N6 KINNEGAD – ATHLONE SCHEME PHASE 2: KILBEGGAN TO ATHLONE DUAL CARRIAGEWAY

SITE A016/039; E2667: CREGGANMACAR 2

FINAL REPORT

ON BEHALF OF WESTMEATH COUNTY COUNCIL

26 JUNE 2009

IAC Irish Archaeological Consultancy

PROJECT DETAILS

Project Reference No.	WH/00/112
Project	N6 Kinnegad – Athlone Road Scheme: Phase 2, Kilbeggan – Athlone Dual Carriageway
Ministerial Direction Reference No.	A016/039
NMS Registration Number	E2667
Excavation Director	Patricia Lynch
Senior Archaeologist	Shane Delaney
Consultant	Irish Archaeological Consultancy Ltd 120b Greenpark Road Bray Co. Wicklow
Client	Westmeath County Council
Site Name	Cregganmacar 2
Site Type	Burnt Mound
Townland	Cregganmacar
Parish	Kilcleagh
County	Westmeath
NGR (Easting)	E217106
NGR (Northing)	N237511
Chainage	12020–12050
Height m OD	69.4m OD
RMP No.	N/A
Excavation Start Date	10 April 2006
Excavation Duration	5 days
Report Type	Final
Report Date	26 June 2009
Report By	Patricia Lynch

ACKNOWLEDGMENTS

This report has been prepared by Irish Archaeological Consultancy Ltd on behalf of Westmeath County Council and the National Roads Authority in advance of the construction of the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme.

The excavation was carried out in accordance with the Directions of the Minister for the Environment, Heritage and Local Government (DOEHLG), in consultation with the National Museum of Ireland (NMI) issued under Section 14 of the National Monuments Acts 1930–2004.

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ABSTRACT

Irish Archaeological Consultancy Ltd (IAC), funded by Westmeath County Council (WCC) and the National Roads Authority (NRA), undertook an excavation in the townland of Cregganmacar at the site of Cregganmacar 2 in advance of the proposed N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme (Figure 1). The following report describes the final results of archaeological fieldwork at that site. The area was fully excavated by Patricia Lynch under Ministerial Direction (A016/039) and NMS Registration Number E2667 issued by the DOEHLG in consultation with the National Museum of Ireland. The fieldwork took place from 10–14 April 2006.

The excavation at Cregganmacar 2 revealed the remains of a number of features potentially indicating the presence of a heavily disturbed burnt mound site. A single broad phase of archaeological activity was identified on-site based upon the proximity of features; the similarity of fills and in some cases the direct stratigraphical association between features. In total two possible troughs, four postholes, two stakeholes, a shallow pit and two spreads were identified as belonging to this phase. Chronological interpretation of the site relied on the identification and dating of a single charcoal sample recovered from the basal fill of pit C33. The sample was identified as being birch or alder and was subsequently submitted for AMS radiocarbon dating where it returned a calibrated 2 Sigma date of 912–822 BC placing it within a late Bronze Age date range which is typical of this site type.

A post-medieval to modern phase of activity was also identified consisting of a boundary ditch, two field boundaries and an agricultural plough furrow. Whilst these features are non-archaeological in nature they do help to assist in the chronological interpretation of a site and for this reason were included in the discussion of this site. This site did not produce any artefacts or ecofacts.

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1 INTRODUCTION

1.1 General

This final archaeological report describes the results of the excavation carried out at the site of Cregganmacar 2 in the townland of Cregganmacar, Co. Westmeath (Figures 1 and 2) as part of an archaeological mitigation program associated with the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme. Archaeological fieldwork was carried out under ministerial direction by Patricia Lynch of Irish Archaeological Consultancy Ltd (IAC Ltd) and was funded by WCC & NRA under the National Development Plan 2000–2006, 2007–2013 and the EU Structural fund.

Cregganmacar 2 was identified as a result of archaeological assessment undertaken by IAC Ltd in August 2005 (Ministerial Direction No. A016/029; NMS Registration No. E3273). All features identified during the assessment phase (two burnt spreads and a probable furrow) were subsequently re-identified and the site was fully excavated during the full resolution phase of the project which took place between 10 and 14 April 2006 with a team of 1 director, 1 supervisor and 10 site assistants.

The site was located in boggy pastureland at a height of 69.4m OD to the south of the existing N6, c. 1.5km south of Moate (Westmeath OS sheet 036). Cregganmacar 2 had not been previously identified and was not a recorded monument.

The site was assigned the following identification data:

Site Name: Cregganmacar 2; Ministerial Direction No.: A016/039; NMS Registration No.: E2667; Route Chainage (Ch): 12020–12050; NGR: 217106/237511.

1.2 Proposed Development

The proposed N6 Kinnegad–Athlone Scheme is to be constructed in two phases. The Phase 2 Kilbeggan–Athlone scheme will consist of a dual carriageway that will run for a distance of approximately 29km. The location of the route is predominantly to the south of the existing N6 and there will be access to the local road network through the seven grade separated junctions located at Athlone, Farnagh, Moate and Kilbeggan. The cross-section of the mainline consists of 2m wide verges, 2.5m wide hard shoulders, 7m wide two-lane carriageways and a 3m wide central reserve. This central reserve will accommodate 1m hard strips and a safety barrier. In addition to the mainline dual carriageway there is a further 0.3km of standard dual carriageway to the south of Athlone Interchange to connect to the existing N6 and 1.2km to the south of Kilbeggan Interchange to connect to the existing N52.

1.3 Archaeological Requirements

The archaeological requirements for the N6 Kilbeggan to Athlone Dual Carriageway Scheme, are outlined in the Ministerial Directions issued to Westmeath County Council by the Minister for Environment, Heritage and Local Government under Section 14A (2) of the National Monuments Acts 1930–2004 and in the terms of the contract between Westmeath County Council and Irish Archaeological Consultancy Ltd. These instructions form the basis of all archaeological works undertaken for this development. The archaeological excavation works under this contract are located between the townlands of Kilbeggan South, Co. Westmeath and Creggan Lower, Co. Westmeath.

The proposed N6 was subjected to an Environmental Impact Assessment, the archaeology and cultural history section of which was carried out by Sheila Lane and Associates and presented in 2003. The Record of Monuments and Places, the Sites and Monuments Record, Topographical files, aerial photography, the Westmeath

Archaeological Urban Survey and literary sources were all consulted. One phase of geophysical survey was also conducted at selected sites along the proposed route by Target Archaeological Geophysics. As a result of the paper survey, field inspections and geophysical survey, a number of potential sites were recorded in proximity to this section of the overall route alignment.

Advance archaeological testing was completed by IAC Ltd and excavation of the sites identified during testing was conducted by IAC Ltd on behalf of Westmeath County Council.

1.4 Methodology

The topsoil was reduced to the interface between natural and topsoil using a 20 tonne mechanical excavator equipped with a flat toothless bucket under strict archaeological supervision. The remaining topsoil was removed by the archaeological team with the use of shovels, hoes and trowels in order to expose and identify the archaeological remains. A site grid was set up at 10m intervals and was subsequently calibrated to the national grid using GPS survey equipment.

All features were subsequently fully excavated by hand and recorded using the single context recording system with plans and sections being produced at a scale of 1:50, 1:20 or 1:10 as appropriate.

A complete photographic record was maintained throughout the excavation. Digital photographs were taken of all features and of work in progress.

An environmental strategy was devised at the beginning of the excavation. Where relevant features exhibiting large amounts of carbonised material were the primary targets.

In the instances where artefacts were uncovered on site they were dealt with in accordance with the guidelines as issued by the NMI and where warranted in consultation with the relevant specialists. All artefacts, ecofacts and paper archive are currently stored in IAC offices, Lismore, Co Waterford and will ultimately be deposited with the National Museum of Ireland.

Radiocarbon dating of the site was carried out by means of AMS (Accelerator Mass Spectrometry) dating of identified and recommended charcoal samples. All calibrated AMS dates in this report are quoted to 2 Sigma.

All excavation and post excavation works were carried out in consultation and agreement with the Project Archaeologist, the National Monuments Section of the DOEHLG and the National Museum of Ireland.

2 EXCAVATION RESULTS

Detailed descriptions of contexts are listed in Appendix 1. The site matrix is detailed in Figure 6.

2.1 Phase 1: Natural Drift Geology

The dominant bedrock geology identified along the corridor of the proposed route are Lower Carboniferous rocks, mainly limestone lithologies, which overlay Devonian Old Red Sandstone rocks. Carboniferous volcanic rocks were also identified as being present locally in the form of sills passing through the bedrock sequences (Riada Consult, 2003). The underlying geology of the area is overlain by occasional moraines and small glacial hillocks covered by grey brown podzolic soils.

The subsoil C2 above bedrock encountered at Cregganmacar 2 was uniform across the site and consisted of a grey marl clay and gravels.

2.2 Phase 2: Primary Archaeological Activity

The excavation at Cregganmacar 2 revealed the remains of a number of features potentially indicating the presence of a heavily disturbed burnt mound site. A single broad phase of archaeological activity was identified on-site based upon the proximity of features, the similarity of fills and in some cases the direct stratigraphical association between features (Figure 6).

2.2.1 Pit/Trough C14 and Associated Postholes

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
3	C14	3.5	2.5	0.25	Dark sandy silt with small stone inclusions	Top fill of C14
9	C14	3.5	2	0.25	Compacted light-mid grey sandy silt	Mid fill of C14
10	C14	2	0.45	0.07	Loosely compacted light-mid grey sandy silt	Basal fill of C3
11	C14	2	0.14	0.11	Orange/brown silty clay	Basal fill of C3
12	N/A	N/A	0.12	0.18	Circular cut, rounded base	Cut of posthole
13	C12	N/A	0.12	0.18	Grey/brown sandy silt. 20% pebbles	Fill of posthole
14	N/A	3.5	2.25	0.55	Elliptical cut-gradual base	Cut of pit/trough
15	N/A	0.1	0.1	0.18	Circular cut, curved base	Cut of posthole
16	C15	0.1	0.1	0.18	Loosely compacted grey/brown silty clay	Fill of posthole
18	N/A	0.1	0.1	0.15	Circular cut, rounded base	Cut of posthole
19	C18	0.1	0.1	0.15	Loosely compacted dark grey silty clay	Fill of posthole
21	N/A	0.1	0.1	0.08	Circular cut, rounded base	Cut of posthole
22	C21	0.1	0.1	0.08	Loosely compacted grey silty clay	Fill of C21

Finds: None

Interpretation:
This group of contexts represents a potential trough or pit and four postholes located towards the northeastern corner of the site (Plates 3 and 5; Figures 4 and 5). Postholes C12, C15, C18 and C21 cut the base of C14 and may be evidence that the feature was lined, though no evidence of any lining was recovered. The possible trough/pit C14 had four fills. The two basal fills (C10 and C11) abutted one another and were probably related to the functioning lifespan of the feature (Figure 5; Plate 3). Fill of C3 (C11) comprised of a moderate amount of stones, some of which were quite large. These fills were overlain by C9, which was in turn overlain by C3. C3 represented the final infill of the feature and comprised a layer of burnt mound material (Plate 1 and Plate 2).

