M3 CLONEE – NORTH OF KELLS MOTORWAY SCHEME
ARCHAEOLOGICAL SERVICES CONTRACT 4
NAVAN TO KELLS AND KELLS BYPASS

E3122: GRANGE 4
MINISTERIAL DIRECTION REF. NO.: A029/

FINAL REPORT

SUBMITTED TO MEATH COUNTY COUNCIL

21 JUNE 2010

Irish Archaeological Consultancy

PROJECT DETAILS

Project Reference No.	MH 00 100
Project	M3 Clonee–North of Kells, Contract 4
Ministerial Direction Reference No.	A029
Excavation Registration Number	E3122
Excavation Director	Carmel Duffy
Senior Archaeologist	Shane Delaney
Consultant	Irish Archaeological Consultancy Ltd, 120b Greenpark Road, Bray, Co. Wicklow.
Client	Meath County Council
Site Name	Grange 4
Site Type	Early Neolithic, Late Neolithic–Middle Bronze Age Pits and Early Medieval Curvilinear Gully and Pit.
Townland	Grange
Parish	Ardbraccan
County	Meath
NGR (Easting)	280940
NGR (Northing)	269850
Chainage	61600
Height m OD	69m OD
RMP No.	N/A
Excavation Start Date	14 June 2006
Excavation Duration	28 days
Report Type	Final
Report Date	21 June 2010
Report By	Carmel Duffy

ACKNOWLEDGMENTS

This final report has been prepared by Irish Archaeological Consultancy Ltd on behalf of Meath County Council and the National Roads Authority in advance of the construction of the M3 Clonee – North of Kells Motorway Scheme. This excavation has been carried out under Ministerial Direction to the Department of Environment, Heritage and Local Government (DoEHLG), in consultation with the National Museum of Ireland issued under Section 14 of the National Monuments Acts 1930–2004.

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ABSTRACT

This is a final report of an archaeological excavation at Grange 4 which was located on the route of the M3 Navan–Kells & Kells Bypass (Archaeological Services Contract 4) of the M3 Clonee–North of Kells Motorway Scheme, County Meath. The excavation was carried out by Carmel Duffy of Irish Archaeological Consultancy Ltd on behalf of Meath County Council and the National Roads Authority. The work was carried out under Ministerial Direction No. A029/004 and National Monuments Service (NMS) Excavation Registration No. E3122 which were received from the DoEHLG in consultation with the National Museum of Ireland. The fieldwork took place between 14 June 2006 – 21 July 2006.

A total area of 2160m² was opened at Grange 4 to reveal the archaeological features that were identified at the site during archaeological testing under licence 04E0925. Grange 4 consisted of a curvilinear gully, a series of pits and a possible structure.

Early Neolithic pottery was recovered from one of the pits and from a posthole in the possible structure (Structure A) which was defined by a series of postholes, stakeholes and associated pits clustered in an area of *c.* 5m diameter. A late Neolithic/earliest Bronze Age date and a middle Bronze Age date were also established for elements of this group of features, meaning that a firm date could not be conclusively be established for the structure. It was clear that they may have been residual material incorporated into the fills of these structural elements.

An early medieval phase was also identified represented by a curvilinear gully and associated pit. A pit possibly related to cereal drying was also identified and may also have been dated to this period.

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1 INTRODUCTION

This report presents the results of the archaeological excavation of Grange 4 carried out in the townland of Grange, Co. Meath (Figures 1–4) as part of an archaeological mitigation program completed under Archaeological Services Contract 4 for the M3 Navan–Kells & Kells Bypass, which forms part of the M3 Clonee–North of Kells Motorway Scheme, County Meath. Archaeological fieldwork was directed by Carmel Duffy of Irish Archaeological Consultancy Ltd (IAC) under Ministerial Direction No. A029/004 and NMS Registration No. E3122. The work described here was funded by the Department of Transport under the National Development Plans 2000–2006 and 2007–2013 as part of the Transport 21 initiative. The total archaeological cost is administered by the National Roads Authority through Meath County Council. Irish Archaeological Consultancy Ltd was appointed by Meath County Council to undertake the works following a public procurement process.

1.1 Background to the Proposed Development

The M3 Clonee–North of Kells Motorway Scheme involves construction of 49km of two-lane, dual-carriageway motorway between Clonee and Kells and 10km of single carriageway from Kells to Carnaross, north of Kells, along with additional road upgrades, realignments and associated ancillary works. For the purposes of the Environmental Impact Assessment and the subsequent archaeological investigations the scheme was subdivided into five separate sections as follows: Clonee to Dunshaughlin (Contract 1), Dunshaughlin–Navan (Contract 2), the Navan Bypass (Contract 3) Navan to Kells (Contract 4) and Kells to North of Kells (Contract 5). This section of the scheme incorporates 11.1km along the N3 Navan–Kells Road and 3.8km of the N52 Kells Bypass.

The archaeological components of the Environmental Impact Statement published in 2002 were carried out by Valerie J. Keeley Ltd (VJK) and Margaret Gowen and Co. Ltd (MGL) in 2000–2001. This included desk based studies and field surveys of each section (VJK – Sections 1 & 3 and MGL – Sections 2, 4 & 5). Additionally on behalf of Margaret Gowen and Co. Ltd geophysical survey was undertaken on the Dunshaughlin–Navan section and at Nugentstown on the Navan–Kells section by GSB Prospection (2000 & 2001). These studies carried out as part of the Environmental Impact Assessment were augmented by further geophysical survey conducted by Bartlett-Clark Consultancy on the remainder of the scheme (2002).

Advance archaeological testing was completed by ACS and Irish Archaeological Consultancy Ltd (IAC) in 2004 (ACS – Sections 1–3 and IAC Sections 4–5). Excavation of the sites identified during testing was conducted by ACS and IAC between 2005 and 2008 (ACS Sections 1–3 & 5 and IAC Section 4).

The archaeological requirements for the M3 Clonee–North of Kells Motorway Scheme are set out in the Archaeological Directions issued to Meath 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 Meath County Council and Irish Archaeological Consultancy Ltd. These documents form the basis of all archaeological works undertaken for this development. The excavations at Grange 4 were carried out in accordance with the written method statement submitted for approval to the Project Archaeologist and the National Monuments Service and National Museum of Ireland in accordance with the provisions of the Ministerial Directions and the terms of the contract.

All features identified during the assessment phase were subsequently re-identified and the site was fully excavated during the resolution phase of the scheme which took place between 14 June 2006 – 21 July 2006.

Grange 4 was located in the townland of Grange, *c.* 8.5km to the south-east of Kells and *c.* 2km south of the current N3 (County Meath OS sheet 24). The topography from Navan to Kells is generally flat and gently undulating lowland. The area is characterised by a patchwork pattern of high quality agricultural fields as well as developed hedgerows. Grange 4 (A029/004) is located in the north-west corner of a roughly rectangular field which was previously under a crop of potatoes.

The site was assigned the following identification data:

Site Name: Grange 4; Ministerial Direction Number: A029; Excavation Registration Number: E3122; Route Chainage (Ch): 61600; NGR: 280940/269850.

1.2 Previous Archaeological Work

1.2.1 EIS

An archaeological assessment of the proposed corridor for Contract 4 of the M3 Navan–Kells & Kells Bypass, which forms part of the proposed M3 Clonee–North of Kells Motorway Scheme was included within an EIS which was published in February 2002. This identified twelve RMP sites that would be directly affected by the proposed road development and highlighted a number of areas of archaeological potential.

The Environmental Impact Assessment recorded the following archaeological sites and areas of archaeological potential within 500m of Grange 4:

- ME024:008, a rectilinear earthwork. This is a poorly surviving feature best observed from the air. One straight section of the bank that formed the eastern side of the enclosure survives. The bank is *c.* 51m long, 7m wide and 1m high.

Field walking and aerial survey for the EIA revealed the following areas of archaeological potential:

- A crossing point of a tributary of the River Blackwater is located *c.* 1km southeast of Grange 4. The archaeological significance of the River Blackwater is well attested in the archaeological record. Rivers have acted as focal points for settlement through all periods of human settlement, and it is possible, particularly in green-field areas that prehistoric settlement activity may come to light.

1.2.2 Geophysical Survey

A geophysical survey of the site was undertaken from May to July 2002. The survey phases were as follows:

Phase 1:	Magnetometry of 9m blocks within each 20m strip of ground, giving 45% coverage of each 20m block.
Phase 2:	A magnetic susceptibility reading at 12.5m intervals along the magnetometry transects.

Bartlett-Clark Consultancy undertook a geophysical survey of the test area containing Grange 4 under Licence No. 02R058 (Figure 5). Any potential archaeological

anomalies worth investigation were highlighted within the report. Test trenches were excavated across geophysical anomalies to assess the extent, character and condition of any such below-ground archaeological remains (see section 1.2.3). In all cases the location of the geophysical trenches were surveyed in by GPS to ensure the accuracy of the testing exercise.

Details of the results are as follows:
No significant archaeological features which might correlate with the results from testing at Grange 4 were recorded. The absence of a definitive archaeological context to the results suggested that the isolated responses and weak trends recorded were likely to be of agricultural, modern and / or natural origin. The possibility that small scale archaeological remains such as postholes and small pits have not been detected by the gradiometer should not be dismissed.

