilns, however they are indicators of medieval industrial activity at a local level especially in the context of the numerous – but not archaeologically investigated – monuments such as ringforts which are known in this area. The three archaeological sites in question (Bolane 1, Bolane 2 and Glenameade 1)¹ were identified and excavated in advance of the N69 Bolane Bends Realignment Scheme, in the townlands of Bolane and Glenameade just west of Kildimo, Co. Limerick in the summer of 2012 (Fig. 1).

The Archaeological Landscape

Apart from these newly discovered burnt mounds, the only other evidence we have of prehistoric settlement in the immediate area are a cist grave (RMP LI011-027), a standing stone (RMP LI011-141) and another burnt mound (RMP LI011-145) in the townland of Tobermurry c.1.5km to the north-west. In contrast, there is significant early-historic settlement in the immediate landscape characterised by numerous (at least 13) ringforts within 1km of the Bolane and Glenameade sites (Fig. 1). Of particular note is the presence of a ruined church, depicted on early mapping as Killulta (*Cill Ollta*) and known locally as *Teampaillin* (RMP LI012-025001), which is located only 200m north-west of Glenameade 1. The church – which is a national monument – is situated in rough pasture on a limestone outcrop overlooking Dromore Lough to the north.² The date of this church is uncertain: Leask³ considered it to be the oldest church in the county, though he did not indicate a precise date, while others have suggested it belongs to the period between the 8th and 10th centuries.⁴ The site was also reputedly used as a children's burial ground until 1910. Close-by, the partial remains of an ecclesiastical enclosure (RMP LI012-025002) is illustrated on the first edition OS map curving around the western side of the church. Further afield a small early-medieval burial ground was identified

¹ The excavations were carried out, on behalf of the National Roads Authority and Limerick County Council, under Licence Nos. 12E228, 12E229 and 12E230 issued by the National Monuments Service, Department of Arts, Heritage and the Gaeltacht, Dublin and the National Museum of Ireland.

² Source www.archaeology.ie

³ H. G. Leask, *Irish Churches and Monastic Buildings. I. The first phases and the Romanesque* (Dundalk, 1955) p. 73.