2.2.2 Pit/Trough C24

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
17	C24	4.85	3.25	0.14	Black silty clay, charcoal, burnt stones	Spread
23	N/A	5.9	5.5	0.18	Dark brown peaty clay of small pebbles	Peaty material
24	N/A	1.85	1.2	0.25	Sharp break of slope at top, flat base	Cut of pit
33	N/A	0.15	0.15	0.18	Feature with steep sides and narrow base	Cut of stakehole
34	C33	0.15	0.15	0.18	Black silty clay with heat affected stone	Fill of C33

Finds: None

Interpretation:
This group of contexts represents the remains of a potential trough (C24) located to the west of trough C14 (Figure 4; Plate 6). There was no evidence that the trough was lined, although it is unlikely that any timber or organic lining would have survived. Stakehole (C33) located to the south of the trough, and its fill (C34) were sealed beneath C17. Spread C17 consisted of heat-shattered stones and dark brown black clay similar to burnt mound material. It is possible that this deposit was the result of a deliberate phase of in filling of the trough feature once the site went out of use. It is possible that C23 is a natural layer that built up over time and as a result covered C17.

2.2.3 Possible Associated Isolated Features-Stakehole C7 and Pit C31

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
7	N/A	0.15	0.15	0.1	Circular feature with curved base	Cut of Stakehole
20	C7	0.15	0.15	0.1	Light brown/grey silty clay	Fill of C7
31	N/A	0.9	0.75	0.1	Shallow circular cut, flat but uneven base	Cut circular pit
32	C31	0.9	0.75	0.1	Dark brown peaty clay, wood fragment	Fill of C31

Finds: None

Interpretation:
This group of contexts represents the remains of a stakehole (C7) located in close proximity to trough C14, and an isolated shallow pit (C31) located to the north of the peaty burnt spread material C23 (Figures 4 and 5). The function of the stakehole is unknown although it is assumed it is directly associated with the other archaeological features on the site given its proximity to them and the similar nature of their fills.

Pit C31, located to the north of burnt spread material C23, contained a single fill C32 in which small quantities of charcoal and some animal bone were found. The function of this feature is unknown, but it is assumed that it is directly associated with the other archaeological features on site given its proximity to them. The charcoal, identified as birch (*Betula*) or alder (*Alnus glutinosa.),* retrieved from the fill C32 was sent for AMS radiocarbon dating. It returned a date of 2726 +/- 21 BP (UBA 9160). The 2 Sigma calibrated result of this sample produced a date range of 912–822 BC, placing it within the late Bronze Age (Appendix 2.2). Also from fill C32 were 35 fragments of animal bone, identified as pig humerus (*Sus domesticus*) weighing 10g (Lofqvist, Appendix 2.3).

2.3 Phase 3: Post-Medieval and Modern Agricultural Activity

2.3.1 Linear Boundary Ditch C4

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
4	N/A	8.5	2.5	0.6	Linear cut, steep sides, curved base	Cut of field boundary
5	C4	8.5	2.5	0.55	Grey/brown silty clay	Fill of field boundary
8	C4	0.5	1.06	0.19	Yellowish silty clay	Basal fill of boundary

Finds: None

Interpretation:
This group of contexts represent the remains of a modern, linear, north to south-aligned boundary ditch containing two fills C8, the basal fill, and C5 the latest fill. The boundary ditch ran along the eastern side of the site and continued outside the line of the CPO into the next field (Figures 4, 5 and 6; Plate 1 and Plate 4).

2.3.2 Field Boundaries C25 and C29

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
25	N/A	11.5	1.5	0.4	Curving linear cut, flat uneven base	NE–SW field boundary
26	C25	11.5	1.5	0.4	Mid brown silty clay, sub-angular stone	Fill of C25
29	N/A	4.75	1.75	0.2	Gently sloping sides , concave base	NW–SE field boundary
30	C29	4.75	1.75	0.2	Mid brown silty clay	Fill of C29

Finds: None

Interpretation:
This group of contexts represents the remains of two field boundaries identified to the south of the main archaeological features on the site. C25 was orientated northeast to southwest whilst C29 was orientated northwest to southeast (Figure 4). C29 met field boundary C25 at its northern end and it appears that both boundaries are likely to have been related (Figure 5). Both features contained a single fill each, which were of similar composition. It appears that C30, the fill of C29, may have been formed as a result of deliberate backfilling of the feature.

2.3.3 Agricultural Furrow C27

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
27	N/A	3	0.5	0.15	Gently sloping sides, shallow concave base	NW–SE furrow
28	C27	3	0.5	0.15	Mid brown silty clay, small pebbles	Fill of furrow

Finds: None

Interpretation:
This feature represented a modern agricultural furrow orientated northwest to southeast which truncated spread C17 and possible trough C24 (Figure 4). This feature had no archaeological significance and represents the latest activity associated with this site.

2.4 Phase 4: Topsoil

2.4.1 Topsoil

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
1	N/A	Site	Site	Site	Mix of peat and soil	Topsoil

Finds: None

Interpretation:
This group represents the topsoil that sealed all of the archaeological deposits and features at Cregganmacar 2.

3 SYNTHESIS AND DISCUSSION

3.1 Landscape Setting

The new route of the N6 runs from south of Kilbeggan town to east of Athlone Co. Westmeath, crossing through the northern part of Co. Offaly for approximately 7.5km of its entire length. The landscape of this area is comprised of generally flat to undulating terrain. The underlying geology of the area is dominated by carboniferous limestone and is overlain by occasional glacial features such as moraines and eskers. The eskers dominate to the north and south of most of the route, with moraines featuring along parts of the western section toward Athlone. The soil cover varies considerably across the scheme, passing through soil complexes, grey brown podzols, boglands and alluvial deposits. The area is drained by the River Shannon through its tributaries, the Brosna, Boor, Cloghatanny and Gageborough rivers.

The burnt mound site at Cregganmacar 2 was located 2km southwest of the town of Moate on the crest of a gently sloping hill (69.4m OD). The underlying geology of the area is carboniferous limestone, which is overlain by small glacial hillocks to the north. The site was located on the boarder between the Patrickswell/Baggotstown soil complexes and peat soils to the south. A small bog was situated 500m to the southeast of the site in Gorteen/Curries/Ballynamuddagh (6"OS map 1834–1842). Baltrasna Lough lies 700m northeast and a small river flows 200m northeast of the site.

3.2 Archaeological Landscape (Bronze Age)

Apart from the publication of archaeological inventories in some midland counties – such as Offaly (O'Brien and Sweetman 1997) for example (There is, as yet, no archaeological inventory for Co. Westmeath) – and peatland surveys by the Irish Archaeological Wetland Unit (see below) our knowledge of the prehistoric archaeology of the midlands is limited. We are reliant on data stored at the RMP (see Appendix 3 and Figure 2) and information from a limited number of excavations within Westmeath and Offaly. This road scheme joins a number of recent large-scale commercially-driven archaeological excavations, most notably the gas pipeline to the west (Grogan *et al*. 2007) which runs mostly parallel a short distance to the north of the N6, but unfortunately evidence for Iron Age settlement and activity remains relatively minor in this region.

Excavations along the gas pipeline produced a small number of Iron Age sites (Grogan *et al*. 2007, 6), but none within the midland counties. The Iron Age was better represented by a number of ironworking sites and the settlement/cemetery site of Johnstown 1, Co. Meath, discovered in advance of the M4 which traverses counties Westmeath, Meath and Kildare (Carlin, Clarke and Walsh 2008). The site of Kinnegad 2, within the barony of Farbill, Co. Westmeath, revealed ironworking features dating to the early, middle and later parts of the period (Carlin 2008, 2; table 1.1), while a small number of sites – mainly industrial-type features – in neighbouring County Meath were also dated to the Iron Age (*ibid*.). Survey and excavation of the midland bogs – mainly in Offaly but also Westmeath – have also revealed snippets of Iron Age activity. An Iron Age vessel, dating to 197 BC–AD 68, was recovered from Toar Bog, Co. Westmeath (Murray 2000), after initial survey (Irish Archaeological Wetland Unit 2000). The northern parts of Daingean Bog, within counties Offaly and Westmeath, revealed small deposits of brushwood and some roundwoods – one site was classified as a trackway – dating from the Iron Age onwards (McDermott 2001). To the south of Daingean, at Clonad Bog, a number of sites were discovered including three substantial trackways dating from the late Bronze Age/Iron Age (Murray 2000). Finally, four Iron Age Y-shaped pendants were uncovered in the same region at Ballykean Bog, as part of the peatland survey in Offaly, as well as an

early medieval palisaded habitation site and 12 trackways (Stanley 2003). The most significant recently discovered Iron Age site in the region is at Coolure crannog on Lough Derravaragh in the barony of Moycashel (O'Sullivan *et al*. 2007). A substantial plank palisade was dendrochronologically dated to 402 ± 9 years placing a secondary construction phase of the crannog at the end of the Iron Age, 1200 years after it was originally built. This is a rare example of a crannog dating to the late Iron Age/early medieval transitional phase as most lake dwellings have been dated to the late Bronze Age/early Iron Age – for example Ballinderry crannog No. II, Co. Offaly (Hencken 1942; Newman 1997), – or securely to the late sixth and early seventh centuries (*ibid*.).