1.2.3 Testing

Grange 4 was identified as a result of archaeological assessment undertaken by IAC Ltd. in 2005. The testing at Grange 4 (Ronayne 2005) revealed a line of possible postholes/pits with two pits/postholes on either side of the line and a small spread of possible burnt material at the south-west end. One of the postholes/pits was sectioned and found to contain prehistoric pottery sherds and one piece of flint debitage in its fill. An irregular-shaped reddish brown small spread that measured 0.5m in length and 0.3m in width was also noted in this area.

1.3 Methodology

The methodology adopted was in accordance with the approved Method Statement. The topsoil was removed to the interface between natural and topsoil using a 20 tonne mechanical excavator equipped with a flat toothless bucket under strict archaeological supervision across an area measuring 2160m². 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 tied in to the national grid using GPS survey equipment.

All archaeological features were fully excavated by hand and recorded on *pro forma* record sheets using a variant of the single context recording system with plans and sections being recorded 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. These photographs were supplemented by specialist aerial photography.

An environmental strategy was devised at the beginning of the excavation which consisted of a combination of targeted and random bulk sampling. This ensured that noticeably rich contexts were sampled, but also allowed for samples where environmental remains may not have been obvious. Features exhibiting large amounts of carbonised material such as hearths and pits were the primary targets as well as structural stakeholes and postholes.

All artefacts uncovered on site 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's facility in Lismore, Co Waterford and will ultimately be deposited with the National Museum of Ireland.

All dating of samples from the site was carried out by means of AMS (Accelerator Mass Spectrometry) Radiocarbon Dating of identified and recommended charcoal and charred plant remains samples. All calibrated radiocarbon dates in this report are quoted to two Sigma. Dating of the site also involved pottery, lithic and small find analysis through typological study.

All excavation and post excavation works were carried out in accordance with the relevant approvals and in consultation and agreement with the National Roads Authority (NRA) Project Archaeologist, the National Monuments Section of the DoEHLG and the National Museum of Ireland. Where necessary licences to alter and export archaeological objects were sought from the National Museum of Ireland.

Final Report Date Ranges

The following date ranges for Irish prehistory and medieval periods are used for all final reports for the M3 Contract 4 excavations.

Mesolithic: 7000–4000 BC
Neolithic: 4000–2500 BC
Early Bronze Age: 2500–1700 BC
Middle Bronze Age: 1700–1200 BC
Late Bronze Age: 1200–800 BC
Iron Age: 800 BC–AD 500
Early medieval period: AD 500–1100
Medieval period: AD 1100–1600
Post-medieval: AD 1600–1800

Source:
Carlin, N., Clarke, L. & Walsh, F. 2008 *The M4 Kinnegad-Enfield-Kilcock Motorway: The Archaeology of Life and Death on the Boyne Floodplain*. NRA Monograph Series No. 2, Wordwell, Bray.

2 EXCAVATION RESULTS

Two–three phases of activity were identified at Grange 4. An early Neolithic phase (Phase 1) was identified by a large pit with associated features which contained early Neolithic pottery. A group of postholes, stakeholes and pits (Structure A) contained early Neolithic pottery and returned both final Neolithic/early Bronze Age and middle Bronze Age AMS dates. An early medieval phase (Phase 2) was recognised by a single pit with associated curvilinear gully. A number of pits, isolated postholes and stakeholes were positioned across the site, none of which could be conclusively assigned to Phase 1 or 2. A firm date for Structure A is also elusive.

2.1 Natural Geology

The geology of the area consists of stiff silts overlying glacial till with limestone bedrock likely to be at *c.* 5 m below ground level. The area surrounding Kells is characterised by relatively low ice marginal ridges, eskers, and kame and kettle topography (Finch *et al*. 1983; Meehan 1996) dominated by sand and gravel units. Overall, this area is very hummocky with some interspersed peat bogs and badly drained hollows (Meehan 1999).

The natural subsoil varied across this cutting. It had patches of orange brown and yellow brown silty soil. There were frequent inclusions of medium sized sub-angular and rounded stones.

2.2 Phase 1: Early Neolithic Pits

A number of pits containing early Neolithic pottery and lithics were identified, central to which was large pit C110/C11.

2.2.1 Large Pit C110/C11

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C11/C112	N/A	1.26	0.82	0.18	Irregular, sloping sides, concave base.	Pit.
C110	N/A	2.35	1.65	0.55	Sub-rectangular, sloping sides.	Pit.
C111	C110	0.79	1.65	0.28	Firmly compact mid-brown silty clay.	Fill of pit.
C113	C11	1.26	0.82	0.18	Firm light yellow brown clayey/silt.	Fill of pit.
C121	C110	0.7	0.45	0.26	Compact dark brown/grey clayey silt.	Fill of pit.
C122	C110	0.65	0.4	0.04	Firmly compact dark grey/brown silty clay.	Fill of pit.
C124	C110	1.05	0.52	0.28	Hard compact light brown silty sand.	Re-deposited subsoil.

Finds:

Context	Find Number	Material	Period	Description
C111	E3122:111:4–12	Pottery	Early Neolithic	Sherds and fragments.
C111	E3122:111:14	Chert	Early Neolithic	Angular shatter piece.
C111	E3122:111:15–23	Pottery	Early Neolithic	Sherds.
C111	E3122:111:24	Fossil	Prehistoric	Fossil, possible bead.
C111	E3122:111:26	Stone	Prehistoric	Possible bead fragment.
C111	E3122:111:27	Quartz	Early Neolithic	Angular shatter.
C111	E3122:111:29	Pottery	Early Neolithic	Sherd.
C111	E3122:111:30, 33	Chert	Early Neolithic	Chert flake.
C111	E3122:111:31	Chert	Early Neolithic	Possible wedge tool.
C111	E3122:111:32	Chert	Early Neolithic	Chert core.
C113	E3122:113:1	Pottery	Early Neolithic	Sherd.

Interpretation:

This large, sub-circular-shaped, north-west to south-east orientated pit (Figures 6–7; Plates 1 and 2) was located roughly at the centre of the area of excavation.

Pit C110 had sloping sides and an irregular shaped base. The pit contained four fills, (C111, C121, C122 and C124) and was then truncated by a secondary pit (C11) that contained fill C113. There appeared to be an arrangement of stones towards the north-west end of the feature. Fill C121 was a basal fill and was located at the southern end of pit C110. It was a loosely compact, dark-brown/grey, clayey silt. Fill C122 was also a basal fill that was located at the southern end of C110. It consisted of a firmly compact, dark-grey/brown, silty clay with charcoal inclusions. Fill C124 was the third basal fill that was located at the centre of pit C110. This fill consisted of a hard compact, light-brown, silty sand with some gravel inclusions. This layer was interpreted as redeposited subsoil. Fill C111 was the upper fill of pit C110 and consisted of *c*. 80% of the entire fill of the feature.

Fill C111 was a firmly compact, mid-brown, silty clay with occasional charcoal flecks and burnt bone inclusions. A sample of this was submitted for charcoal analysis. The majority of the charcoal identified was found to be oak (*Quercus* sp.) with a small quantity of pomaceous fruitwood (Maloideae) and hazel (*Corylus avellana*) also present (O'Donnell, Appendix 2.4). Analysis carried out on a sample of burnt bone from this context could only identify five calcined fragments of indeterminate bone (McCarthy, Appendix 2.6). C111 was the only fill towards the north of the feature, and it also sealed the entire pit, apart from the south-east section. A number of finds were recovered from C111 including nine sherds of early Neolithic pottery representing at least four vessels (Grogan and Roche, Appendix 2.1) and two possible beads. One of the possible beads is a fossil crinoid ossicle while the other appears to have been fashioned from sandstone or siltstone (Parkes, Appendix 2.3.2).

Four pieces of chert were recovered from C111 including a wedge tool (Figure 8) which exhibits some retouch as well as edge damage through use, and was based on a small bipolar flake (E3122:111:31). Wedge tools are present in most Neolithic chipped stone assemblages, in both ritualised (e.g. Ballynahatty, Co Down) and domestic (e.g. Thornhill, Co Derry) contexts, where it is inferred that they were used to split/chop bone and/or wood. A single piece of quartz shatter was also recovered (Nelis, Appendix 2.2).

Pit C110 was truncated at its southern end by a second small pit, C11 (which had also been recorded as C112). This was an irregular-shaped feature with sloping sides and a concave base. Its break of slope was sharp at the top and absent at the base. It had one fill (C113) which was a moderately firm, light yellow brown, clayey/silt with charcoal inclusions. Frequent sub-angular stones were also present within this fill. Analysis of charcoal from a sample of C113 identified only oak (*Quercus* sp.) (O'Donnell, Appendix 2.4). One sherd of early Neolithic pottery was also recovered (Grogan and Roche, Appendix 2.1).