⁴ www.archaeology.ie

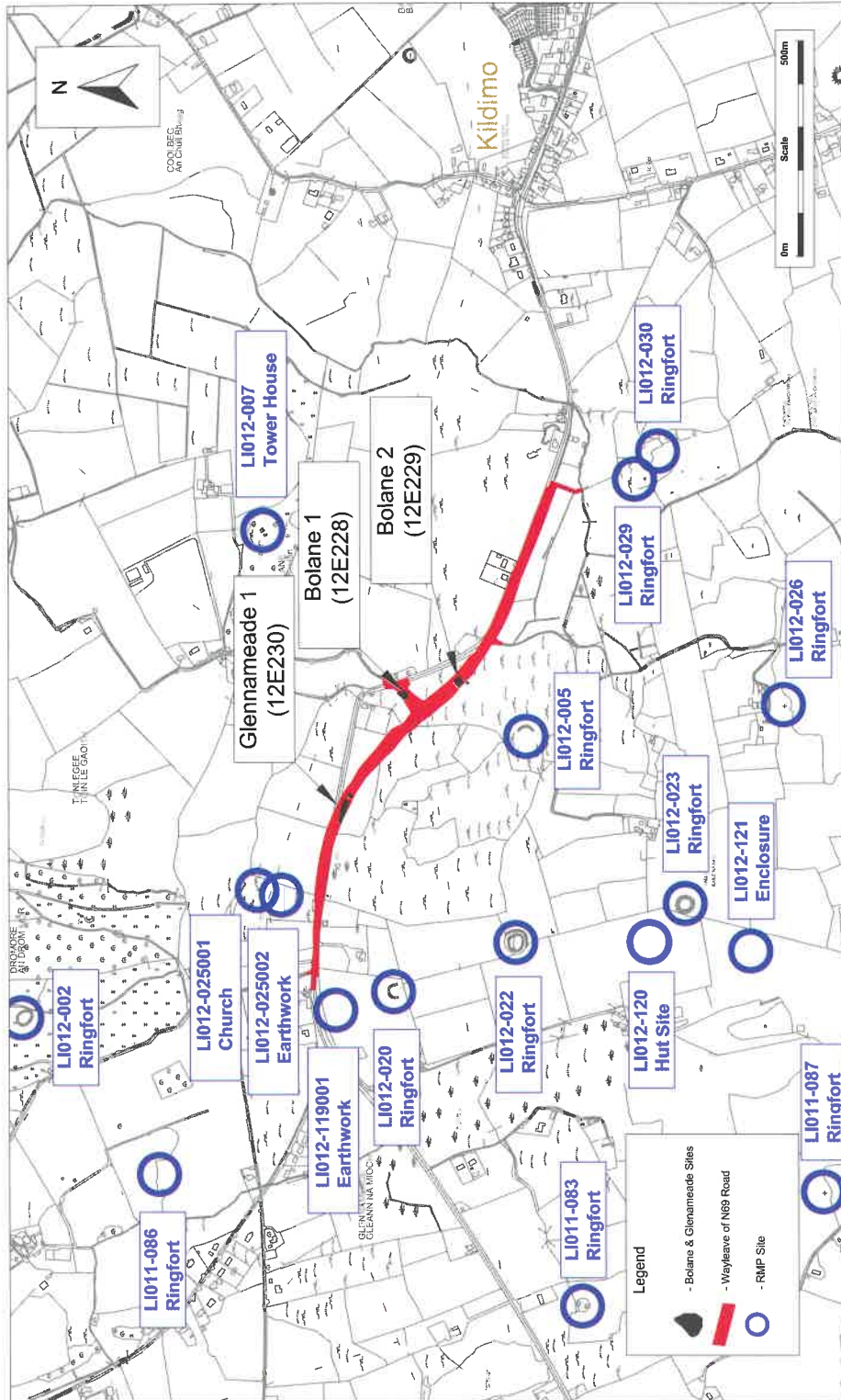


Fig. 1 Location of sites and recorded monuments in area (Irish Archaeological Consultancy - IAC).

in Kildimo during recent quarrying works c.1.8 km SSE of Bolane.⁵ This site had not previously been recorded as a burial ground, although human remains had been uncovered here in the mid-later 20th century.

The Physical Landscape

The newly discovered sites at Bolane and Glenameade were located in fields of rough pasture, woodland, scrub and rock out-crops between 10m OD and 16m OD. The area around Bolane 1 and 2 – which are in close proximity – is depicted as marshy ground on the first edition OS six-inch map (1844) while there are also numerous wetland areas within the Kildimo, Bolane and Glenameade townlands as well as an area indicated on the OS mapping as being liable to flooding.

The Burnt Mounds

Burnt mounds are often identified by mounds or flattened deposits of heat-fractured stone and charcoal-rich soils which seal, or are associated with, troughs, pits, hearths and wells and occasionally with structures, huts etc. Sometimes the troughs were lined with wood, clay or stone and it is into these troughs, whilst filled with water, that heated stones from a hearth were placed. Traditionally interpreted as the remnants of cooking sites⁶ whereby joints of meat could be cooked in the troughs, these sites may have had a variety of functions by which the use of hot water and/or steam would be necessary (Fig. 2).

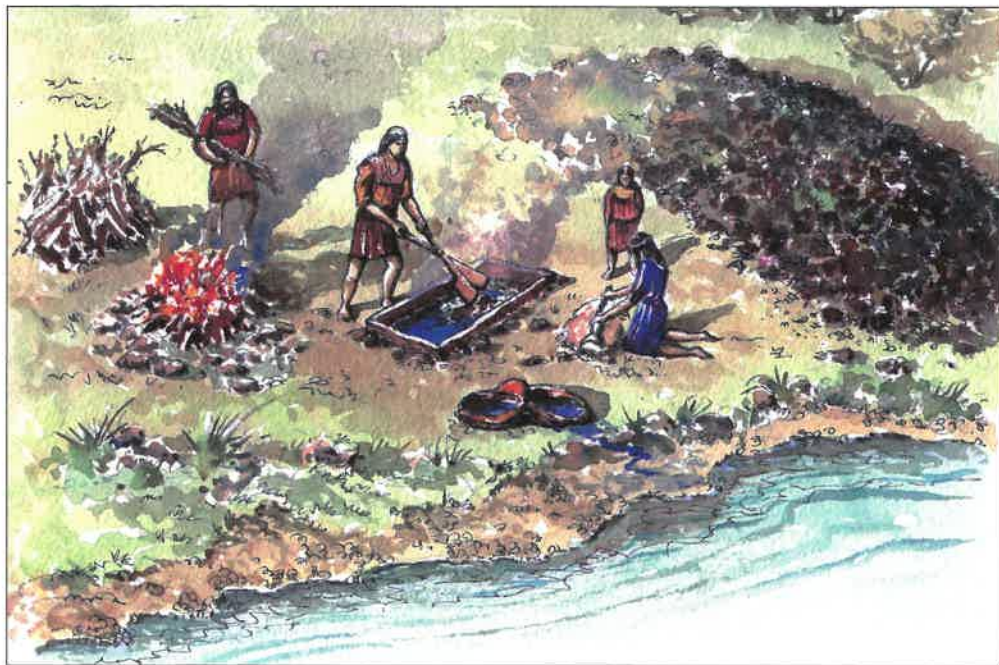


Fig. 2 Reconstruction illustration of a typical burnt mound

(Image ©NIEA): Taken from <http://www.philarm.com/prehistoric.aspx?pageSelect=prehistoric>
– accessed March 2013; Copyright Northern Ireland Environment Agency.