The N6 has produced a small number of sites that can be dated to the late Bronze Age/early Iron Age transitional phase such as the burnt mound sites at Williamstown 2, Seeoge and Aghafin 1, some pits and postholes at Moyally 6 and a possible hearth at Ballinderry Big 2. A burnt spread at Cregganmacar 1 was dated to 399–235 BC while a similar date came from a pit at Cregganmacar 3 a short distance away. The latter site – also consisting of a burnt mound and trough – produced middle and late Bronze Age radiocarbon dates. A figure-of-eight-shaped ironworking furnace was dated to the middle Iron Age at Moyally 2 and, finally, a ringditch was also dated to the same period at Cappydonnell Big. The N6 findings mirror the results from other excavations within the region – such as the M4 and gas pipeline – and throughout Ireland generally whereby only a small number of sites dating to the Iron Age were revealed.

The burnt mound site at Cregganmacar 2 is paralleled by a number of similar sites that were revealed along the N6 between Kilbeggan and Athlone. Apart from Cregganmacar other notable clusters of burnt mound sites occurred also at Williamstown, Seeoge, Burrow or Glennanummer and Kilbeg. This clustering of sites has also been identified at excavations elsewhere in Westmeath including Newtown (Stevens 2004a, 2004b, 2004c) and Enniscoffey/Caran (Molloy 2007a, 2007b, 2007c 341–2). Archaeological investigation on the section of the N6 to the east of Kilbeggan has also uncovered a range of burnt mound sites, including Stonehousefarm 6.1 and 6.2 (McDermott 2004).

3.3 Archaeological Typology Background (Burnt Mound)

Fulacht Fiadh or burnt mound sites are one of the most common field monuments found in the Irish landscape. The last published survey (Power *et al*. 1997), carried out over a decade ago, recorded over 7,000 burnt mound sites and in excess of 1,000 sites have been excavated in recent years through development led archaeological investigations. In spite of this no clear understanding of the precise function of these sites has being forthcoming.

Burnt mound sites are typically located in areas where there is a readily available water source, often in proximity to a river or stream or in places with a high water table. In the field burnt mounds may be identified as charcoal-rich mounds or spreads of heat shattered stones, however, in many cases the sites have been disturbed by later agricultural activity and are no longer visible on the field surface. Nevertheless even disturbed spreads of burnt mound material often preserves the underlying associated features, such as troughs, pits and gullies, intact.

Ó Néill (2003–2004, 82) has aptly identified these sites as the apparatus and by-product of pyrolithic technology. This technology involved the heating or boiling of water by placing fire-heated stones into troughs of water. Small shallow round-bottomed pits, generally referred to as pot boiler pits or roasting pits, are often associated with burnt mound sites. The purpose of these pits remains unclear.

Occasionally large pits are also identified and may have acted as wells or cisterns. Linear gullies may extend across the site, often linked to troughs and pits, and demonstrate a concern with onsite water management. Post and stakeholes are often found on burnt mound sites and these may represent the remains of small structures or wind breakers.

Burnt mound sites are principally Bronze Age monuments and reach their pinnacle of use in the middle/late Bronze Age (Brindley *et al*. 1989−90; Corlett 1997). Earlier sites, such as Enniscoffey Co. Westmeath (Grogan *et al*. 2007, 96), have been dated to the Neolithic and later sites, such as Peter Street, Co. Waterford (Walsh, 1990, 47), have been dated to the medieval period. Thus although burnt mound sites generally form a components of the Bronze Age landscape, the use of pyrolithic technology has a long history in Ireland.

Although there is a general consensus that burnt mound sites are the result of pyrolithic technology for the heating or boiling of water, the precise function of these sites has, to date, not been agreed upon. Several theories have been proposed but no single theory has received unanimous support. The most enduring theory is that burnt mounds sites were used as cooking sites. O'Kelly (1954) and Lawless (1990) have demonstrated how joints of meat could be efficiently cooked in trough of boiling water. The use of burnt mound sites for bathing or as saunas has been suggested as an alternative function (Lucas 1965, Barfield and Hodder 1987, O' Drisceoil 1988). This proposal is largely influenced by references in the early Irish literature to sites of a similar character and is very difficult to prove, or disprove. Others, such as Jeffrey (1991), argue that they may have been centres of textile production for the fulling or dyeing of cloth. More recent demonstrations by Quinn and Moore (2007) have shown that troughs could have been used for brewing, however, this theory has been criticised by leading Irish environmentalists due to the absence of cereal remains from most burnt mound sites (McClatchie *et al*. 2007).

Four sites were uncovered in Cregganmacar that were similar in form; they comprised of burnt mounds or spreads, mostly sealing trough-like features which occasionally contained postholes. Evidence from the AMS dating indicates that none were contemporary and it illustrates how elements of this pyrolithic technology remained the same across thousands of years.

3.4 Discussion

The excavation at Cregganmacar 2 revealed the remains of a number of features potentially indicating the presence of a heavily disturbed burnt mound.

3.4.1 Phase 1: Natural deposits

This phase represents the natural subsoil, which was cut or sealed by all subsequent archaeological features. For the purposes of recording on-site this phase of activity was allocated the context number C2. The subsoil C2 above bedrock encountered at Cregganmacar 2 was uniform across the site and consisted of a grey marl clay and gravel (Figure 6).

3.4.2 Phase 2: Primary Archaeological Activity

Phase 2 represents the remains of features uncovered that are associated with the primary phase of activity on-site (Figure 6). A total of 10 features were uncovered consisting of two possible troughs, four postholes, two stakeholes, a shallow pit and burnt mound spread material.

In terms of direct association stratigraphy, possible trough C14 and postholes C12, C15, C18 and C21 are the only directly associated features in this phase with the

postholes having been cut into the trough. The presence of the postholes has been interpreted as potentially indicating the remains of a form of trough lining that did not survive. Whilst not directly associated through stratigraphy a single stakehole C7 was identified located to the northeast of this trough possibly implying a connection but there is no evidence to support this or to help further the interpretation of the function of this feature.

The second possible trough C24 was filled by C17 which represented the remains of burnt mound material, being dark brown and containing heat shattered stones (Figures 4 and 5; Plate 6). A single isolated stakehole C33 was identified in close proximity to this trough but as with C7 above there is no direct link with C24 or conclusive evidence to suggest a function for this feature. In terms of interpretative phasing it is possible to identify that C17 itself sealed both C24 and C33 indicating at least that these two features went out of use prior to the deposition of C17 across them (Figures 4 and 5).

A single isolated shallow pit feature C31 (fill C32) located to the north of the natural peaty spread C23 provided little in the way of furthering the understanding of the function of the features uncovered on-site (Figures 4 and 5). The fill of the pit was very similar to C23 possibly suggesting that the feature was partially silted up prior to an episode of intrusive activity in which C23 became mixed with C32.

This site did not produce any artefacts. In the absence of these more decisive chronological interpretation of the site relied on the identification and dating of a single charcoal sample recovered from the basal fill of pit C33. The sample was identified as being birch (*Betula* sp.) or alder (*Alnus glutinosa*) (O'Carroll, Appendix 2.1) and was subsequently submitted for AMS radiocarbon dating where it returned a 2 Sigma Calibrated date range of 912–822 BC (UBA 9160, Appendix 2.2) placing it within the late Bronze Age; the most commonly cited period for this site type in general.

Fragments of animal bone weighing 10g, identified as pig humerus *(Sus domesticus),* also came from a sample of fill C32 (Lofqvist, Appendix 2.3). Due to the deteriorated condition of the fragments it could only be determined that this humerus was from the right side and no traces of cuts, gnawing or pathologies could be detected.

3.4.3 Phase 3: Post-Medieval and Modern Agricultural Activity

Phase 3 represents the remains of features interpreted as being related to modern agricultural activity on the site consisting of a linear boundary ditch, two field boundaries and a plough furrow (Figure 6). These features are not archaeological in nature but are useful in helping to determine the sequencing of archaeological events on-site. This is evident in how the plough furrow C27 truncated spread C17 allowing for the interpretation that C17 was no longer in use by the time C27 was created.

3.4.4 Phase 4: Topsoil

This phase represents the topsoil that sealed all of the archaeological deposits and features on site.

4 CONCLUSIONS

Cregganmacar 2 consisted of the remains of a burnt mound site. In its simplest form evidence for this site type is usually in the form of a trough and burnt mound although sometimes one exists without the other. At this site there was evidence that the site had been truncated in more recent times but despite this it was possible to identify a total of two possible troughs, four postholes, two stakeholes, a shallow pit and two spreads all belonging to the primary phase of activity for this site. The majority of *fulacht fiadh* or burnt mound sites are datable to the Bronze Age (c. 2500–c. 700 BC). Dating of a charcoal fragment from the fill of a pit C33 from this site returned a 2 Sigma date range of 912–822 BC (UBA 9160, Appendix 2.2) dating it to the late Bronze Age. There were no artefacts recovered during the course of the excavation however this is a common characteristic of this type of site.

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PLATES

Plate 1: E2667: Pre-excavation of site, facing east.