2.2.2 Pit C10, Posthole C35, and Stakehole C65

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C10	N/A	0.94	0.85	0.14	Circular, sloping sides, irregular base.	Pit.
C35	N/A	0.25	0.25	0.1	Circular, sloping sides, concave base.	Posthole.
C64	C35	0.25	0.25	0.1	Firm mid-orange brown silty clay.	Fill of posthole.
C65	N/A	0.12	0.12	0.07	Circular, steep sides and a concave base.	Stakehole.
C66	C65	0.12	0.12	0.07	Firm, mid-brown silty clay.	Fill of stakehole.
C80	C10	0.48	0.45	0.11	Dark brown to black silty soil.	Fill of pit.
C81	C10	0.94	0.85	0.19	Mid-brown/orange silty soil.	Fill of pit.

Finds: None

Interpretation:
These three features were positioned immediately either side of pit C110/C11 and may have been associated with it (Figures 6 and 7). Pit C10 was a large circular-shaped pit with sloping sides and an irregular-shaped base (Plate 3). Its break of slope was gradual at the top and bottom. Its upper fill (C80) was a firmly compact, dark brown/black, charcoal-rich, silty soil. Occasional small stones were also present. Its basal fill (C81) was a firmly compact, mid-brown, sandy silt with inclusions of charcoal and small burnt stones. There were traces of *in situ* burning towards the north and south of the feature.

Posthole C35 and stakehole C65 were located to the north-west of pit C110/C11. Posthole C35 was a circular-shaped feature with sloping sides and a concave base. Its break of slope was sharp at the top and gradual at the base. Its fill (C64) was a moderately firm, mid-orange brown, silty clay, with inclusions of very small stones. Stakehole C65 was also a circular-shaped feature with steep sides and a concave base. The break of slope was sharp at the top and bottom. Its fill (C66) was a firm, mid to light-brown silty clay, with inclusions of very small stones. Stakehole C65 was located 0.2m directly to the north of posthole C35.

2.3 Posthole, Stakehole and Pit Group (Structure A)

2.3.1 Structure A

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C3	N/A	0.45	0.41	0.16	Circular, vertical sides and a sloping base.	Cut of pit.
C4	N/A	0.5	0.4	0.19	Oval, sloping sides and a concave base.	Cut of pit
C18	N/A	0.86	0.33	0.2	Triangular, irregular sides, sloping base.	Cut of pit.
C20	N/A	0.14	0.17	0.2	Circular, vertical sides and a concave base.	Cut of posthole.
C21	N/A	0.08	0.08	0.08	Circular, straight sides and a concave base.	Cut of stakehole.
C22	N/A	0.21	0.2	0.19	Circular, steep sides and a 'v' shaped base.	Cut of posthole.
C23	N/A	N/A	0.39	0.14	Circular, steep sides and a concave base.	Posthole.
C25	N/A	0.2	0.22	0.45	Circular, vertical sides and a flat base.	Cut of posthole.
C27	C85	0.3	0.3	0.27	Mid-to light brown silty clay,	Fill of posthole.
C28	C3	0.43	0.37	0.18	Mid-brown to grey silty soil.	Fill of pit.
C29	C4	0.5	0.4	0.19	Mid-brown to grey silty soil.	Fill of pit.
C38	N/A	0.19	0.13	0.1	Sub-circular, steep sides, sloping base.	Cut of posthole.
C40	N/A	0.1	0.1	0.1	Circular, vertical sides, irregular base.	Fill of stakehole.
C56	C20	0.14	0.14	0.2	Firmly compact grey brown silty clay.	Fill of posthole.
C70	N/A	0.26	0.26	0.13	Circular, vertical sides and a concave base.	Post-pipe in C23.
C71	C70	0.26	0.26	0.15	Compact light yellow/brown silty soil.	Fill of posthole.
C72	C23	N/A	0.4	0.14	Compact light yellow/brown silty clay soil.	Packing fill.
C73	C25	0.2	0.22	0.45	Loosely compact mid-brown silty soil.	Fill of posthole.
C82	C38	0.19	0.13	0.1	Loosely compact light brown silty soil.	Fill of posthole.
C83	C18	0.86	0.33	0.19	Medium compact red/orange silty soil.	Fill of pit.
C85	N/A	0.36	0.3	0.27	Circular, steep sides and a concave base.	Fill of posthole.
C88	C18	0.86	0.21	0.075	Compact light orange brown silty clay.	Fill of pit.
C93	C22	0.21	0.2	0.19	Compact mid-brown silty clay.	Fill of posthole.
C94	C21	0.08	0.08	0.08	Firmly compact mid-to light brown sandy silt	Fill of stakehole.
C95	C40	0.95	0.95	0.95	Med. compact dark orange brown silty clay.	Fill of stakehole.
C96	N/A	0.08	0.07	0.11	Circular, vertical sides and a concave base.	Fill of stakehole.
C97	C96	0.08	0.07	0.11	Medium compact mid-brown silty soil.	Fill of stakehole.
C115	C120	N/A	0.29	0.35	Loosely compact mid-brown silty soil.	Fill of posthole.
C119	C120	N/A	0.14	0.12	Med. compact mid-to dark brown silty soil.	Fill of posthole.
C120	N/A	N/A	0.29	0.62	Circular, steep sides and a concave base.	Cut of posthole.

Finds:

Context	Find Number	Material	Period	Description
28	E3122:28:1	Burnt flint	Prehistoric	Flake debitage.
29	E3122:29:1	Chert	Prehistoric	Flake debitage.
29	E3122:29:2–9	Pottery	Early Neolithic	Sherds.
71	E3122:71:1	Pottery	Early Neolithic	Sherd.

Interpretation:
This tentatively identified structure was defined by a series of postholes: C20, C22, C25, C38, C23, C85, C120; stakeholes: C21, C40, C96, and three pits: C3, C4, C18 (Figures 6–7; Plates 4–9). All of the features were within close proximity and were relatively isolated from other features within the area of excavation.

The postholes, stakeholes and pits were aligned in one south-west–north-east line (stakeholes C96, C40, postholes C85, C23 and pit C4), a rough south-east–north-west line perpendicular to this defined by postholes C22 and C120, stakehole C21 and pits C3 and C18 (Figure 6). The remaining feature, a relatively isolated posthole (C38), was positioned *c.* 2m to the south of C120.

On average, the postholes and stakeholes were between 0.5m and 0.75m apart from each other. They were all circular with an average diameter of 0.25m and had steep sides, with either a flat or concave base. Their break of slope was sharp at the top and bottom. Their fills were generally loose to moderately compact, light to mid-brown silty clay, with occasional small stones and flecks of charcoal. Postholes C20 and C120 contained large, sub-angular stones which may have been packing stones. The fill of posthole C23 contained one sherd of early Neolithic pottery (Grogan and Roche, Appendix 2.1).

Postholes C20 and C25 (Plate 9) were slightly apart from the main cluster of features. Posthole C20 was located 2m to the north-east of the south-east–north-west line of features outlined above while posthole C25 was positioned *c.* 1m north of posthole C23. Posthole C23 was located 0.5m north-east of pit C4. It was a circular in plan and had steep sides and a concave base. Its break of slope was sharp at the top and bottom. It had clear packing (C72) and post-pipe (C70).

A sample of C56, the fill of posthole C20, was submitted for charcoal analysis. Fill C56 was found to contain small quantities of hazel (*Corylus avellana*), ash (*Fraxinus* sp.) and oak charcoal (*Quercus* sp.) while C73, the fill of posthole C25, contained hazel and oak. O'Donnell notes that the small quantity of charcoal recovered from these fills makes it unlikely that the posts had been burnt *in situ* (Appendix 2.4), and this was apparent in the archaeological remains.

There were four pits (C3, C4, C18 and C23) associated with the postholes and stakeholes.

Pit C3 circular in plan with vertical sides and a sloping base. Its break of slope was sharp at its top and bottom. Its fill (C28) was a moderately compact, grey silty soil with occasional flecks of charcoal and infrequent inclusions of very small stones. A single piece of burnt flint shatter was recovered from this context (Nelis, Appendix 2.2).

Pit C4 (Plate 5) was located 1.25m to the north-west of pit C3. It was oval in plan and had sloping sides with a concave base. Its break of slope was irregular at the top and concave at the base. Its fill (C29) was a mid-brown to grey silty soil and contained inclusions of stone, decayed stone and flecks of charcoal. A chert flake (Nelis,

Appendix 2.2) and seven sherds and one fragment of early Neolithic pottery from a single vessel (Grogan and Roche, Appendix 2.1) were recovered from this fill. Plant remains analysis carried out on a sample of C29 by Susan Lyons identified hazelnut shell (Appendix 2.5) while charcoal analysis identified very low quantities of hazel (*Corylus avellana*), oak (*Quercus* sp.) and elm (*Ulmus* sp.) (O'Donnell, Appendix 2.4).

Pit C18 was 0.5m east of pit C3, and 1.5m south of C20 and 3.2m north of C38, the two most easterly features of this cluster. It was a sub-triangular-shaped feature with irregular sides and a sloping base. The break of slope was sharp at the top and irregular at the bottom. It had two fills (C83 and C88). Fill C83 was the basal fill and was a red/orange clay. This fill/deposit was possibly created by *in situ* burning, although it should be noted that there was no charcoal present within the fill. Fill C88 was the upper fill and consisted of a loosely compact, light orange brown silty clay. No charcoal or stones were present within this fill.