⁵ L. Lynch, and E. Reilly, 'Early medieval human burials and insect remains from Kildimo, Co. Limerick', *The Journal of Irish Archaeology*, xx (2011) pp 65-76.

⁶ C. Lawless, 'A *Fulacht Fiadh* Bronze Age cooking experiment at Turlough, Castlebar', *Cathair na Mart*, 10 (1990) pp 1-10.



Fig. 3 Plan of Bolane I (IAC).

A range of other functions have been suggested for these sites which include bathing – some have been interpreted as saunas⁷ – cloth fulling⁸ and even for the brewing of beer.⁹

Access to water for these sites is preferable so many are found close to wetlands/bogs, rivers, or beside seasonal pools. The continued use of these troughs would result in a mound of fire-cracked stones and charcoal-rich soils – dumped after being removed from the trough after use – which would commonly be deposited around the trough forming a horseshoe-shaped deposit. Over time these deposits may have become flattened and spread-out producing the burnt mound spreads which survive in the archaeological record, as was the case at Bolane and Glenameade.

The Bolane 1 Burnt Mound

The archaeological remains at Bolane 1 comprised a truncated burnt mound positioned on undulating marginal ground at c.12.6m OD (Fig. 3). The site comprised two large troughs; three pits; a linear gully and two pits/depressions which were sealed by a levelled burnt mound deposit which measured 15.2m x 11.3m x 0.44m deep. This is a classic (although flattened) horseshoe-shaped burnt mound with the mound material (discarded heated stones (mostly limestone) and soils from the troughs) distributed around the south, east and northern edges of the troughs (Fig. 4). The two troughs (C16¹⁰ and C23¹¹) were



Fig. 4 Excavation of the troughs at Bolane 1: C16 in foreground and C23 in centre, facing WNW (IAC).

⁷ A.T. Lucas, 'Washing and bathing in ancient Ireland', *JRSAL*, 96 (1965) pp 65-114; L. Barfield and M. Hodder, 'Burnt mounds as saunas, and the prehistory of bathing', *Antiquity*, 61 (1987) pp 370-9; D.A. O'Drisceoil, 'Burnt mounds: cooking or bathing', *Antiquity*, 62 (1988) pp 671-80.

⁸ S. Jeffrey, 'Burnt mounds, fulling and early textiles?' in M. Hodder and L. Barfield (eds), *Burnt mounds and hot stone technology* (Sandwell, 1991) pp 97-102.

⁹ B. Quinn and D. Moore, 'Ale, brewing and *fulachta fiadh*', *Archaeology Ireland*, 21 (3) (2007) pp 8-10.

¹⁰ 1.6m long, 1.5m wide and 0.5m deep.

¹¹ 3.5m long, 2.2m wide and 0.8m deep.



Fig. 5 Bolane 1 during excavation showing burnt mound spreads, facing south-west (IAC).

dated using charcoal (Pomoideae – a fruitwood which includes apple, pear, hawthorn and mountain ash or rowan—and hazel respectively) and found to represent two clear phases of use: one in the Chalcolithic (Copper Age) period (trough C16¹²) and the other in the Early Bronze Age (trough C23¹³). It is clear therefore that this site was re-used, or at least re-visited, over a long period of time. A small pit (C7¹⁴), which although much smaller than the troughs may also have been a cooking pit, was also dated¹⁵ (using hazel charcoal) and found to be contemporary with the use of the later trough C23 (Fig. 3).

Charcoal from burnt mound sites is a very useful tool for radiocarbon dating but it also provides valuable information on the choice of wood species used by, and available to, the Bronze Age population. At this site oak, ash, elm, hazel and Pomoideae woods were all used in the hearths to heat the stones and as these species would have been collected locally we can presume that the woodland surrounding Bolane would have included these trees (see section on environment below).

¹² 3842 ± 57 BP (UBA-22148). The two-sigma calibrated result for this was 2468–2141 BC.

¹³ 3665 ± 31 BP (UBA-22149). The two-sigma calibrated result for this was 2137–1953 BC.

¹⁴ 1.48 m long, 1 m wide and 0.2 m deep.

¹⁵ 3667 ± 32 BP (UBA-22150). The two-sigma calibrated result for this was 2139–1951 BC.



Fig. 6 Bolane 2 during excavation, facing SSE (IAC).