Plate 2: E2667: Burnt spread C3 sealing possible trough C14, pre-excavation, facing northeast

Plate 3: E2667: Trough C14, mid-excavation, facing east

Plate 4: E2667: Boundary ditch C4, mid-excavation, facing north

Plate 5: E2667: Trough C14, post-excavation, facing southeast, with postholes C12 and C18 shown

Plate 6: E2667: Trough C24 with stakehole C33, mid-excavation, facing southeast

APPENDIX 1 CATALOGUE OF PRIMARY DATA

Appendix 1.1 Context Register

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description	Finds
1	N/A	N/A	N/A	N/A	Topsoil	Mix of peat and soil	N/A
2	N/A	N/A	N/A	N/A	Subsoil	Grey marl clay and gravel	N/A
3	C14	3.5	2.5	0.25	Layer of burnt mound material. Top fill of C14.	Sub-circular, loosely compacted dark sandy silt with small stone inclusions.	N/A
4	N/A	8.5	2.5	0.6	Cut of linear field boundary.	Linear feature with steep sides and curved base.	N/A
5	C4	8.5	2.5	0.55	Fill of field boundary.	Linear feature with compacted grey/brown silty clay. Some stone inclusions.	N/A
6	N/A	N/A	N/A	N/A	Non-archaeological.		N/A
7	N/A	0.15	0.15	0.1	Possible stake hole.	Circular feature with curved base, steep sides and sharp break of slope at top.	N/A
8	C4	0.5	1.06	0.19	Soil from base of modern field boundary.	Rectangular feature with loosely compacted yellowish silty clay. Less than 10% small stone inclusions.	N/A
9	C4	3.5	2	0.25	Mid fill of C14.	Elliptical feature with compacted light-mid grey sandy silt.	N/A
10	C14	2	0.45	0.07	One of 2 basal fills of C3. Small dark brown/black layer.	Elliptical feature with loosely compacted light-mid grey sandy silt.	N/A
11	C14	2	0.14	0.11	Basal fill of C3, abutting C10.	Elliptical feature with compacted orange/brown silty clay. Common stone inclusions.	N/A
12	N/A	N/A	0.12	0.18	Cut of posthole.	Circular feature with sharp break of slope at top, straight sides and slightly rounded base.	N/A
13	C12	N/A	0.12	0.18	Fill of posthole.	Loosely compacted grey/brown sandy silt. 20% pebble inclusions.	N/A
14	N/A	3.5	2.25	0.55	Cut of pit/possible trough.	Elliptical feature with steep sides and sharp-gradual base.	N/A
15	N/A	0.1	0.1	0.18	Cut of posthole within C14 and in close proximity to C18.	Circular feature with steep sides and curved base.	N/A
16	C15	0.1	0.1	0.18	Fill of posthole.	Circular feature with loosely compacted grey/brown silty clay.	N/A
17	C24	4.85	3.25	0.14	Spread of burnt mound material.	Irregular spread with heat affected angular stones. Medium compaction black silty clay. Charcoal rich.	N/A
18	N/A	0.1	0.1	0.15	Cut of posthole.	Circular feature with sharp break of slope at top, steep sides and slightly rounded base.	N/A
19	C18	0.1	0.1	0.15	Fill of posthole within C14.	Round feature with loosely compacted dark grey silty clay.	N/A
20	C7	0.1	0.1	0.08	Cut of posthole.	Circular feature with sharp break of slope at top, steep sides and slightly rounded base.	N/A
21	N/A	0.1	0.1	0.08	Fill of C21.	Round feature with loosely compacted grey silty clay.	N/A

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description	Finds
22	C21	0.1	0.1	0.08	Fill of C21.	Round feature with loosely compacted grey silty clay.	N/A
23	N/A	5.9	5.5	0.18	Peaty material, part of burnt mound. Over-lying C17.	Layer of dark brown/black peaty clay of loose to medium compaction. Regular-frequent inclusions of small pebbles.	N/A
24	N/A	1.85	1.2	0.25	Cut of pit under burnt. mound C23 and C17.	Sharp break of slope at top, steep sides and a flat uneven base.	N/A
25	N/A	11.5	1.5	0.4	NE–SW orientated field boundary. Filled by C26.	Curving linear feature with steep sides and flat uneven base.	N/A
26	C25	11.5	1.5	0.4	Fill of C25.	Mid brown silty clay with regular inclusions of small sub-angular stone inclusions.	N/A
27	N/A	3	0.5	0.15	NW–SE orientated furrow, cuts C17/23 & C24. Modern agricultural furrow.	Gently sloping sides with shallow concave base.	N/A
28	C27	3	0.5	0.15	Fill of modern furrow C27.	Mid brown silty clay with occasional small pebble inclusions.	N/A
29	N/A	4.75	1.75	0.2	NW–SE orientated field boundary.	Gently sloping sides with shallow concave base.	N/A
30	C29	4.75	1.75	0.2	Fill of C29. Formed as a result of deliberate backfilling?	Medium to loosely compacted mid brown silty clay with occasional small pebble inclusions.	N/A
31	N/A	0.9	0.75	0.1	Cut of shallow circular pit.	Shallow feature with graduated sides and a flat but uneven base.	N/A
32	C31	0.9	0.75	0.1	Fill of C31.	Dark brown peaty clay similar to C23. Loosely compacted with no inclusions. Small piece of wood (S#3) was found at base.	N/A
33	N/A	0.15	0.15	0.18	Cut of possible stakehole. Filled by C34 with material that is similar to that in C17. The similar nature of C34 to C17 may suggest the removal of the stake from C33 prior to the deposition of C17.	Feature with steep sides and narrow flat base.	N/A
34	C33	0.15	0.15	0.18	Fill of C33.	Loose to medium compaction black silty clay with occasional inclusions of heat affected stone.	N/A

Appendix 1.2 Catalogue of Artefacts

There were no artefacts recovered from this excavation.

Appendix 1.3 Catalogue of Ecofacts

A total of five bulk soil samples were taken during the course of excavation at this site. Of these all five were processed by means of flotation and sieving through a 250/300µm mesh. The resulting retrieved samples of this process are listed below.

1.3.1 Animal bone

Sample 3 produced 35 fragments of animal bone. These were subsequently sent for specialist identification (Appendix 2.3).

Context number	Sample number	Feature	Sample weight (g)
32	3	Shallow Pit	10g

1.3.2 Charcoal

One charcoal sample was recovered following floatation.

Context number	Sample number	Feature	Sample weight (g)
32	3	Shallow Pit	0.01g

Appendix 1.4 Archive Checklist

Project: N6 Kilbeggan – Athlone	**Irish Archaeological Consultancy Ltd**	
Site Name: Cregganmacar 2		
NMS Number: E2667		
Ministerial Direction Number: A016/039		
Site director: Patricia Lynch		
Date: 17 September 2008		
Field Records	**Items (quantity)**	**Comments**
Site drawings (plans)	4	Digitised
Site sections, profiles, elevations	8	Digitised
Other plans, sketches, etc.	0	
Timber drawings	0	
Stone structural drawings	0	
Site diary/note books	1	Digitised
Site registers (folders)	4	Digitised
Survey/levels data (origin information)	0	
Context sheets	34	Digitised
Wood Sheets	0	
Skeleton Sheets	0	
Worked stone sheets	0	
Digital photographs	25	On IAC Server
Photographs (print)	0	
Photographs (slide)	0	
Finds and Environ. Archive	0	
Flint/chert	0	
Stone artefacts	0	
Pottery (specify periods/typology)	0	
Ceramic Building Material (specify types eg daub, tile)	0	
Metal artefacts (specify types - bronze, iron)	0	
Glass	0	
Other find types or special finds (specify)	0	
Human bone (specify type eg cremated, skeleton, disarticulated)	0	
Animal bone	35 fragments	
Metallurgical waste	0	
Enviro bulk soil (specify no. of samples)	5	
Enviro monolith (specify number of samples and number of tins per sample)	0	
Security copy of archive	1	On IAC server

Appendix 1.5 Copy of Registration No. Document from DoEHLG

National Monuments
Acts (1930-2004)
Ministerial Directions
Record Number for
archaeological activity

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE
AND LOCAL GOVERNMENT

File: **Direction No. A16**

Registration Number: E2667

Directions have been issued to Murty Hanly on behalf of Westmeath County Council in order to regulate archaeological activities carried out on N6 Kilbeggan to Athlone (Phase 2).

Application having been duly made to me by Ms. Patricia Lynch of c/o ADS Ltd,, Windsor House,, 11 Fairview Strand,, Fairview, Co. Dublin.

For a registration number to record excavation at the site of Cregeanmacar 039 being part of the townland of in the County of Westmeath.

This registration is not an archaeological licence or consent but it is issued solely for archive purposes and to allow for the material from the activity to be registered with the National Monuments Service and the National Museum.

Signed ..... 31 October 2006

Website: www.environ.ie

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Appendix 1.6 Copy of Ministerial Direction Document

Section 14A(2) National Monuments Acts 1930-2004

Directions to Westmeath County Council for the carrying out of archaeological works on the N6 Kinnegad to Athlone dual carriageway road scheme (Phase 2 * Kilbeggan to Athlone).

1. Introduction

The project is an approved road development, having been approved by An Bórd Pleanála on 26th March 2004.

The development will consist of a dual carriageway that will run for a distance of approximately 57.5km.

In line with recommendations in the Environmental Impact Assessment for the scheme, archaeological investigations included site specific testing followed by a centreline test trench with staggered offsets. The request for directions has an attached strategy document that covers the proposed resolution works

These directions relate to Phase 2 works and are issued following the receipt by the Minister of reports on the testing work carried out in Phase 1.

2. Directions

All aspects of the archaeological works should be conducted in accordance with provisions of the policy and advice notes on archaeological excavations issued by the Department and in line with the provisions of the Code of Practice agreed with the National Roads Authority. Archaeological works shall be carried out in accordance with the Strategy for Proposed Works submitted with the application seeking Directions.

3. Project Archaeologist

The Project Archaeologist appointed for the road development should ensure that the archaeological works are carried out in accordance with the terms of the directions.
· Any changes to the agreed method statement for the excavations should be submitted to the National Monuments Section for approval.
· Any proposal to change any named director of a specific excavation should firstly be notified to the National Monuments Section for approval.

4. Conduct of Archaeological Excavations:

a) The archaeological excavations should be carried out in accordance with the specifications set out in the strategy document submitted to the Minister.
b) The National Monuments Section should be notified of the commencement date of the works on site.
c) The names of the archaeological consultants, including site directors should be submitted to the National Monuments Section in advance of the works commencing.

d) Where necessary the layout of the archaeological trenches should be adjusted to include additional archaeological features and deposits or areas of archaeological potential.
e) All archaeological objects recovered in the course of the test excavations should be treated and conserved in line with the advice notes and guidelines issued by the National Museum of Ireland.
f) A report on the progress of the archaeological works shall be submitted to the National Monuments Section every 4 weeks.

5. Record Number for the scheme:

The record number for the recording of archaeological works is A016/000. Sub-numbers may be allocated by the Project Archaeologist to the additonal works. These numbers should be notified to the National Monuments Section for agreement with full details of the archaeological works involved.

6. Detection Device:

Detection devices may be used as appropriate in the course of archaeological works to recover archaeological objects. Details of proposed methodologies should be notified to the National Monuments Section.