Dating and function
A fragment of charred hazelnut shell was identified from a sample of fill C71 from posthole C23–post-pipe C70 (Lyons, Appendix 2.5) and was chosen for AMS dating. The charred shell returned an AMS result of 4008+/-25 BP (UBA 11128). The 2 Sigma calibrated result for this was 2574–2474 BC (Appendix 2.8), indicating a date in the transition from the late Neolithic / early Bronze Age period for this feature.

A fragment (0.1g) of hazel charcoal (*Corylus avellana*) identified from a sample of fill C73 of posthole C25 by Ellen O'Carroll was also selected for AMS dating. The charcoal returned an AMS result of 3145+/-23 BP (UBA 11127). The 2 Sigma calibrated result for this was 1493–1326 BC (Appendix 2.8), indicating a date in the middle Bronze Age for this posthole.

In addition to these dates early Neolithic pottery was recovered from pit C4 and posthole C23 (which returned a late Neolithic/early Bronze Age AMS date). It is possible that the pottery is residual from the pit group C110/C11 however regardless of this possibility, the fact that the AMS dates are at odds with each other means that a precise date for this group of features cannot be established.

2.4 Early Medieval Features

2.4.1 Curvilinear Feature

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C127	C131	6.2	0.1–0.2	0.1	Mid-brown silty soil, rich in charcoal.	Fill of arc shaped feature.
C130	C131	6	0.1	0.1	Mid-brown silty clay.	Fill of arc shaped feature.
C131	N/A	6.8	0.8–1.2	0.2	Arc shaped, irregular sloping sides.	Cut of arc shaped feature.

Finds: None

Interpretation:
This curvilinear feature that formed an arc contained two fills (Figures 6–7; Plate 10). The feature was located in the southern half of the area of excavation, just at the edge of the limit of excavation.

Curvilinear feature C131 was semi-circular in plan and had rounded corners, steep sides and a rounded base. Its break of slope was sharp at the top and gradual at the base. It had two fills (C127 and C130). Fill C130 was the basal layer and consisted of a firmly compact, yellow sandy soil with inclusions of large flecks of charcoal. Fill

C127 was the upper fill and consisted of a compact, grey, silty clay with inclusions of large pieces of charcoal and small pieces of charcoal. A sample of this fill was analysed by Susan Lyons and was found to contain barley (*Hordeum* sp.) grains as well as a small quantity of oat (*Avena* sp.) grains. Lyons suggests that these most likely represent a dumping of discarded charred remains from nearby kilning activities (Appendix 2.5). A further sample sent for charcoal analysis was found to contain mainly hazel (*Corylus avellana*), with some alder (*Alnus* sp.) and willow (*Salix* sp.) charcoal also present (O'Donnell, Appendix 2.4).

It was not possible to determine the precise function of this feature however it may have been associated with pit C7 located to the north-east of the eastern terminus of the gully.

2.4.2 Pit C7

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C7	N/A	0.7	0.7	0.15	Circular, steep sides and a concave base.	Pit.
C67	C7	0.4	0.4	0.12	Medium compact mid-brown silty clay.	Fill of pit.
C69	C7	0.7	0.7	0.15	Compact dark brown/grey silty soil.	Fill of pit

Finds: None

Interpretation:
Pit C7 contained two fills: C67 and C69 (Figures 6–7; Plate 11). This pit was a circular-shaped feature and was bowl-shaped in profile. It had steep sides and a concave base. Its break of slope was sharp at the top and gradual at the bottom. Fill C69 was the basal layer and consisted of a loosely compact, black, sandy silt rich in charcoal and burnt bone. Fill C67 was the upper fill and was located at the eastern side of the cut. It consisted of a moderately compact, mid-brown, silty clay. A sample of C69 sent for charcoal analysis was found to contain mainly ash (*Fraxinus* sp.) charcoal with small quantities of alder (*Alnus* sp.), pomaceous fruitwood (Maloideae) and willow (*Salix* sp.) (O'Donnell, Appendix 2.4). The presence of a small quantity of burnt bone within this pit led the excavator to believe that this feature may have been a cremation pit; however osteo-archaeological analysis of this bone sample established that it was too fragmented to be identified to species or anatomical element (Coughlan, Appendix 2.7).

Two charred Barley grains (*Hordeum* sp.) (<0.1g) were identified from a sample of fill C69 by Susan Lyons (Appendix 2.5). This cereal sample was chosen for AMS dating and returned an AMS result of 1291+/-27 BP (UBA 11126). The 2 Sigma calibrated result for this was AD 666–772 (Appendix 2.8), indicating a date in the early medieval period for this pit.

Pit C7 was positioned to the north-east of the eastern terminus of curvilinear gully C131 and may have been related to it.

2.4.3 Pit C30 and Posthole C31

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C30	N/A	0.48	0.46	0.2	Sub-circular, sloping sides, concave base.	Cut of pit.
C31	N/A	0.13	0.18	0.04	Circular, concave sides and a flat base.	Posthole.
C91	C31	0.13	0.18	0.04	Firm compact light brown/yellow silty clay.	Fill of posthole.
C92	C30	0.48	0.46	0.2	Firm light brown/yellow silty clay,.	Fill of pit.

Finds: None

Interpretation:
Pit C30 was located immediately east of the eastern terminus of curvilinear gully C131. It was a sub-circular-shaped feature with sloping sides and a concave base. Its break of slope was gradual at the top and bottom. Its fill (C92) was a moderately firm, light brown/yellow, silty clay with frequent inclusions of charcoal flecks and medium-sized circular stones.

Posthole C31, positioned *c.* 2m west of pit C7, was a shallow, circular-shaped feature with concave sides and a flat base. Its break of slope was sharp at the top and bottom. Its fill (C91) consisted of a moderately firm compact, light brown/yellow, silty clay with occasional flecks of charcoal.

2.5 Un-Dated Features

A number of dispersed pits and groups of features were recorded across the site that were not dated and cannot be assigned to any recognised phase of activity.

2.5.1 Linear Feature C6

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C6	N/A	2.2	0.6	0.1	Linear, steep sides and a flat base.	Linear cut.
C100	C6	0.5	0.44	0.1	Firm dark brown/black, silty soil.	Fill of linear cut.
C101	C6	0.96	0.5	0.1	Yellow/light brown sandy clay.	Fill of linear cut.
C102	C6	0.74	0.64	0.16	Moderately compact mid-brown silty soil.	Fill of linear cut.

Finds: None

Interpretation:
Linear feature C6 (Figure 6) was located at the southern end of the area of excavation and extended beyond the CPO and was therefore only partly exposed. It was linear in plan, with steep sides and a flat base. Its break of slope was gradual at the top and bottom. It contained three fills (C100, C101 and C102).

Fill C101 was the basal fill of C6. It was a moderately firm, dark brown/black, charcoal-rich silty fill with occasional sub-angular stones. Fill C101 was overlain at its southern end by fill C100 which was a moderately firm, dark-brown/black charcoal-rich, silty fill. It contained frequent sub-angular stones. Fill C102 overlay fill C101 at its northern end and was a moderately compact, mid-brown, silty fill with frequent charcoal deposits and occasional medium-sized stones.

The function of this feature is unclear, and not all of it was exposed. It is possible that there was more than phase of activity, as indicated by the truncation of the basal fill of the feature. It may also have been that this feature represented just an area of burning vegetation.

2.5.2 Pit C9 with Postholes and Stakeholes

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C9	N/A	0.47	0.72	0.3	Sub-oval, sloping sides and a flat base.	Pit.
C32	N/A	0.14	0.16	0.19	Circular, vertical sides and a concave base.	Posthole.
C37	N/A	0.1	0.11	0.13	Sub-circular, vertical sides, concave base.	Stakehole.
C74	C116	0.2	0.16	0.15	Moderately compact silty soil.	Fill of posthole.
C77	C9	0.47	0.72	0.3	Dark brown and red silty soil.	Fill of pit.
C78	C37	0.1	0.11	0.13	Firmly compact mid-brown silty soil.	Fill of stakehole.

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C79	C32	0.14	0.16	0.19	Compact mid-brown silty soil.	Fill of posthole.
C116	N/A	0.2	0.16	0.15	Irregular, vertical sides and a concave base.	Posthole.

Finds: None

Interpretation:
Pit C9 and associated stake and postholes: C32, C37 and C116 (Figures 6–7; Plate 12) were located towards the south-west of the area of excavation, approximately 15m to the west of early medieval pit C7.

Pit C9 was a sub-oval-shaped feature with sloping sides and an irregular base. Its break of slope was sharp at the top and bottom. This feature contained one fill (C77) a moderate to hard, dark-brown/black, silty sand that was rich in charcoal and small stones and there was evidence of *in situ* burning within the pit. Analysis of a sample of C77 was found to contain oak (*Quercus* sp.) charcoal (O'Donnell, Appendix 2.4).