The Bolane 2 Burnt Mound

This burnt mound was in an unusual location – the north-facing slope of a rock outcrop at c. 10.6–14.1m OD – defying the general norm for these sites (low-lying on marginal land) (Fig. 6). The overlying burnt mound deposits were deep and extensive (16m x 11m x 0.8m deep) in relation to the small size of the trough (1.6m x 1.3m x 0.5m deep) which suggests that the trough was extensively used and had many working cycles (Fig. 7). The trough (C8) was dated to the Chalcolithic period using ash charcoal – the only wood species identified at this site.¹⁶

The Glennameade Burnt Mounds

Two periods of archaeological activity were identified at Glennameade 1: a complex of Bronze Age burnt mounds; and much later in the early medieval period the site was chosen for the location of two charcoal-production kilns. The burnt mound complex had three use-phases (Phases I–III) signifying that this particular location was re-visited/re-used intermittently throughout the Bronze Age – a period spanning nearly one and a half millennia. This particular location – marginal land at 16.6m OD – may have been chosen as it is positioned immediately adjacent to a small turlough – the water level of which extended into the site covering part of the levelled burnt mound spreads – which would

¹⁶ 3887 ± 34 BP (UBA-22151). The two-sigma calibrated result for this was 2470–2234 BC.

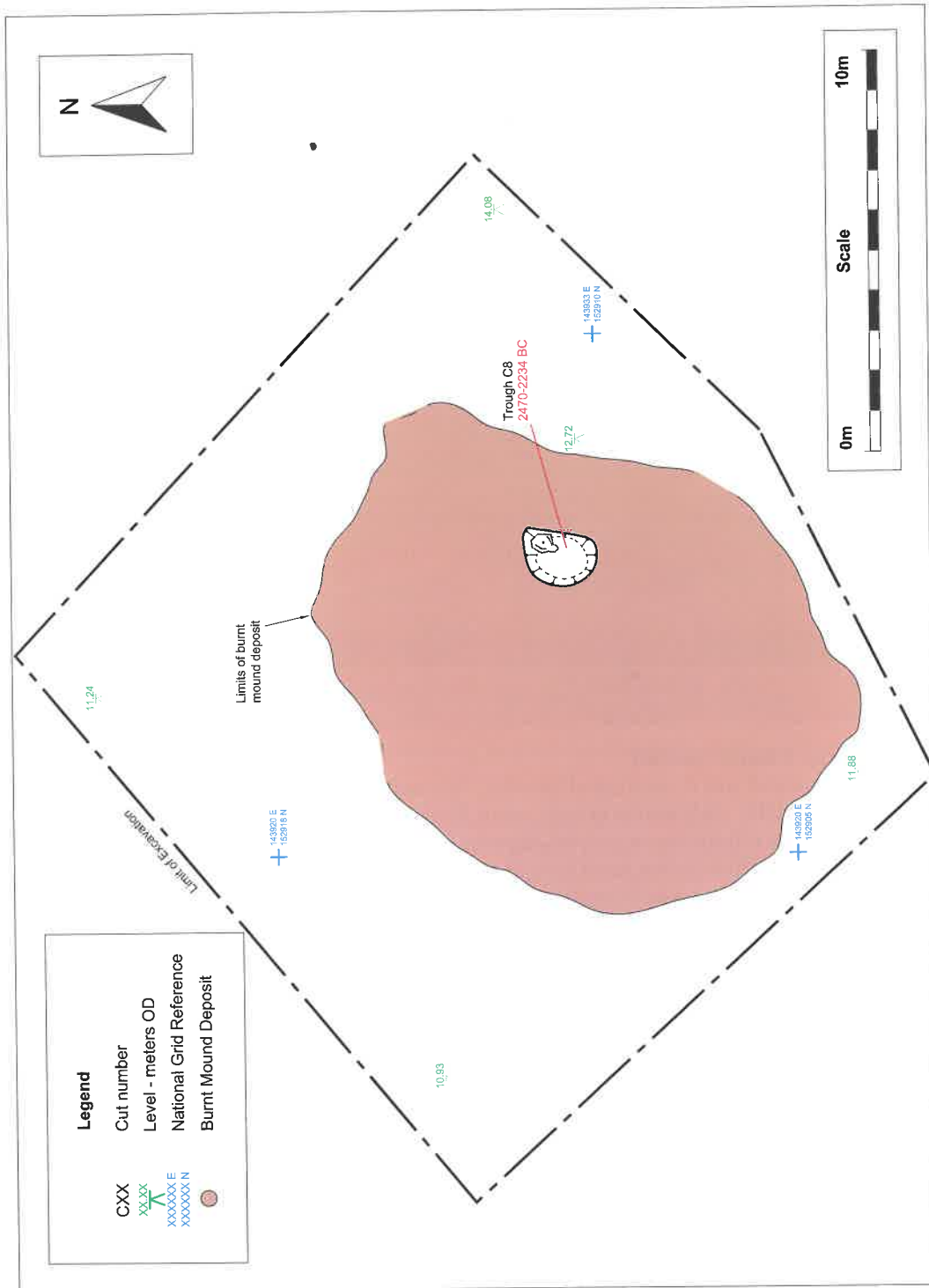


Fig. 7 Plan of Bolane 2 (IAC).