7. Reports:

1. A report on the results of the archaeological excavations should be submitted to the National Monuments Section within 4 weeks of the completion of the works on site. Should additional time be required to complete the report the National Monuments Section should be notified before the expiration of the 4-weeks period. A copy of the report should be sent to the National Museum of Ireland.
2. A summary of the excavation results for the site should be published in the Excavations Bulletin for the year when works are undertaken.

8. National Monuments (Subsection 14A(4)):

If during the carrying out of the archaeological excavations a site should prove to be a National Monument within the meaning of the National Monuments Acts (1930-2004) all works should stop and the National Monuments Section should be informed immediately.

9. Inspection of Works

Officers, servants or agents of the Minister may inspect the archaeological works at any time and full co-operation should be given to them in carrying out the inspections.

APPENDIX 2 SPECIALIST REPORTS

CHARCOAL IDENTIFICATIONS

N6 KINNEGAD – ATHLONE SCHEME
PHASE 2: KILBEGGAN TO ATHLONE
DUAL CARRIAGEWAY

MINISTERIAL DIRECTION NUMBER: A016/038 AND A016/039
NMS REGISTRATION NUMBER: E2666 AND E2667
CREGGANMACAR 1 AND 2

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Introduction
Two charcoal samples were sent for analysis from Cregganmacar 1 & 2. The sites were located in the townland of Cregganmacar, c. 1km south SSW of Moate town, Co. Westmeath. The archaeological excavation was carried out by Irish Archaeological Consultancy Ltd on behalf of Westmeath County Council and the National Roads Authority in advance of the construction of the N6 Phase 2: Kilbeggan to Athlone Dual Carriageway Scheme.

The analysis of charcoal can provide information on two different levels. Charcoal analysis is an important component of any post-excavation environmental work as it can help in re-constructing an environment hitherto lost to us, although this must be done with caution as sufficient sample numbers are required for a complete and full understanding of the immediate environment. Keepax suggest 50 samples in a European temperate climate. Charcoal is also analysed and identified to determine what species are used and selected for particular functions on site i.e. postholes, wall posts, burnt remains of wattle and so on.

Methods
The process for identifying wood, whether it is charred, dried or waterlogged is carried out by comparing the anatomical structure of wood samples with known comparative material or keys (Schweingruber 1990). A wood reference collection from the Botanical Gardens in Glasnevin, Dublin was also used.

Charcoal
The soil samples were processed on-site. The flots were sieved through a 250 micron or a 1mm sieve, while the retent was put through a 2mm or 4mm sieve. All of the charcoal remains from the soil samples were then bagged and labeled.

The identification of charcoal material involves breaking the charcoal piece along its three sections (transverse, tangential and radial) so clean sections of the wood pieces can be obtained. This charcoal is then identified to species under a universal compound microscope reflected and transmitted light sources at magnifications x 10–400. By close examination of the microanatomical features of the samples the charcoal species are determined.

The purpose of the charcoal identifications was two-fold. In some cases the identifications were carried out prior to AMS radiocarbon dating in order to select specific species for dating and in other cases the charcoal was analysed for fuel selection policies and selection of wood types for structural use. Each species was identified, bagged together and then weighed.

The two charcoal samples were very small in size. There was only one small gnarly twig present in the sample from Cregganmacar 1 and this was unidentifiable as its microstructure could not be determined. The second sample from Cregganmacar 2 was identified as birch/alder as these fragments were also very small and some of the micro-structural characteristics of the sample could not be determined.

Description of the feature types
The excavation at Cregganmacar 1 (A016-038) uncovered burnt mound/*fulacht fiadh* activity consisting of a layer of burnt mound material that measured 3.85m x 2.07m x 0.08m, comprising charcoal enriched soil that contained heat shattered stones. This in turn was overlaid on the sides by a deposit of re-deposited subsoil. These deposits overlay a sub oval uneven depression in the subsoil that contained a single pit and four postholes.

The site at Cregganmacar 2 (A016-039) consisted of a potential burnt mound/*fulacht fiadh* including the remains of two potential troughs.

Results
Four fragments from 2 charcoal samples were present and analysed from the charcoal remains. The results are represented below in Table 1.

Table 1: Results from charcoal identifications from Cregganmacar 1 & 2

Site Number	Context Number	Context Type	Sample Number	Species	Comment
A016-38 E2666	3	Layer of burnt mound material	1	Unidentifiable twig	Very distorted microstructure with large holes
A016-39 E2667	32	Fill of shallow circular pit	3	Birch/alder (0.01g), 3 fragments	Send birch/alder for dating. Really tiny fragments of charcoal and difficult to id

Discussion and Conclusions of Charcoal assemblage

Wood types identified the assemblages
The two charcoal samples were very small in size. There was only one small gnarly twig present in the sample from Cregganmacar 1 and this was unidentifiable as its microstructure could not be determined. The second sample from Cregganmacar 2 was identified as birch/alder as these fragments were also very small and some of the micro-structural characteristics of the sample could not be determined.

Alder and birch are both wetland type taxa and the results indicate that Cregganmacar 1 and Cregganmacar 2 were possibly located next to a wetland environment.

Further analysis, discussions and comparisons of results will form part of a final integrated charcoal and pollen study of the sites and the surrounding environment on this scheme which is being undertaken as part of the authors PHD thesis. These results will be published accordingly.

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RADIOCARBON DATING RESULTS
CREGGANMACAR 2

CHRONO LABORATORY, QUEENS UNIVERSITY BELFAST

Colette Rynhart
Irish Archaeological Consultancy Ltd
120b Greenpark Road
Bray
Co. Wiklow, Ireland
Rep. of Ireland
VAT No. IE8288812U

^{14}CHRONO

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-9160
Date of Measurement:	2008-05-22
Site:	A016/039 Cregganmacar Co,Westmea
Sample ID:	S3 C32
Material Dated:	Birch/Alder
Pretreatment:	Acid Only
Submitted by:	IAC

^{14}C Date: 2726±21

AMS δ^{13}C: -23.4

Information about radiocarbon calibration

```
            RADIOCARBON CALIBRATION PROGRAM*
                        CALIB REV5.0.2
        Copyright 1986-2005 M Stuiver and PJ Reimer
*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
          Annotated results (text) - -
          Export file - c14res.csv
```

```
S3 C32
UBA-9160
Radiocarbon Age BP    2726 +/-    21
Calibration data set: intcal04.14c                  # Reimer et al. 2004
  % area enclosed       cal AD age ranges               relative area under
                                                      probability distribution
  68.3 (1 sigma)      cal BC 896- 864                         0.598
                             859- 838                         0.402
  95.4 (2 sigma)      cal BC 912- 822                         1.000
```

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 References for calibration datasets:
PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, C Bertrand, PG Blackwell,
  CE Buck, G Burr, KB Cutler, PE Damon, RL Edwards, RG Fairbanks, M Friedrich,
  TP Guilderson, KA Hughen, B Kromer, FG McCormac, S Manning, C Bronk Ramsey,
  RW Reimer, S Remmele, JR Southon, M Stuiver, S Talamo, FW Taylor,
  J van der Plicht, and CE Weyhenmeyer (2004), Radiocarbon 46:1029-1058.