There were two postholes (C32, C116) and a stakehole (C37) that appeared to be related to this pit. Both postholes had vertical sides, a concave base and a sharp break of slope at the top and bottom. They differed in plan, as posthole C32 was circular and posthole C116 had an irregular shape. Stakehole C37 was also circular, with vertical sides, a concave base and a sharp break of slope at the top and bottom. The fills within the stakehole and postholes were similar. They consisted of a moderately/firmly compact, mid to dark brown silty soil with occasional flecks of charcoal.

The location of these postholes and stakeholes suggests that they may have formed some type of structure around the pit but no function could be determined for this group of features.

2.5.3 Dispersed Pits

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C62	N/A	0.42	0.42	0.11	Circular, sloping sides, concave base.	Fill of shallow pit.
C104	C62	0.42	0.42	0.11	Fairly loose light yellow brown silty clay	Fill of shallow pit.
C108	N/A	0.17	1.3	0.08	Sub-rectangular, vertical sides, flat base.	Modern cut.
C109	C108	0.17	1.3	0.08	Compact light/mid-brown sandy silty soil.	Fill.
C125	C126	0.08	0.08	0.1	Loosely compact dark brown sandy clay.	Fill of pit.
C126	N/A	1.05	0.52	0.28	Circular, steep sides and a flat base.	Pit.
C128	C126	0.58	0.56	0.08	Loosely compact dark black sandy clay.	Fill of pit.
C129	C126	0.2	N/A	0.04	Loosely compact mid-red sandy clay	Fill of pit.

Finds: None

Interpretation:
These three pits (C62, C108, and C126) were dispersed across the site (Figures 6–7).

C126 represented a small circular pit (Plate 13) that contained three fills (C125, C128 and C129). This feature was located at the western end of the excavation area. Pit C126 was circular in plan with steep sides and a concave base. The break of slope was sharp at the top and concave at the base. Fill C129 was a burnt clay layer at the interface of the cut and the basal fill (C128). It was a loosely compact, mid-red, sandy clay. This burnt layer was located mainly at the southern end of the feature. Fill C128 was a basal layer, and consisted of loosely compact, dark black sandy clay that was

rich in charcoal. Its upper fill (C125) was a loosely compact, dark-brown, sandy clay which was rich in ash (*Fraxinus* sp.) charcoal (O'Donnell, Appendix 2.4) and contained frequent pebbles. A sample of C128 was sent for analysis by Susan Lyons and found to contain a quantity of oat (*Avena* sp.) grains as well as a small quantity of barley (*Hordeum* sp.) grains. A number of unidentifiable grains were also present. Lyons suggests that this feature may have functioned as a corn drying kiln or crop storage facility, which may have burnt down (Appendix 2.5).

Small pit C62 was isolated and located in the north-east of the site. It was a relatively shallow, circular-shaped feature with sloping sides and a concave base. Its break of slope was sharp at the top and bottom. The fill was a fairly loose, light yellow brown, silty clay *c.* 60% of which comprised sub-angular stones that were placed in the southern section of the feature and were sticking out over the edge of the cut. There were also frequent inclusions of charcoal, although the pit bore no evidence of *in situ* burning. Charcoal recovered from a sample of C104 was mainly oak (*Quercus* sp.), but hazel (*Corylus avellana*) and ash (*Fraxinus* sp.) were also identified (O'Donnell, Appendix 2.4).

C108 was a small pit, west of the centre of the excavation area and was sub-rectangular in shape with vertical sides and a flat base. The break of slope was sharp at the top and bottom. The fill (C109) was a moderately loose, light to mid-brown sandy silt. This feature may be of modern origin.

2.5.4 Isolated Postholes

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C41	N/A	0.2	0.2	0.18	Sub-circular with 'v' shaped profile.	Posthole.
C44	N/A	0.33	0.3	0.19	Circular, vertical sides, concave base.	Cut of posthole.
C89	C44	0.33	0.3	0.19	Moderately compact mid-brown silty clay.	Fill of posthole.
C90	C41	0.2	0.2	0.18	Brown/grey silty clay.	Posthole fill.

Finds: None

Interpretation:
Posthole C44 was located in the eastern side of the area of excavation, and the edge of the CPO was 7.5m to its east. It was a circular-shaped feature with vertical sides and a concave base. Its break of slope was sharp at the top and bottom. Its fill (C89) was a moderately compact, mid-brown, silty clay with frequent inclusions of small rounded stones/pebbles. Flecks of charcoal were also present.

2.6 Topsoil

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C1	N/A	N/A	N/A	0.3	Mid-brown/grey silty clay	Topsoil.

Finds:

Context	Find Number	Material	Period	Description
C1	E3122:1:1	Copper	19th Century	Irish halfpenny issued AD 1822/3.
C1	E3122:1:2	Pottery	Early Neolithic.	Sherd.

Interpretation:
The topsoil sealed all the archaeological features on site. It was a mid-brown/grey, clayey silt with inclusions of small angular stones and was consistent over the site. A single sherd of early Neolithic pottery was recovered from the topsoil (Grogan and

Roche, Appendix 2.1) as well as an Irish half penny issued in 1822/23 (Stafford-Langan, Appendix 2.3).

3 SYNTHESIS

The synthesis presents the combined results of all of the archaeological analysis carried out at Grange 4. This includes the analysis of the physical and archaeological landscape, the compilation of information gathered during research into the site type, date, and function, and the results of the excavation and specialist analysis of samples taken during the course of on-site works.

3.1 Landscape Setting

The topography from Navan to Kells is generally flat and gently undulating lowland. The area is characterised by a patchwork pattern of high quality agricultural fields as well as mature hedgerows. The River Tolka and its tributaries drain much of southern part of County Meath. The Blackwater drains most of north Meath, flowing just east of Kells and is fed by a number of significant tributaries such as the Moynalty River and Yellow River.

The geology of Meath consists of solid and glacial geology. The solid geological formations are mostly of Palaeozoic age dating between 545–290 million years ago (Finch *et al*. 1983, 9). The solid geology of the area through which the road traverses is dominated principally by carboniferous limestone, which provides the basis for the nourishing, calcium-rich pastures that are seen throughout much of County Meath. The outcome of geological activity from other periods can be seen in the Namurian shales, which form a number of the hills in the area, such as the Hill of Tara and Skreen, and the Ordovician and Silurian shale and sandstones, which form the underlying geology of Kells and the surrounding area.

The overburden in this area consists of stiff silts overlying glacial till. Bedrock is likely to be found *c.* 5 m below ground level and to be limestone. Generally, the area surrounding Kells is characterised by relatively low ice marginal ridges, eskers, and kame and kettle topography (Finch *et al*. 1983; Meehan 1999) dominated by sand and gravel units. Overall, this area is very hummocky with some interspersed peat bogs and badly drained hollows (Meehan 1999).

The overlying soils of County Meath are mostly classified as grey-brown podzolics which are good all-purpose, well drained soils used for both arable and pastoral farming. The overlying soil of the Kells area is brown earths, which are well-drained, mature soils which are generally ideally suited to arable farming. A detailed survey of the soils of County Meath is provided by Finch *et al*. (1983).

Grange 4 was located at 69m above sea level in a relatively flat rectangular-shaped arable field. The field was bounded on all four sides by hedgerows and the site was located in the north-western quadrant of the field. The nearest watercourse was located *c.* 300m to the east and a third class road was located *c.* 250m to the north. The general relief of the area is flat and other prehistoric sites may have been visible from Grange 4 e.g. Grange 5 and Grange 3. There are several recorded archaeological monuments in the vicinity of Grange 4. All of these sites date to the early medieval and medieval periods.

3.2 The Archaeological Landscape – Early Neolithic, Bronze Age and Early Medieval

As part of the general research relating to sites along the scheme and the specific research relating to Grange 4, the known archaeology within the surrounding landscape was assessed in order to establish the level and type of activity in the surrounding area in the past. This included a review of information from the Record of monuments and places, previous excavations and other relevant documentary sources including mapping and other sites excavated as part of the M3 scheme. The

excavated archaeology at Grange 4 has been identified as being Neolithic, Bronze Age, and early medieval in date

3.2.1 Neolithic Summary

Extensive settlement and funerary activity dating to the Neolithic period (*c.* 4000–2500 BC) has been identified in advance of the M3 Clonee–North of Kells Contract 4 Road Scheme. County Meath has a number of well-known burial/ceremonial centres which is indicative of a large and well established Neolithic population. These include the large passage tomb complexes at Newgrange and Loughcrew to the less widespread court and wedge tombs at Cornaville North (ME001:005) and Edengera (ME002:037-001). Until recently, comparatively little evidence of the wider settlement and domestic activities of these communities were known. In recent years as a result of nationwide development and infrastructure projects, a number of dwellings and settlement sites dating to this period have been uncovered. These discoveries provide us with an insight into the domestic and familial aspects of this society beyond the more obvious upstanding funerary monuments. Discoveries in advance of road scheme and other linear projects such as the M1 Northern Motorway Drogheda Bypass, the M3 Clonee–North of Kells, the N2 Ashbourne Bypass and the Dunshaughlin to Castletown Tara Sewerage Scheme have contributed to the growing number of Neolithic discoveries in Co. Meath. Contract 4 of the M3 Clonee–North of Kells Road Scheme in particular has provided for the identification of an expansive prehistoric landscape including at least eight early Neolithic houses with associated structures, as well as evidence of middle Neolithic activity, late Neolithic ceremonial deposits and a late Neolithic timber circle (McLoughlin and Walsh 2008, 20).