Fig. 8 Excavations at Glenameade 1 in progress showing turlough at the edge of the excavation area, facing north-west (IAC).

have been an excellent water source for the burnt mounds (Figs 8 and 10). Its presence would have been inconsequential to the decision to undertake charcoal production here however.

The earliest use-phase (Phase I) of the burnt mound complex was centred on a circular trough (C28)¹⁷ which was dated to the Chalcolithic period¹⁸ using hazel charcoal (Fig. 9). This was directly associated with a curvilinear gully which extended south-westwards down-slope from the trough and a group of pits. Gullies like this one have frequently been discovered associated with troughs on other burnt mound sites across the country. Some suggest that they may have been used to manipulate timbers or rods through the use of hot water or steam from the trough which could then be used in the construction of houses.¹⁹ This phase was associated with thin spreads of burnt mound material measuring 15m x 11m x 0.25m deep.

¹⁷ 1.75m x 1.3m x 0.5m deep.

¹⁸ 3909 ± 33 BP (UBA-22153). The two-sigma calibrated result for this was 2474–2294 BC.

¹⁹ E. Danaher, *Monumental Beginnings: The Archaeology of the N4 Sligo Inner Relief Road*. NRA Monograph Series (Bray, 2007).

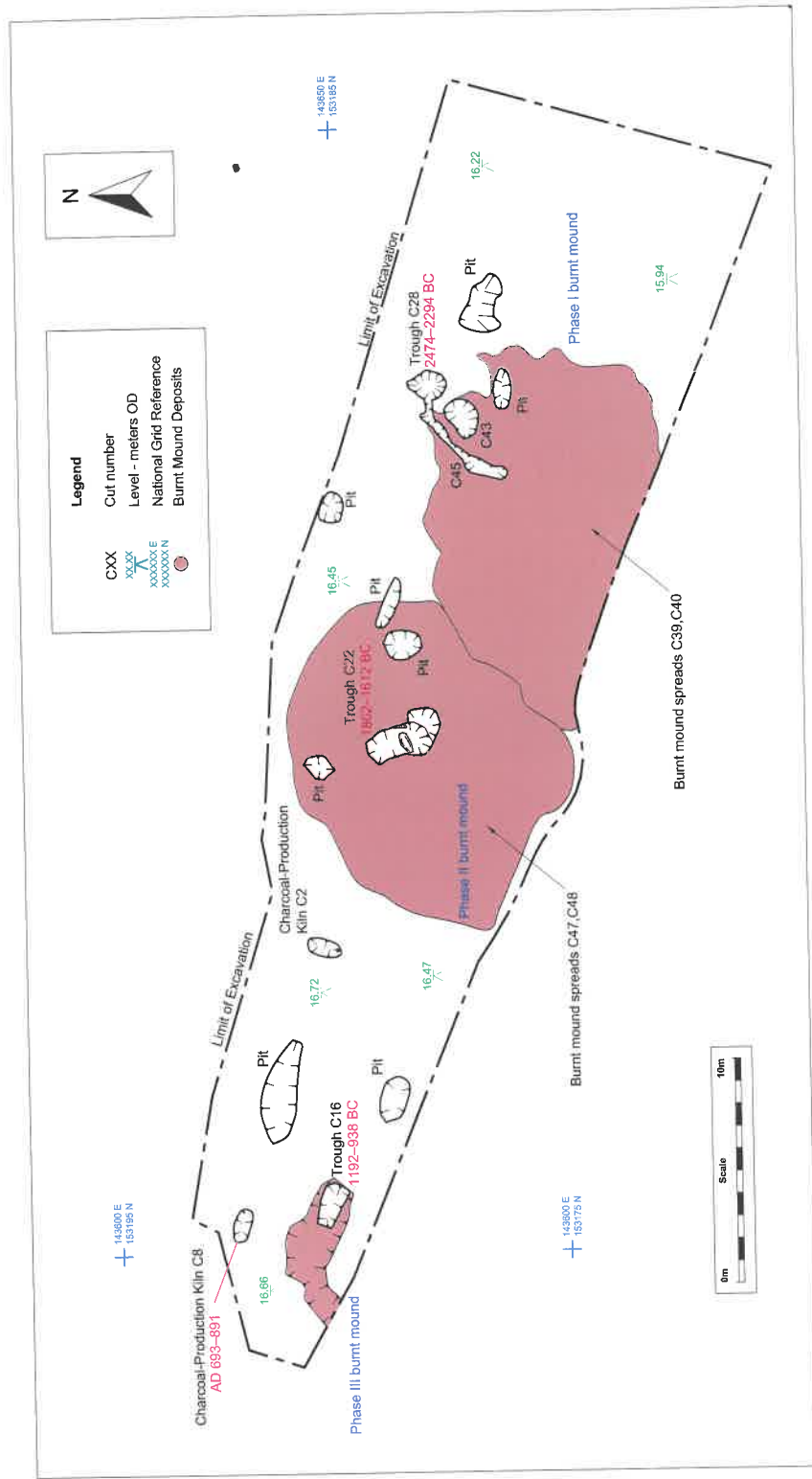


Fig. 9 Plan of Glennameade 1 (IAC).



Fig. 10 Burnt mound deposits at Glengnameade 1 during excavation, facing south-west (IAC).

The second use-phase (Phase II) involved a slight shift in location to the west and was centred on a large trough (C22)²⁰ – with associated pits – which was dated using hazel charcoal to the Early/Middle Bronze Age.²¹ This represented more intensive activity judging by the large size of the trough and much larger, darker and deeper associated burnt mound spreads. Interestingly, a large stone slab divided the trough into two chambers. This may have been used for a variety of reasons: perhaps to keep separate the heated stones from one chamber while still allowing the hot water to fill the other? This would have been particularly useful if the trough was used for bathing (Fig. 11). The pits found in association with the troughs of these two use-phases may have been simple cooking pits whereby a pit filled with heated stones and perhaps covered could be used to cook or bake food.

The Phase II burnt mound spreads – which would have derived from trough C22 and the surrounding pits – were much more substantial than those of Phase I, comprising a deposit measuring 14m x 13m x 0.4m deep. It was deepest at its southern, topographically lower, extent and made up of two spreads, one of which comprised heat-fractured sandstone and the other predominantly burnt limestone.