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE:  Cal ages and ranges are rounded to the nearest year which
       may be too precise in many instances.  Users are advised to
       round results to the nearest 10 yr for samples with standard
       deviation in the radiocarbon age greater than 50 yr.
```

OSTEOARCHAEOLOGICAL REPORT OF ANIMAL BONES FROM A016/39 CREGGANMACAR 2, N6 ATHLONE TO KILBEGGAN ROAD SCHEME COUNTY WESTMEATH

MOORE GROUP
ANIMAL BONE REPORT PREPARED FOR IAC LTD
AUTHOR: CAMILLA LOFQVIST,
OSTEOARCHAEOLOGICAL SERVICES SECTION
DATE: DECEMBER 2007

Non-technical summary

This report describes the results of the osteoarchaeological analysis of animal bones retrieved during archaeological work carried out at Cregganmacar 2 (A016/39, E2667), along the N6 Athlone to Kilbeggan Road Scheme, Co. Westmeath. The author undertook the bone analysis for the Osteoarchaeological Services Section of Moore Group (MOORE) on behalf of the client, IAC Ltd.

The bone analysis was commissioned in order to obtain an osteoarchaeological aspect of the development site and to determine if the bone material could provide additional information on the interpretation of the site. The purpose is also to broaden the understanding of animal consumption and animal husbandry at the site, through the osteological study of the animal remains.

A total of 35 bone fragments from one humerus were retrieved. This humerus was identified as pig. The weight of the fragments was 10g.

Introduction

The Osteoarchaeological Services Section of Moore Group was commissioned to undertake an osteoarchaeological analysis of disarticulated animal bones retrieved during archaeological work at Cregganmacar 2, N6 Athlone to Kilbeggan Road Scheme, Co. Westmeath. The osteoarchaeological analysis was carried out on behalf of IAC Ltd.

The purpose of this report is to broaden the understanding of animal consumption and animal husbandry at the site, through the osteological study of the animal remains. The aim is to use the bones as a means of archaeological interpretation of the site, either to support suggested theories or to point to other possible interpretations of the cultural heritage. As the osteological materials contain a large quantity of information; it is important from the start, to define the type of information that is going to be collected. The data gathered from this report was based on five different variables:

- Species distribution
- Anatomical distribution
- Age distribution
- Sex ratios and size variations
- Cut-/gnaw-marks and disease distribution.

In order to enable comparisons between the different materials it is important to be consistent in the use of analysis methods. If this is not fulfilled, the results would be impossible to compare. The osteological methods used in this report are presented in the section below.

Methodology

Identification of the bones was made by reference to Sisson and Grossman *The anatomy of the Domestic Animals* (1975), Schmid *Atlas of Animal bones* (1972), Hillson *Teeth* (1996), During´s *Bildkompendium i Animalosteologi* (unpubl) and a comparative collection of bones belonging to the author. Systematic bird bone identification was made by reference to Cohen & Serjeantson *A Manual for the Identification of Bird bone from Archaeological Sites* and where possible, the bones were identified to family level.

During analysis of the material, all fragments were counted and identified to species, anatomical unit, part of anatomical unit, side and fusion stage. Pathology and

cut/gnaw marks were also examined. Quantification was based on three methods:

NISP: Number of Identified Specimens. This indicates the total number of fragments found. The NISP is determined by different factors such as the age of the animal, the size of the animal and how well the preservation was at the location where the bones were deposited.

MNI: Minimum Number of Individuals. This indicates the minimum number of individuals from every species that were present in the material. The MNI is calculated on the specimen of the most abundant skeletal element present, taking the left and right side into consideration, as well as examining the age of the animal. However, it is important to point out that MNI is only an estimate.

MNE: Minimum Numbers of Elements. This indicates the minimum number of anatomical units that were present in the bone sample. It is important to take into consideration what side of the body the elements were from as MNE is used to calculate MNI and is also utilized in the Fusion data tables. To allow for a young individual to grow the bones from a juvenile at birth are made up of several different parts. When the individual gets older the different parts fuse together and form one bone. The parts of the bone grow together at different age-stages and this makes it possible to estimate the age of an animal. This means that three bone fragments can be part of the same bone element. For example: Proximal and distal epiphyses fused with the diaphysis. To avoid getting a higher MNE all loose epiphyses have to be paired with all unfused diaphysis.