3.2.2 Bronze Age Summary

Activity dating to the Bronze Age period (2500–800 BC) along Contract 4 of the M3 Clonee–North of Kells Road Scheme was represented in the form of funerary and settlement activity.

Funerary Activity

Bronze Age funerary sites occur throughout Co. Meath. Ring-ditches and barrows are a common feature of the Bronze Age, 48 of which are listed as recorded monuments in the county. A cluster of such monuments occurs at the Tara complex, to the south of Navan, in the townlands of Castletown Tara and Castleboy, and barrows are recorded at Kilmainham (ME017:020) and Commons of Lloyd (ME016:014) to the west of Kells. Additional barrows recorded within the vicinity of Contract 4 of the M3 Clonee–Kells Road Scheme include those at Hurdlestown (ME017:028) and Ardbraccan (ME024:013). Barrows are located to the north-west at the Loughcrew complex. Two ring-ditches dating to the Bronze Age were excavated on Contract 4 of the M3 Clonee–Kells Road Scheme. At Grange 3 a large ring-ditch was established in the middle Bronze Age (1372–1131 BC) and re-cut in the late Bronze Age (974–828 BC). Four cremation pits were also excavated at the site and are likely to be contemporary with this Bronze Age monument. At Kilmainham 3 (Whitty 2010), close to recorded monument ME017:020 (possible barrow), an early Bronze Age ring-ditch was tentatively identified (2137–1965 BC). Bronze Age pottery was also recovered from a number of sites. The types of pottery consisted of cinerary urns and included cordoned urns, vase urns and a fine bipartite vase that was recovered from Phoenixtown 3 (Lyne 2010a). In addition to this a cordoned urn recovered from Kilmainham 1C (Walsh 2010) has been identified as a possible disturbed burial. The remainder of the Bronze Age vessels, although they are most commonly associated with burial, have been associated with domestic use.

Settlement Activity
Settlement sites dating to the Bronze Age period along Contract 4 of the M3 Clonee–Kells Road Scheme have recovered substantial evidence for Bronze Age houses. The most common type in Ireland is circular or almost circular in plan (Doody 2000, 139) and similarly, the majority of the structures excavated along Contract 4 conform to this design. Burnt mound activity is also a common feature of the Bronze Age and a number of these sites were excavated along Contract 4 of the M3 Road Scheme.

As part of the excavations for Contract 4 of the M3 Clonee–North of Kells Road Scheme Bronze Age structures were excavated at Grange 3 (Structure 1: 1499–1415 BC – and Structure 2: 1408–1269 BC; Kelly 2010b), Nugentstown 1 (Structure 3: 1186–978 BC; Lynch 2010b), Phoenixtown 3 (Structure 1: 1503–1415 BC – 1435–1303 BC; Lyne 1010a), Cakestown Glebe 2 (Structure 1: 1122–939 BC and 993–838BC, Structure 2: 1215–1013 BC; Lynch 2010c), Kilmainham 1A (Structure 3: 1436–1314 BC – 1419–1269 BC; Lyne 2010c), and Town Parks 3 (late Bronze Age structure: 1019–906 BC; Gleeson 2010b). In addition to these two small 'D shaped' structures were excavated at Cookstown Great 3 (McLoughlin 2010) dated to the early Bronze Age and some small Bronze Age huts were identified at Kilmainham 1C (Walsh 2010).

Lithic finds were also recovered throughout Contract 4 of the M3 Clonee–Kells Road Scheme. A number of these artefacts have a wide date range from the Neolithic to the historic period. Lithics recovered from Phoenixtown 1 (Lyne 2010b) included thumbnail scrapers diagnostic of the Bronze Age period and flint artefacts recovered from Nugentstown 3 (Lynch 2010a), Ballybeg 3 (Coughlan 2010) and Town Parks 2 (Gleeson 2010a) have been identified as late Neolithic/Bronze Age in date.

The funerary and settlement activity excavated along Contract 4 of the M3 Clonee–North of Kells Road Scheme has uncovered additional elements of Co. Meath's Bronze Age heritage and further contributes to our knowledge and understanding of these communities.

3.2.3 Early Medieval Summary
No settlement sites were excavated although numerous ring-forts and enclosures are recorded in the region, of which a significant number are located in close proximity to the M3 Clonee–North of Kells Contract 4 Road Scheme excavations. Ring-forts are listed at Cakestown Glebe (ME017:002), Newrath Big (ME016:023001) and Commons of Lloyd (ME016:015). In addition to these, four enclosures are recorded at Commons of Lloyd (ME016:057, ME016:012, ME016:016, ME016:056) and two are recorded at Grange (ME024:008, ME031:041).

Trade and Communication
An ancient road known as the *Slíghe Assail* is located close to the M3 Clonee–North of Kells, Contract 4 excavations and would have facilitated trade and communication in the early medieval period. This road travelled on an east–west axis from Drogheda towards Rathcroghan (Geissel 2006, 10). Teltown was one of three important locations of an aonach; a fair held every three years (Geissel 2006, 43; Bradley 1998, 47) and was located approximately 3km east of Nugentstown along this ancient route-way. It is mentioned that once in the eleventh century a tailback of six miles (ten kilometres) of chariots and vehicles was caused by people going to the fair there, not counting people travelling on foot (Geissel 2006 43; Joyce 1903, 409). The *Slíghe Assail* also passed through Kells, another prominent market settlement and would have supported the trade and communication networks between these sites and those further to the west.

Funerary Activity
Funerary activity was identified along the M3 Clonee–North of Kells Contract 4 Road Scheme in the form of eight grave cuts dating to this period (5th–6th centuries AD) which were uncovered at Grange 2 (Kelly 2010a). This period also saw the introduction of Christianity to Ireland and a number of monasteries and ecclesiastical centres were established. In Co. Meath the Abbey of Kells was founded *c*. AD 804 by monks from Colmcille's foundation in Iona. An early medieval ecclesiastical enclosure is also recorded in the vicinity of Kells town at Town Parks (ME017:044025). It is also evident from the literature that in the late seventh and early eighth centuries in Ireland, burial in formal Christian cemeteries was not yet the norm, pagan burial practices were still in use and were even tolerated to some extent (O'Brien 1992, 133).

Industrial and Domestic Activity
The remainder of the activity excavated along the M3 Clonee–North of Kells Contract 4 Road Scheme was industrial in nature. Early medieval metalworking was recorded at Grange 3 (Kelly 2010b), and Grange 2 (Kelly 2010a) and kilns were excavated at Gardenrath 2 (Bayley 2010), Kilmainham 1A (Lyne 2010c), Grange 3 (Kelly 2010b) and at Kilmainham 1C (Walsh 2010) where eleven figure of eight cereal drying kilns dating to the Iron Age and early medieval period were recorded. Some ephemeral activity in the form of pits was also excavated at Cookstown Great 3 (McLoughlin 2010).

3.2.4 Archaeological Landscape of Grange 4
Grange 4 consisted of several pits dating to the early Neolithic, the final Neolithic/early Bronze Age, middle Bronze Age and early medieval periods. The early Neolithic evidence in the wider area is quite limited and generally comprises isolated pits such as at Grange 2 where an isolated pit (3654–3527 BC) was identified on an otherwise Iron Age/early medieval site (Kelly 2010a). Further to the north-west at Phoenixtown an early Neolithic pit (3770–3654 BC) was identified associated with the burnt mound at Phoenixtown 6 (Lyne 2010a) and pits containing early Neolithic pottery were identified at Phoenixtown 1 (Lyne 2010b). Both of these sites were *c.* 1.8km to the north-west of Grange 4.

Components of the burnt mound site at Phoenixtown 1 (2559–2300 BC; Lyne 2010b) were contemporary with the late Neolithic/early Bronze Age element of Grange 4 while the middle Bronze Age element of Grange 4 was contemporary with the extensive middle Bronze Age settlement at Grange 3 *c.* 150m to the north-west (Kelly 2010b) which included two Bronze Age houses (Structure 1: 1499–1415 BC and Structure 2: 1408–1269 BC), a ring-barrow (Phase 1: 1372–1131 BC) and cremation pits (1420–1294 BC).

The early medieval pit and curvilinear gully (AD 666–772) is broadly contemporary with, if not slightly later than a boundary ditch (AD 617–666) identified at Grange 3, while earlier – early medieval settlement is attested by the presence of a burial ground (AD 424–568, AD 431–571 and AD 432–591) at Grange 2.

The several newly discovered prehistoric sites found in the vicinity of Grange 4 (Figure 2) which were not necessarily contemporary or of a similar type do provide tangible evidence of a continued settlement in the immediate landscape spanning several millennia. There were a number of recorded archaeological monuments within the general vicinity of Grange 4 (Figure 2). All of these other recorded monuments date from the early medieval period or later.