The final phase of burnt mound activity was centred on a large rectangular trough (C16)²² at the very west of the site. This one did not have an extensive burnt mound spread like those associated with the Phase I and II activity. Only a slight burnt mound spread was encountered which extended westwards in an undulating scoop in the ground.

²⁰ 3.5m x 1.3m x 0.6m deep.

²¹ 3396 ± 33 BP (UBA-22154). The two-sigma calibrated result for this was 1862–1612 BC.

²² 2m x 1m x 0.46m deep.



Fig. 11 Trough C22 at Glengameade 1 showing 'dividing' stone slab, facing north (IAC).

The trough itself – which was dated to the Late Bronze Age²³ using *Pomoideae* charcoal – was filled with burnt mound material so it probably served the same function as the others. Interestingly, this trough was almost the same size as a modern bath (Fig. 12).

The Burnt Mounds through the Bronze Age

The burnt mounds at Bolane and the early phase (I) at Glengameade were all – on the basis of radiocarbon dating determinations – likely to have been in use at the same time during the Chalcolithic period suggesting that there was a contemporary domestic settlement in the area at this time. Bolane 1 was re-used later in the Early Bronze Age and this re-use, coupled with the evidence of re-use at Glengameade 1 in the Early/Middle and later Bronze Age, is suggestive of a permanent and continuous presence in this area throughout the Bronze Age (Fig. 13). The long span of use at Glengameade may be due to a permanent water source (the adjacent turlough) which may have been omnipresent throughout the Bronze Age. The presence of alder in the charcoal assemblage of the Glengameade Phase III Late Bronze Age trough is in line with this theory as alder is a wetland tree species.

²³ 2880 ± 30 BP (UBA-22155). The two-sigma calibrated result for this was 1192–938 BC.

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Fig. 12 Trough C16 at Glenameade 1, facing north-west (IAC).

The Charcoal-Production Kilns

Charcoal-production kilns like those at Glenameade 1 were essential to the ironworking process as charcoal was produced as a fuel for use in the smelting and forging stages. It appears, on current evidence, that the classic type are large and rectangular in plan such as Hardwood 3, Co. Meath, where long carbonised pieces of oak were found placed along the long axis of the kiln making up almost 100% of the deposit.²⁴

Charcoal-production kilns are usually identified as earth-cut pits, containing charcoal-rich fills, often with evidence for extensive *in-situ* burning along the base and sides. It is important to stress that charcoal-production kilns were recognisable because the carbonised wood had survived *in-situ* upon excavation such as was the case at Glenameade (Fig. 14). These kilns were abandoned possibly because the charcoal became wet. Successful kilns would have been stripped of their charcoal and may just be recognisable as heat-scorched pits, probably containing only moderate amounts of charcoal.