Age is based on fusion data and tooth eruption. Habermehl (1961) and Silver (1969) have been used to determine stages of fusion while Schmid (1972) and Hillson (1996) have been used to determine tooth eruption data. It should be noted that bone elements from juveniles are often under-represented in bone materials, because they are very fragile and easy to break.

Different formulae are used to calculate Estimated Shoulder Heights (ESH) for the different species. Matolsci (1970) and Fock (1966) are used to estimate height of withers for cattle while Teichert (1975) is used for sheep.

The average height of withers and average weight of the meat-producing animals has increased from Bronze Age to Modern time. For example, cattle during medieval times had an average height of 1.05m but by the late 18th century this had increased to an average height of 1.35m (Davis, 1987:178; tab 8:7). Along with size, the average weight of the animals had increased. The dressing-out weight for cattle and caprinae is 50% of the animal's total, live weight. The dressing-out weight for pig is 80% of the animal's total weight (McCormick, 1997:200). The size figures of cattle are based on Davis (1987:178; tab 8:7).

The sex of the animals is estimated from measurements of the horncore and the coxae. For cattle, Armitage & Clutton Brock (1976) is used for the estimation based on the horncore and metacarpal while Vretemark (1997) is used for the estimation based on the coxae. For caprinae Vretemark (1997) is used for the coxae. For pig and horse, the upper and lower Canine teeth are used to determine the sex.

The bones were searched for traces of gnawing, cut marks and pathology. The gnaw marks give information about how exposed the bones were after being discarded. A high percentage of bones with traces of gnawing indicate that the bones were left exposed so animals like dogs, rats and other scavengers had access to the bones. The cut marks can provide valuable information about how the carcasses were

butchered. These marks can also provide information about if the animals were kept for their milk, as a source of meat, or if they played an important part in industrial production of for example hide or bone objects.

Results

A total of 35 bone fragments were submitted for examination. These bone fragments were examined and identified to species. The animal species identified in the material was: *Sus domesticus* (pig) (Table 1)

Showing the total number of fragments (NISP), total number of anatomical elements (MNE), total number of individuals (MNI) and total weight for all species present.

Species	NISP	NISP in %	MNE	MNE in %	MNI*	MNI in %	Weight	Weight in %
Pig	35	100%	1	100%	1	100%	10g	100%
Grand Total:	35	100%	1	100%	1	100%	10g	100%

Table 1. NISP, MNE, MNI and weight for all species.
(*MNI=Minimum Number of Individuals)

Pig; Sus

The 35 bone fragments retrieved from Cregganmacar 2 were identified as a humerus diaphysis fragment from pig. Due to the deteriorated condition of the fragments it could only be determined that this humerus was from the right side and no traces of cuts, gnawing or pathologies could be detected (Plate 1). The total weight of the pig humerus was 10g.

The main purpose of breeding pigs was for their meat which was highly appreciated and it provided a feast for visiting high-ranking guests. However, pigs were also kept as a source of fat and skin (slaughter products). During times when extraction of vegetable oils was difficult, the pig was an important source of essential fat (Wiseman, 2000:5) and the lard from pig was more appreciated than that of cattle or sheep. Pigs need a different environment to cattle and caprinae to thrive. They like foraging and grubbing and were usually kept in forests. Pigs were also reared within towns and, as they are highly prolific, they were often used for provisioning military garrisons.

Plate 1. Deteriorated humerus fragments of pig.

Summary

A total of 35 bone fragment with a total weight of 10g was submitted for examination. These bone fragments were assessed and identified as a right humerus diaphysis of pig. The pigs were appreciated for their meat as well as for their fat and skin. Pigs thrive in forests but were also reared within towns.

No definite conclusions could be made from the Cregganmacar 2 fragments due to the limited size of the bone sample.

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Appendix 1 Animal Bone Database

Sample No	Context	Animal	Element	Part of Element	NISP	MNE	Side	Pr epi	P 1/3	M 1/3	D 1/3	Di epi	J	M / F	C	G	P	Burnt	Description	Meas	Comment	weight
3	32	Sus	Humerus	Diaphysis frags	35	1	Dx	-	-	1	-	-	-	-	-	-	-	-	In bad and fragmented condition	-	10g	

APPENDIX 3 LIST OF RMP SITES IN THE AREA

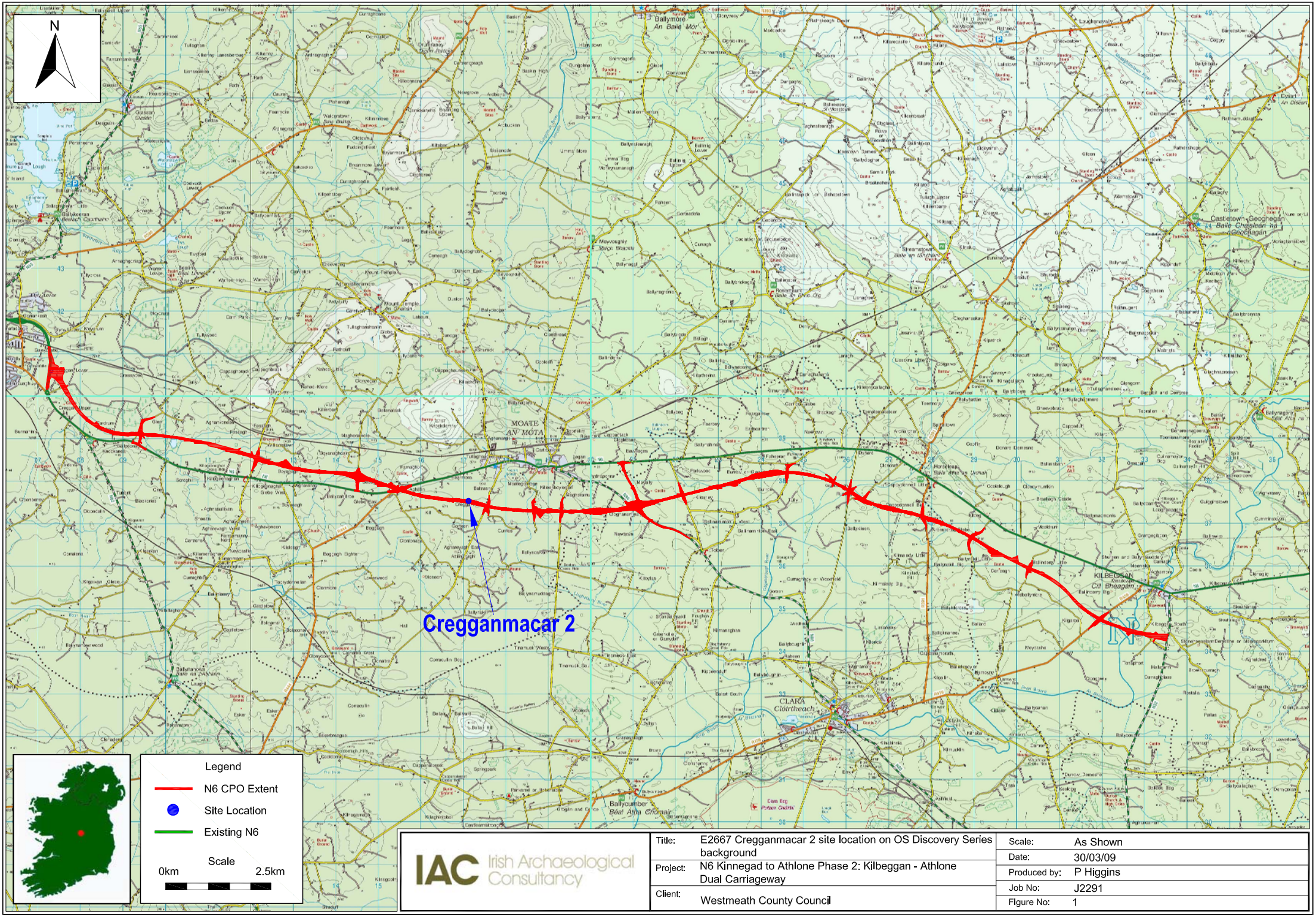
RMP No	Description
WM030-101	Ringfort (Rath/Cashel)
WM030-102	Earthwork
WM030-103	Castle
WM030-107	Ringfort (Rath/Cashel)
WM030-108	Ringfort (Rath/Cashel)
WM030-109	Castle site
WM030-111	Motte and Bailey
WM030-112	Castle
WM030-11201	Sheela-na-gig
WM030-11202	Architectural fragment
WM030-113	Cemetery
WM030-117	Bullaun Stone
WM036-014	Earthwork site
WM036-015	Ringfort (Rath/Cashel)
WM036-016	Ringfort (Rath/Cashel)
WM036-018	Castle
WM036-019	Bullaun Stone
WM036-020	Mill Site
WM036-021	Ringfort (Rath/Cashel)
WM036-030	Ringfort (Rath/Cashel)
WM036-043	Earthwork site

See Figure 2 for location.