3.3 Summary of the Excavation Results

The site at Grange 4 comprised 10 pits the largest of which was 1.62m by 0.82m by 0.18m deep (C110) containing charcoal rich deposits, and a series of postholes and stakeholes, a cluster of which may have defined a small structure. These features were dated to the Neolithic and middle Bronze Age. A curvilinear gully (6.8m long by 1.2m by 0.2m deep) was aligned with a circular pit dated to the early medieval period and together may have defined a circular structure, although this was poorly defined.

3.4 Summary of the Specialist Analysis

A number of specialists provided analysis of samples and artefacts recovered from the site as part of the post-excavation works. This work in part formed the basis for the dating evidence for the site. The detailed reports on the results of all analysis are in Appendix 2.

Prehistoric Pottery Analysis

The site produced a small assemblage of 24 sherds and six fragments representing at least six early Neolithic carinated bowls (Grogan and Roche Appendix 2.1).

Lithics Analysis

A small assemblage of eight flint and chert artefacts was found. The assemblage was dominated by bipolar reduction techniques. The chert artefacts were in a weathered condition, and the poor quality of the raw material was noticeable. The assemblage was small and did not contain any clearly datable artefact types, but there are some knapping trends (Nelis, Appendix 2.2).

Small Finds Analysis

Coins

An Irish copper halfpenny of George IV, minted in London in 1822 was recovered from topsoil (Stafford-Langan, Appendix 2.3.1).

Beads

Two possible beads were recovered as well as one object that was originally interpreted as a bead but is almost certainly a fossil. The most convincing object was E3122:111:26 which was possibly a worked bead, as it has a concave, worked looking segment that may have been the hole and appeared to have been fashioned from decalcified sandstone or siltstone (Parkes, Appendix 2.3.2).

Charcoal Identification

Charcoal was identified from ten contexts from Grange 4. This included pits, postholes, and the fill of a curvilinear feature. Seven wood taxa were identified in total from the site. The results are dominated by oak (*Quercus* sp.) followed by ash (*Fraxinus* sp.) and hazel (*Corylus avellana*). Alder (*Alnus* sp.), pomaceous fruitwood (Maloideae), willow (*Salix* sp.) and elm (*Ulmus* sp.) were also identified (O'Donnell, Appendix 2.4).

Analysis of Plant Remains

Carbonised cereal grains were recorded in noticeable quantities from C127 (fill of C131) and C128 (fill of C126). Just two barley grains were identified from C69 (fill of pit C7). While barley (*Hordeum* sp.) and oat (*Avena* sp.) were both identified from these deposits, barley was the dominant grain recorded from C127, and oat the dominant cereal type recovered from C128. Carbonised nutshell, tentatively identified as hazelnut (*Corylus avellana)* shell was identified from C29 (fill of pit C4) and C71 (fill of C70) (Lyons, Appendix 2.5).

Burnt Bone Analysis

The burnt bone was analysed by two specialists, Margaret McCarthy (Appendix 2.6) and Jennie Coughlan (Appendix 2.7). The features from Grange 4 contained such small quantities of bone that they provided no useful information. Calcined fragments of indeterminate bone and fully oxidised bone were recovered from pit C110 and pit C7.

Radiocarbon Dating

Three AMS dates were established for features at Grange 4.

A fragment of hazelnut shell from posthole C23 returned a late Neolithic/early Bronze Age 2 Sigma calibrated date of 2574–2474 BC.

A fragment of hazel charcoal (*Corylus avellana*) from posthole C25 returned a middle Bronze Age 2 Sigma calibrated date of 1442–1407 BC.

A barley grain (*Hordeum* sp.) from pit C7 returned an early medieval 2 Sigma calibrated date of AD 666–772 (QUB, appendix 2.8).

4 DISCUSSION AND CONCLUSIONS

4.1 Discussion

The site at Grange 4 comprised a group of features with dates ranging from the early Neolithic (based on pottery typology) to the early medieval period. These features have little significance in isolation especially based on the fact that they cannot be easily characterised by any clear/coherent form or function, however they are part of a larger, recently identified prehistoric and Iron Age/early medieval landscape, emphasised by the discoveries of the M3 Contract 4 excavations in this area.

Phase 1: The significance of the site in the Neolithic landscape
The early Neolithic evidence in the Grange area is limited and the discovery of early Neolithic pits at Grange 4 is therefore significant. Grange 4 produced the fragmented remains of six early Neolithic carinated bowls, with four vessels identified from the sherds recovered from pit C110/C11. Isolated early Neolithic pits such as those at Grange 2 and Phoenixtown 6 have also been identified in the Grange area while five early Neolithic bowls were recovered from a small group of features at Phoenixtown 1. The pottery (in particular Vessel No. 3) from Phoenixtown 1 was very similar to the Grange 4 pottery (Group III sherds). While the evidence from Grange 4 is relatively small-scale in nature this may be an indication that there is more permanent early Neolithic settlement in the wider area.

The significance of the site in the final Neolithic/early Bronze Age – middle Bronze Age
The group of pits and postholes/stakeholes that comprised Structure A returned conflicting Neolithic and Bronze Age dates. There is however good evidence for activity in the area contemporary with this. For example components of the burnt mound site at Phoenixtown 1 were late Neolithic/early Bronze Age while the middle Bronze Age element was contemporary with the extensive middle Bronze Age settlement at Grange 3 positioned *c.* 150m to the north-west. The site at Grange 3 included two round houses and associated pits which is tangible evidence of permanent middle Bronze Age settlement in the immediate area.

Phase 2: The significance of the site in the early medieval landscape
The early medieval pit and curvilinear gully is broadly contemporary, if not slightly later, than a boundary ditch identified at Grange 3 which may be part of a larger early medieval settlement outside the wayleave of the M3 Contract 4 to the north. Evidence of Iron Age/early medieval settlement, industry and burial in the area is strong and includes a burial ground at Grange 2 and the metalworking furnaces and cereal-drying kilns at both Grange 3 and 2. Pit C126 at Grange 4 may have been a cereal-drying kiln or pit associated with kilning activities and therefore possibly also early medieval in date.

The surrounding environment in the Neolithic, Bronze Age and early medieval period
Through charcoal analysis it was possible to deduce that the site was located close to oak woodlands while a wetland element was also noted with the identification of alder and willow.

4.2 Conclusions

The site at Grange 4, while small in scale, is a small part of a larger prehistoric and early medieval landscape in the Grange area.

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APPENDIX 1 CATALOGUE OF PRIMARY DATA