The majority of charcoal-production kilns are located away from settlements and close to the raw materials required for primary ironworking such as bog land (to source bog ore) and (oak) woodlands. The charcoal-production process involved the placement of wood (usually oak) against a vertical post in an earth-cut pit which was then covered

²⁴ N. Carlin, L. Clarke, and F. Walsh, *The M4 Kinnegad-Enfield-Kilcock Motorway: The Archaeology of Life and Death on the Boyne Floodplain. NRA Monograph Series No. 2* (Dublin, 2008) p. 102.

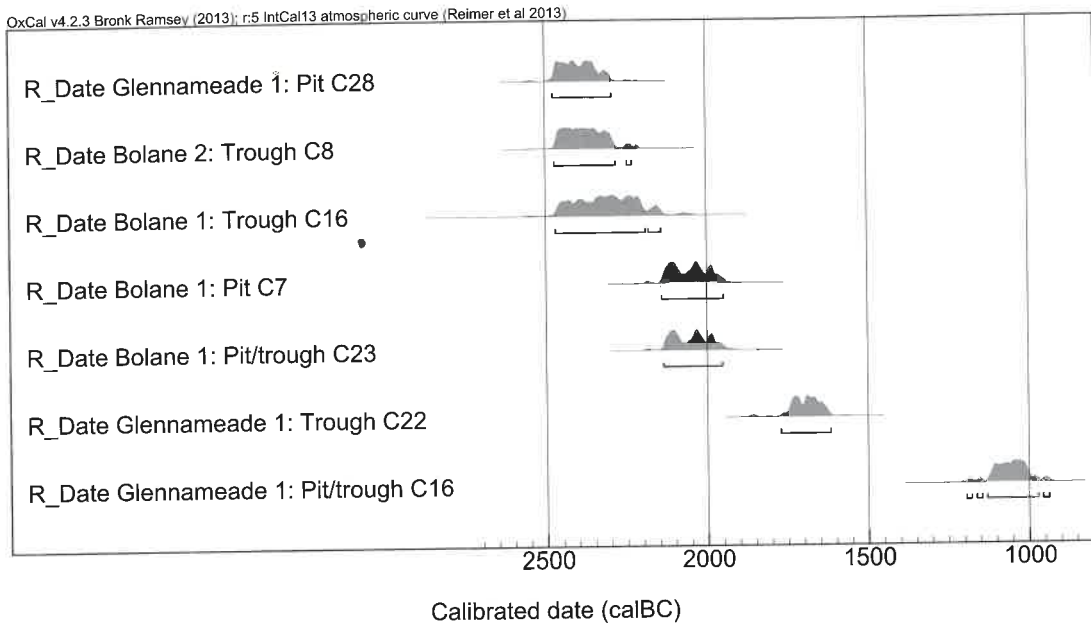


Fig. 13 Calibrated radiocarbon dates for the burnt mounds at Bolane and Glennameade (OxCal v4.2.3).



Fig. 14 Charcoal-production kiln C2 at Glennameade, facing ESE (IAC).

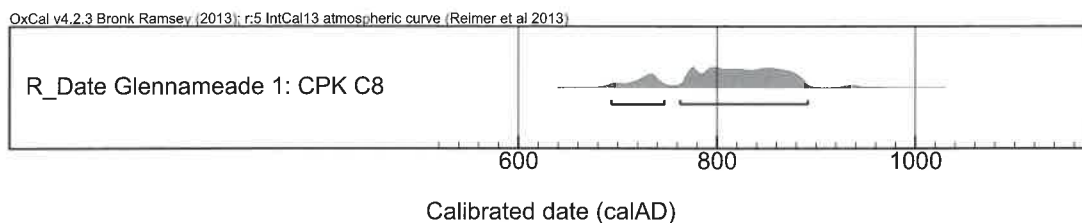


Fig. 15 Calibrated radiocarbon date for the charcoal-production kiln at Glengnameade (OxCal v4.2.3).

by layers of straw or bracken and sealed by a layer of earth or turf. The post was removed and the kiln was subsequently ignited as the wood was roasted to produce the charcoal over a number of days.²⁵

Two charcoal-production kilns were identified at Glengnameade 1 (C8)²⁶ and (C2).²⁷ These kilns were very similar in size and shape to one another and both had a stakehole positioned at one end of the cut – which represents the positioning of the support post mentioned above. It is likely that these two kilns were contemporary. Charcoal analysis showed that both were used to reduce oak wood to charcoal. A sample of oak charcoal from charcoal-production kiln C8 returned an early medieval date²⁸ (Fig. 15).