APPENDIX 4 LIST OF N6 SCHEME SITE NAMES

Site Name	Ministerial Direction No.	NMS Registration Number
Seeoge 2	A016/007	E2635
Moyally 7	A016/015	E2643
Kilcurley 1	A016/019	E2647
Cappydonnell Big 1	A016/025	E2653
Ardballymore 2	A016/028	E2656
Creggan lower 1	A016/030	E2658
Creggan lower 2	A016/031	E2659
Williamstown 1	A016/032	E2660
Williamstown 3	A016/033	E2661
Williamstown 4	A016/034	E2662
Boyanaghcalry 1	A016/035	E2663
Seeoge 1	A016/036	E2664
Aghafin 1	A016/037	E2665
Cregganmacar 1	A016/038	E2666
Cregganmacar 2	A016/039	E2667
Cregganmacar 3	A016/040	E2668
Curries 1	A016/041	E2669
Curries 2	A016/042	E2670
Culleenagower 1	A016/043	E2671
Moyally 2	A016/044	E2672
Moyally 1	A016/046	E3274
Moyally 3	A016/047	E2674
Moyally 5	A016/048	E2675
Moyally 6	A016/049	E2676
Tober 1	A016/051	E2677
Burrow or Glennanummer 1	A016/052	E2678
Burrow or Glennanummer 2	A016/053	E2679
Burrow or Glennanummer 3	A016/054	E2680
Russagh 4	A016/055	E2681
Russagh 1	A016/056	E2682
Russagh 2	A016/057	E2683
Russagh 3	A016/058	E2684
Kilbeg 1	A016/059	E2688
Kilbeg 2	A016/060	E2689
Kilbeg 4	A016/062	E2691
Kilbeg 5	A016/063	E2692
Kilbeg 6	A016/064	E2693
Kilbeg 7	A016/065	E2694
Correagh 1	A016/066	E3374
Ballinderry Little 1	A016/067	E2695
Ardballymore 1	A016/068	E2696
Kilgaroan 1	A016/069	E2697
Kilgaroan 2	A016/070	E2698
Kilgaroan 3	A016/071	E2699
Kilgaroan 4	A016/072	E2700
Kilgaroan 6	A016/074	E2702
Ballinderry Big 1	A016/076	E3275
Ballinderry Big 2	A016/077	E3276
Ballinderry Big 3	A016/078	E3277
Tonaphort 1	A016/079	E3278
Tonaphort 2	A016/080	E3279
Tonaphort 3	A016/081	E3280

Site Name	Ministerial Direction No.	NMS Registration Number
Kilbeggan South 1	A016/082	E3281
Kilbeggan South 2	A016/083	E3282
Kilbeggan South 3	A016/084	E3283
Cregganmacar 4	A016/085	E2703
Williamstown 2	A016/086	E2704
Kilbeg 8	A016/087	E3966



IAC Irish Archaeological Consultancy

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Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client:	Westmeath County Council

Scale:	As Shown
Date:	30/03/09
Produced by:	P Higgins
Job No:	J2291
Figure No:	1

N

WM030-107
WM030-108
WM030-113
WM030-117
WM030-112
WM030-111
WM030-109
WM030-103
WM030-102
WM030-101
Seeoge 1
Seeoge 2
Aghafin 1
Cregganmacar 1
Cregganmacar 2
Cregganmacar 3
Cregganmacar 4
Curries 2
Curries 1
WM036-016
WM036-014
WM036-015
WM036-019
WM036-018
WM036-020
WM036-021
WM036-043
WM036-030

FARNAGH
TULLAGHNAGEERAGH
AGHAFIN
BALTRASNA
CREGGANMACAR
KILL
BOGGAGH
GORTEEN
CURRIES
AGHAREVAGH EAST
ATTIMURTAGH

Legend
N6 CPO Line
RMPs
Scale
0m 250m

Title:	E2667 Cregganmacar 2 showing RMPs with OS background		
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Client:	Westmeath County Council		
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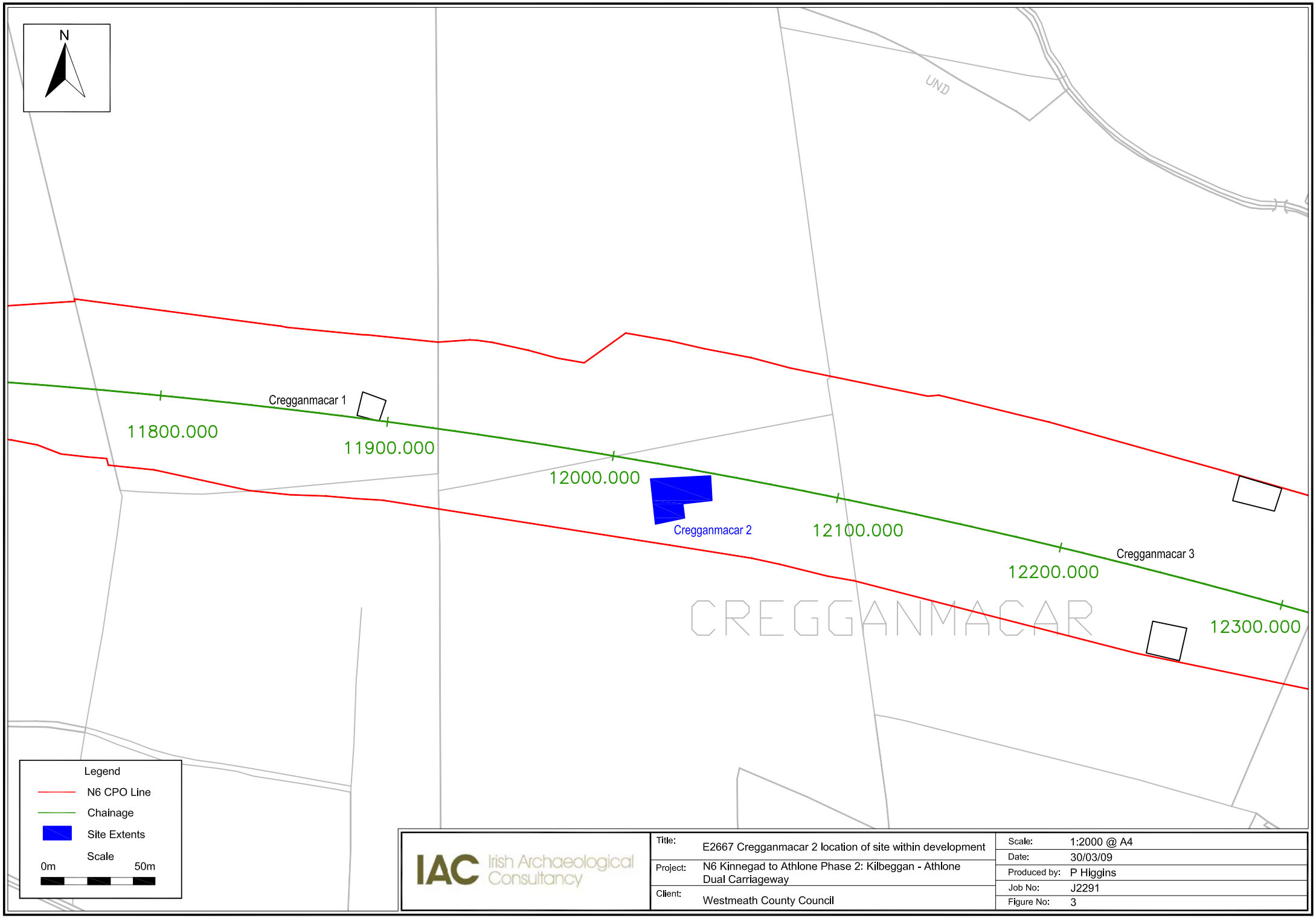
IAC Irish Archaeological Consultancy



IAC Irish Archaeological Consultancy

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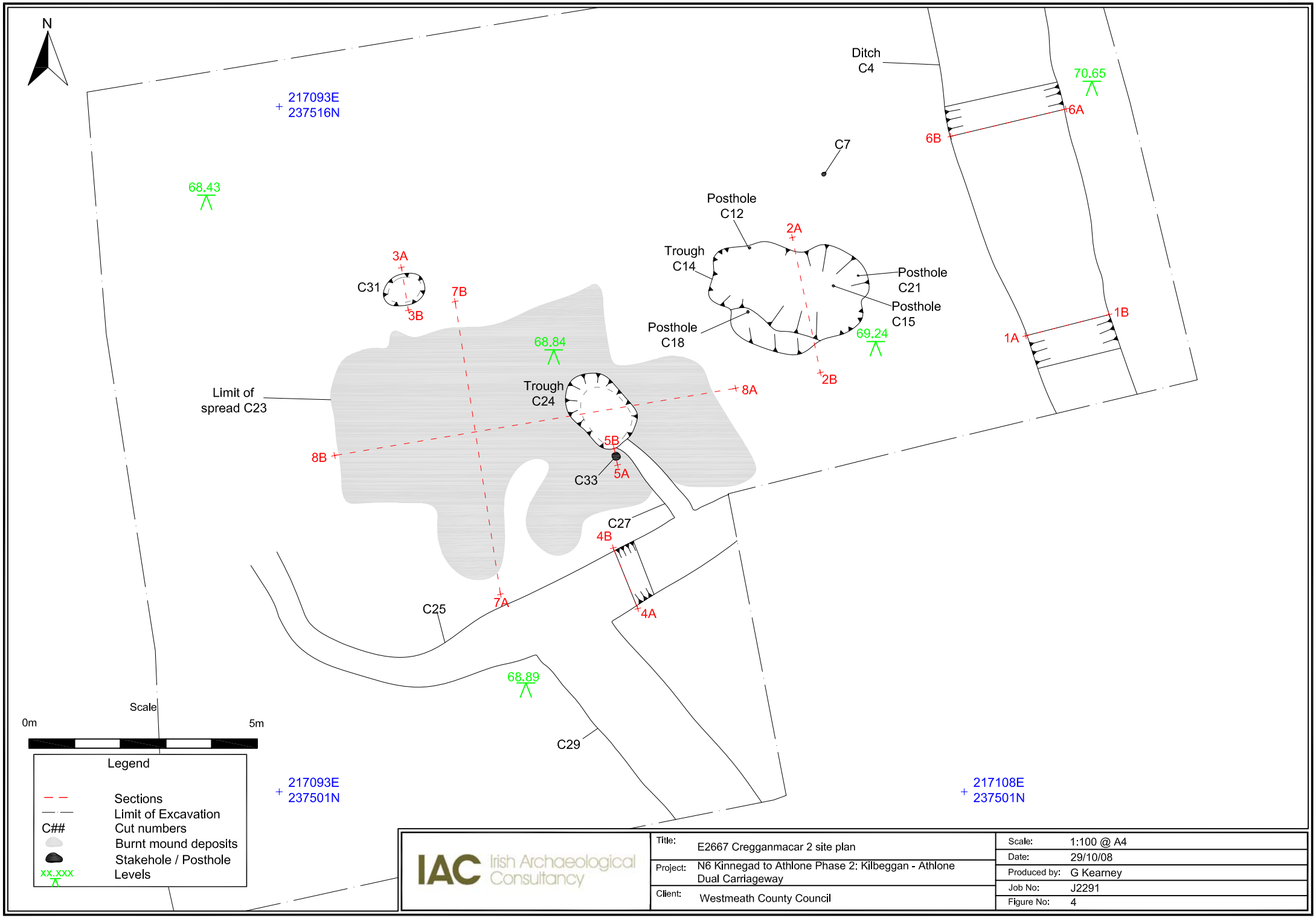
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217093E
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Posthole
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C21
Posthole
C15
Posthole
C18
69.24
2B
1B
1A
3A
C31
3B
7B
68.84
Limit of
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Trough
C24
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8B
5B
5A
C33
C27
4B
4A
C25
7A
68.89
C29
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5m
Legend
Sections
Limit of Excavation
C##
Cut numbers
Burnt mound deposits
Stakehole / Posthole
xx.xxx
Levels
IAC Irish Archaeological Consultancy
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Project: N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client: Westmeath County Council
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Date: 29/10/08
Produced by: G Kearney
Job No: J2291
Figure No: 4

Cregganmacar 2
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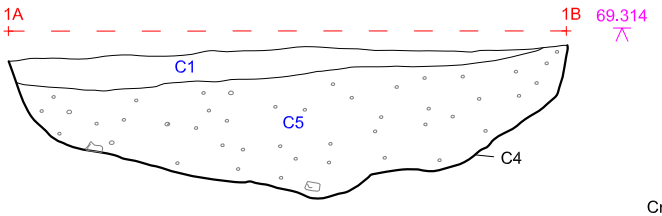

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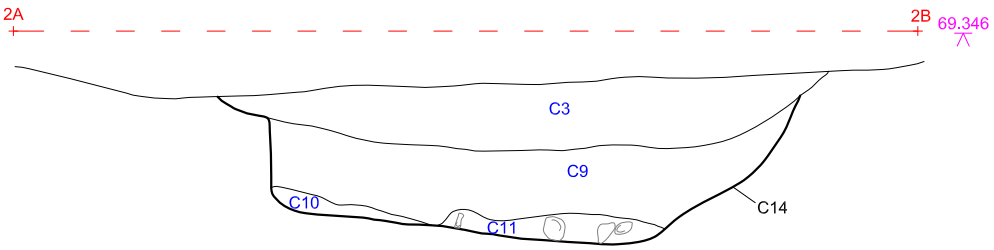
West facing section of C14



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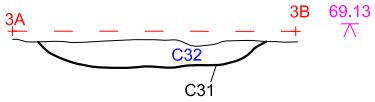

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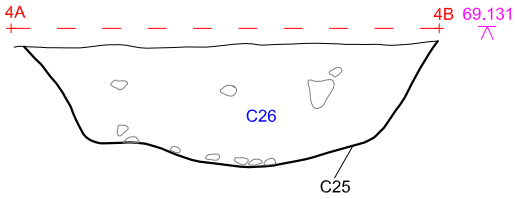
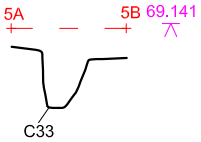
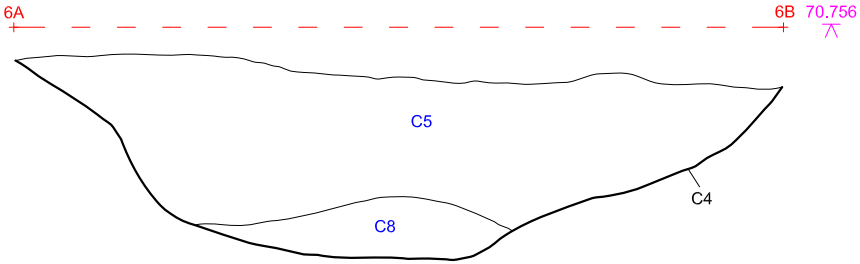


Cregganmacar 2
Profile of C33

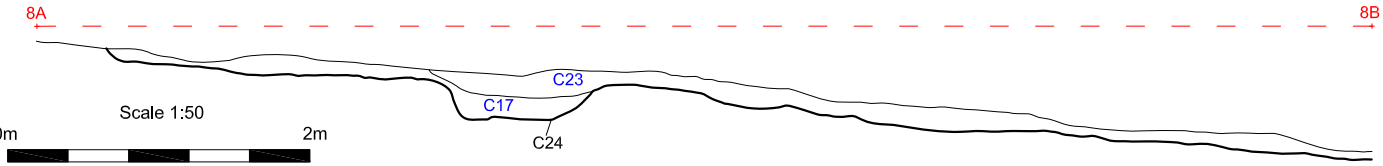


Cregganmacar 2
North facing section of C4



Cregganmacar 2
East facing section of C23

Cregganmacar 2
North facing section of C24



Scale 1:50
0m 2m

Scale 1:25
0m 1m

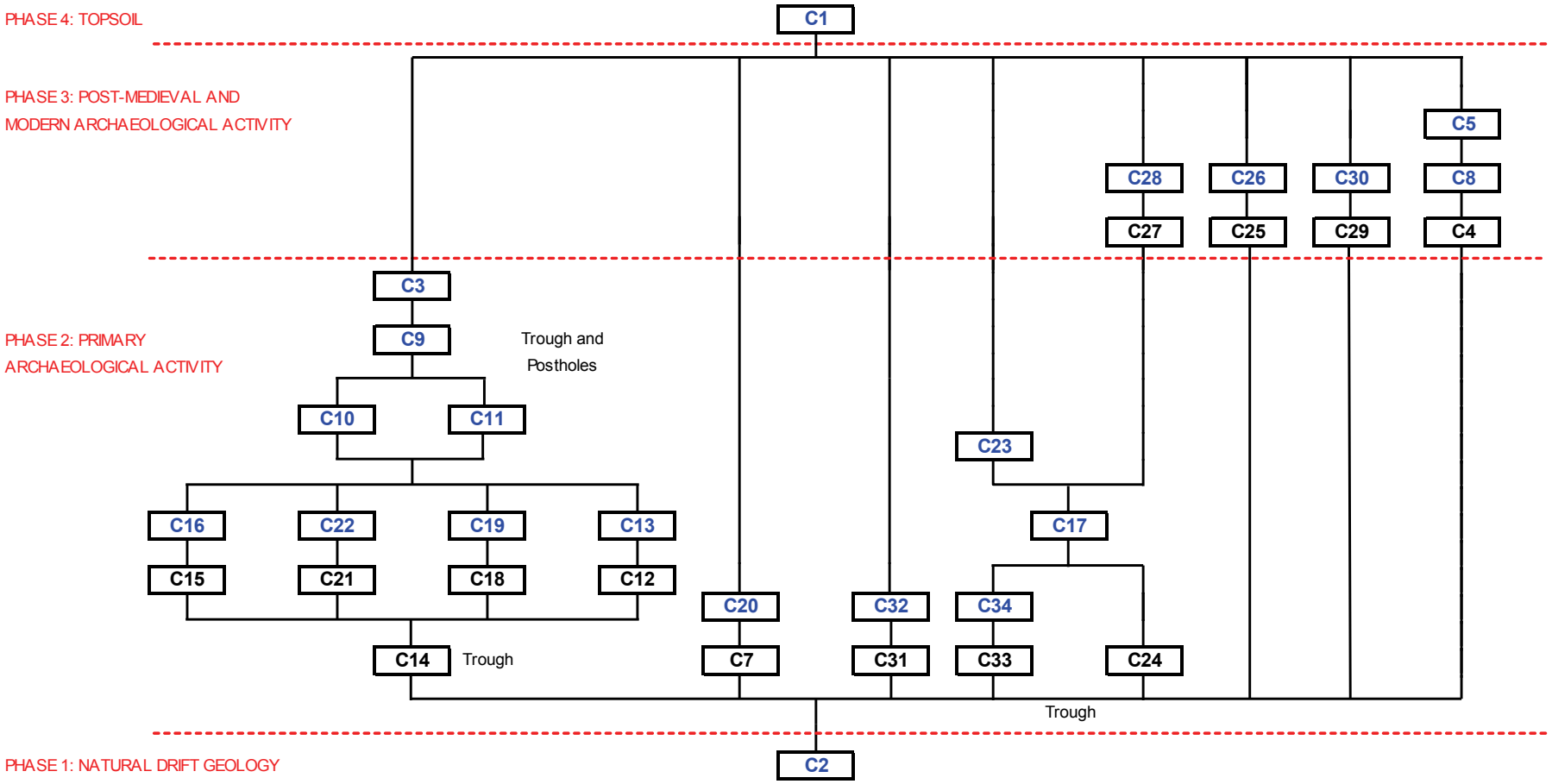
Legend

C##	Cut numbers
C##	Fill Numbers
	Stone
###.##	Reduced Levels

IAC Irish Archaeological Consultancy

Title:	E2667 Cregganmacar 2 sections 1 - 8
Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway
Client:	Westmeath County Council

Scale:	as shown
Date:	30/03/09
Produced by:	G Kearney
Job No:	J2291
Figure No:	5



CXXX = SPREADS AND FILL CONTEXTS
CXXX = CUT CONTEXTS

IAC Irish Archaeological Consultancy	Title:	E2667 Cregganmacar 2 matrix	Scale: N/A
	Project:	N6 Kinnegad to Athlone Phase 2: Kilbeggan - Athlone Dual Carriageway	Date: 25/03/09
	Client:	Westmeath County Council	Produced by: G Kearney
			Job No: J2291
			Figure No: 6