Environmental Changes through Time

It is reasonable to assume that most fuel (used to heat the stones for the troughs at burnt mounds), for convenience, would be gathered close to where it has to be burnt, presuming there is a sufficient fuel source near the site. At Bolane and Glengnameade hazel and oak, in particular, as well as Pomoideae, ash and elm were available and possibly widespread in the Bronze Age.²⁹ It is clear that tree cover around the sites did not change dramatically from the Early to the Late Bronze Age, however, elm was only identified from the earlier dated features which is consistent with environmental records whereby elm all but disappears from the landscape after the Early Bronze Age period in Ireland.³⁰

The surrounding woodlands would have comprised large trees (oak, elm, ash), small trees (hazel), scrub (Pomoideae) and wetland taxa (alder). For the most part, the taxa identified are indicative of a dryland environment. Ash charcoal often appears in the archaeological record in the wake of woodland disturbance and this has also been shown in many pollen studies throughout Ireland.³¹ Therefore, the ash charcoal present may indicate woodland disturbance and secondary woodland growth in this area during the Early Bronze Age. Oak was the only recorded species in the early medieval charcoal-production kilns suggesting that there was a supply of oak in the surrounding area during this period, however as this species would have been specifically chosen for use in these kilns this analysis does not provide much information on the general woodland environment at this time.

²⁵ Ibid., pp 89–91.

²⁶ 1.72m long x 1m x 0.2m deep.

²⁷ 1.7m long x 0.92m x 0.15m deep.

²⁸ 1211 ± 32 BP (UBA-22152). The two-sigma calibrated result for this was AD 693–891.

²⁹ The charcoal analysis and environmental report was undertaken by Dr Ellen O'Carroll.

³⁰ O. Rackham, *Trees and woodlands in the British landscape* (London, 1976).

³¹ E. O'Carroll, 'Quantifying woodland resource usage in the midlands using archaeological and palaeoecological techniques' (Unpublished PhD thesis, Trinity College Dublin, 2012).

Conclusions

The construction of the partial realignment of the N69 road, just west of Kildimo, offered a great opportunity to investigate the hidden archaeological landscape of this part of County Limerick. Although what was found – a series of burnt mounds and two charcoal-production kilns – are very common archaeological features of the Irish landscape, they are very important finds for the local area as the relatively low level of development/infrastructure projects in this region affords few opportunities for new archaeological discoveries to be made.

The Bronze Age

The dates returned for these burnt mounds ranged from Early to Late Bronze Age indicating a continuity of activity in the area and also suggests that there was a permanent – but yet undiscovered – Bronze Age settlement close-by. In general however while several Bronze Age artefacts, such as socketed axes and ornaments, are recorded from the general region the number of known sites of this date within the immediate landscape is minimal.³²

These burnt mounds fit in well with what we know of the overall distribution of Bronze Age settlement in the region which appears to indicate that small-scale communities exploited the better and more manageable soils extending into the margins of the wetter terrain along the eastern estuary of the Shannon.³³ Examples of this include the burnt mound site of Clogh East c.9km south of Glengnameade, which was dated to the Late Bronze Age,³⁴ and the cluster of Bronze Age settlement sites recently unearthed in the hinterlands of Limerick City in advance of the construction of the Limerick Southern Ring Road.³⁵ These new sites included Bronze Age houses, pits, a wooden trackway and burnt mounds at Coonagh West 4, c.11km to the ENE of Bolane. The construction of the M8 Cashel to Mitchelstown, M7 Nenagh to Limerick, and N18 motorway schemes has unearthed a wealth of Bronze Age settlement in the wider landscape suggesting that the mid-west region – like many parts of the country in the Bronze Age – was extensively settled at this time. Finally, the major Bronze Age complex of Lough Gur, positioned c.16–20km to the south-east of Bolane/Glengnameade, was undoubtedly a major focal point for this general area in the Bronze Age.

The Early Medieval Period

The charcoal-production kilns at Glengnameade were in use sometime in the 8th–9th century AD and were possibly owned/used by the local community. It is also possible that they were owned by the church, the closest being the early medieval church at Killulta/*Teampaillin*. This is considered by some to be the oldest church in the county with others suggesting dates between the 8th to 10th centuries. The date obtained for the charcoal-production kiln at Glengnameade is in line with the latter assumption and perhaps this is just a fragment of the industrial activity associated with, and on the periphery of, this religious centre.

³² E. Grogan, L. O'Donnell, and P. Johnston (eds), *The Bronze Age Landscapes of the Pipeline to the West* (Bray, 2007) pp 144 & 149.

³³ *Ibid.*, p. 14.

³⁴ K. Taylor, 1147 Clogh East (02E657), in Grogan, O'Donnell and Johnston (eds), *Bronze Age Landscapes of the Pipeline to the West*, pp 263–5:264.

³⁵ N. Bermingham, F. Coyne, G. Hull, F. Reilly and K. Taylor, *River Road – The Archaeology of the Limerick Southern Ring Road. NRA Scheme Monograph No. 14* (Dublin, 2013).