Appendix 1.1 Context Register

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C1	N/A	N/A	N/A	0.3	Topsoil.	Mid-brown/grey silty clay that had inclusions of occasional large sub-angular stones. Topsoil which sealed the entire site.
C2	N/A	N/A	N/A	N/A	Natural subsoil.	Orange/yellow brown silty soil.
C3	N/A	0.45	0.41	0.16	Pit.	Circular feature, with vertical sides and a sloping base. The break of slope was sharp at the top and bottom.
C4	N/A	0.5	0.4	0.19	Pit.	Oval shaped pit/posthole, with sloping sides and a concave base. The break of slope is irregular at the top and concave at the base.
C5	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C6	N/A	2.2	0.6	0.1	Linear cut.	Linear shaped feature with steep sides and a flat base. Its break of slope was gradual at the top and bottom.
C7	N/A	0.7	0.7	0.15	Pit.	Circular shaped feature, with steep sides and a concave base. The break of slope was sharp at the top and gradual at the base.
C8	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C9	N/A	0.47	0.72	0.3	Pit.	Sub-oval shaped feature with sloping sides and a flat base. The break of slope was sharp at the top and bottom.
C10	N/A	0.94	0.85	0.14	Pit.	Large circular shaped pit with sloping sides and an irregular shaped base. The Break of slope was gradual at the top and bottom.
C11	N/A	1.26	0.82	0.18	Pit.	Irregular shaped feature with sloping sides and a concave base. The break of slope was sharp at the top and absent at the base.
C12	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C13	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C14	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C15	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C16	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C17	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C18	N/A	0.86	0.33	0.2	Pit.	Sub-triangular shaped feature with irregular sides and a sloping base. The break of slope was sharp at the top and irregular at the bottom.
C19	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C20	N/A	0.14	0.17	0.2	Posthole.	Circular shaped feature with vertical sides and a concave base. The break of slope was sharp at the top and bottom.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C21	N/A	0.08	0.08	0.08	Stakehole.	Circular shaped feature with straight sides and a concave base. The break of slope was sharp at the top and bottom.
C22	N/A	0.21	0.2	0.19	Posthole.	Circular shaped feature with steep sides and a 'v' shaped base. The break of slope was sharp at the top, and absent at the base.
C23	N/A	N/A	0.39	0.14	Posthole.	Circular shaped feature truncated by C70. It had steep sides and a concave base. The break of slope was sharp at the top and bottom.
C24	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C25	N/A	0.2	0.22	0.45	Posthole.	Circular shaped feature with vertical sides and a flat base. The break of slope was sharp at the top and bottom.
C26	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C27	C85	0.3	0.3	0.27	Posthole.	Moderately compact mid-to light brown silty clay, with frequent inclusions of very small stones. No charcoal flecks in evidence.
C28	C3	0.43	0.37	0.06–0.18	Pit.	Mid-brown to grey silty soil. Occasional flecks of charcoal. Infrequent inclusions of very small stones.
C29	C4	0.5	0.4	0.19	Pit.	Mid-brown to grey silty soil. Some inclusions of stone, decayed stone and flecks of charcoal. Finds of pottery and chert debitage.
C30	N/A	0.48	0.46	0.2	Pit.	Sub-circular shaped feature, with sloping sides and a concave base. The break of slope was gradual at the top and bottom.
C31	N/A	0.13	0.18	0.04	Posthole.	Shallow, circular shaped feature with concave sides and a flat base. The break of slope was sharp at the top and bottom.
C32	N/A	0.14	0.16	0.19	Posthole.	Circular feature, with vertical sides and a concave base. The break of slope was sharp at the top and bottom.
C33	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C34	N/A	N/A	N/A	N/A	N/A	Same as C11.
C35	N/A	0.25	0.25	0.1	Posthole.	Circular shaped feature with sloping sides and a concave base. The break of slope was sharp at the top and gradual at the base. Adjacent to C65, but larger in size.
C36	N/A	N/A	N/A	N/A	N/A	Same as C98.
C37	N/A	0.1	0.11	0.13	Stakehole.	Sub-circular feature, with vertical sides and a concave base. The break of slope was sharp at the top and bottom.
C38	N/A	0.19	0.13	0.1	Posthole.	Sub-circular shaped feature. The sides were steep at the N, and sloping at the S. The base was sloping. The break of slope was sharp at the top and irregular at the base.
C39	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C40	N/A	0.1	0.1	0.1	Stakehole.	Circular shaped feature with vertical sides and an irregular base. The break of slope was sharp at the top and bottom.
C41	N/A	0.2	0.2	0.18	Posthole.	Sub-circular shaped feature with a 'v' shaped profile. The break of slope was sharp at the top and absent at the base.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C42	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C43	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C44	N/A	0.33	0.3	0.19	Posthole.	Circular shaped feature with vertical sides and a concave base. The break of slope was sharp at the top and bottom.
C45	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C46	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C47	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C48	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C49	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C50	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C51	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C52	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C53	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C54	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C55	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C56	C20	0.14	0.14	0.2	Posthole.	Firmly compact grey brown silty clay, with Infrequent inclusions of large stones, possibly packing stones. Occasional charcoal flecks.
C57	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C58	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C59	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C60	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C61	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C62	N/A	0.42	0.42	0.11	Shallow pit.	Circular shaped feature with sloping sides and a concave base. The break of slope was sharp at the top and bottom.
C63	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C64	C35	0.25	0.25	0.1	Fill of posthole.	Moderately firm mid-orange brown silty clay. With inclusions of very small stones. No flecks of charcoal in evidence.
C65	N/A	0.12	0.12	0.07	Stakehole.	Circular shaped feature with steep sides and a concave base. The break of slope was sharp at the top and bottom. Adjacent to C35, but smaller in size.
C66	C65	0.12	0.12	0.07	Fill of stakehole.	Firm, mid-brown silty clay, with inclusions of very small stones. No flecks of charcoal in evidence.
C67	C7	0.4	0.4	0.12	Fill of pit.	Upper fill of C7. Medium compact mid-brown silty clay with a layer of charcoal and frequent inclusions of burnt bone and mid-sized angular stones.
C68	N/A	N/A	N/A	N/A	N/A	Non-archaeological.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C69	C7	0.7	0.7	0.15	Fill of pit.	Basal fill of C7. A loosely compact dark brown/grey silty soil, with occasional rounded stones.
C70	N/A	0.26	0.26	0.13	Post-pipe in posthole C23.	Circular shaped feature with vertical sides and a concave base.
C71	C70	0.26	0.26	0.15	Fill of posthole.	Moderately compact light yellow/brown silty soil, with inclusions of very small stones. Occasional flecks of charcoal.
C72	C23	N/A	0.4	0.14	Packing fill.	Hard compact light yellow/brown silty clay soil with inclusions of very small stones. Infrequent inclusions of charcoal also present.
C73	C25	0.2	0.22	0.45	Posthole.	Loosely compact mid-brown silty soil, with one large sub-angular stone, possibly a packing stone. Occasional small stones and infrequent flecks of charcoal also present.
C74	C116 (C118)	0.2	0.16	0.15	Fill of posthole.	Moderately compact irregular shaped feature with silty soil containing Inclusions of stone and charcoal within the fill.
C75	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C76	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C77	C9	0.47	~0.72	0.3	Fill of pit.	Dark brown and red silty soil, with rich inclusions of charcoal, as well as *in situ* burning and frequent inclusions of small stones.
C78	C37	0.1	0.11	0.13	Fill of stakehole.	Firmly compact sub-circular feature with a mid-brown silty soil. Occasional charcoal flecks were present.
C79	C32	0.14	0.16	0.19	Fill of posthole.	Moderately/firmly compact mid-brown silty soil, with frequent charcoal flecks and very small stones.
C80	C10	0.48	0.45	0.11	Fill of pit.	Upper, firmly compact charcoal rich fill of C10. Dark brown to black silty soil, with patches of yellow/orange. Occasional small stones.
C81	C10	0.94	0.85	0.19	Fill of pit.	Firmly compact basal fill of C10. Mid-brown/orange silty soil with frequent charcoal and occasional small stone inclusions.
C82	C38	0.19	0.13	0.1	Posthole.	Moderately loosely compact light brown silty soil.
C83	C18	0.86	0.33	0.19	Pit.	Basal fill of C18. Medium compact red/orange silty soil. No charcoal recovered. Some very small stones also present.
C84	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C85	N/A	0.36	0.3	0.27	Posthole.	Circular shaped feature with steep sides and a concave base. The break of slope was sharp at the top and bottom.
C86	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C87	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C88	C18	0.86	0.21	0.075	Pit.	Loosely compact light orange brown silty clay. No charcoal or stones present within the fill.
C89	C44	0.33	0.3	0.19	Posthole.	Moderately compact mid-brown silty clay with frequent inclusions of small rounded stones/pebbles. Infrequent flecks of charcoal also present.
C90	C41	0.2	0.2	0.18	Fill of posthole.	Brown/grey feature with silty clay and with packing stones evident within the fill. Inclusions of charcoal flecks also.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C91	C31	0.13	0.18	0.04	Fill of posthole.	Moderately firm compact light brown/yellow silty clay with occasional flecks of charcoal.
C92	C30	0.48	0.46	0.2	Fill of pit.	Moderately firm light brown/yellow silty clay, with frequent inclusions of charcoal flecks and medium sized circular stones.
C93	C22	0.21	0.2	0.19	Posthole.	Moderately compact mid-brown silty clay with inclusions of small stones. Occasional flecks of charcoal.
C94	C21	0.08	0.08	0.08	Fill of stakehole.	Firmly compact mid-to light brown sandy silt with no inclusions.
C95	C40	0.95	0.95	0.95	Fill of stakehole.	Medium compact dark orange brown silty clay with occasional flecks of charcoal.
C96	N/A	0.08	0.07	0.11	Stakehole.	Circular shaped feature with vertical sides and a concave base. The break of slope was sharp at the top and bottom.
C97	C96	0.08	0.07	0.11	Stakehole.	Medium compact mid-brown silty soil, with occasional flecks of charcoal and very small stones.
C98	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C99	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C100	C6	0.5	0.44	0.1	Fill of linear cut.	Moderately firm dark brown/black charcoal rich, silty fill. Frequent sub-angular stones. Located at south end of feature, stratigraphically above C101 and contemporary with C102.
C101	C6	0.96	0.5	0.1	Fill of linear cut.	Moderately firm basal fill of C6. Yellow/light brown sandy clay with infrequent stone and charcoal flecks. Truncated at its north end by an animal burrow.
C102	C6	0.74	0.64	0.16	Fill of linear cut.	Moderately compact mid-brown silty fill with frequent charcoal deposits. Also containing occasional medium sized stones. Located at north end of feature, stratigraphically above C101 and contemporary with C102. Truncated at its south end by an animal burrow.
C103	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C104	C62	0.42	0.42	0.11	Shallow pit.	Fairly loose light yellow brown silty clay with *c.* 60% sub-angular stones. Frequent inclusions of charcoal also.
C105	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C106	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C107	N/A	N/A	N/A	N/A	N/A	Same as C113.
C108	N/A	0.17	1.3	0.08	Modern cut.	Sub-rectangular shaped feature with vertical sides and a flat base. The break of slope was sharp at the top and bottom.
C109	C108	0.17	1.3	0.08	Fill of modern cut.	Loosely compact light/mid-brown sandy silty fill.
C110	N/A	2.35	1.65	0.55	Large pit.	Large sub-rectangular shaped feature with downward sloping sides. The base of the feature, however, rises up at its centre. Possibly originally two features.
C111	C110	0.79	1.65	0.28	Fill of pit.	Firmly compact mid-brown silty clay with occasional charcoal flecks. 24 pieces of Prehistoric pottery, 1 piece of chert debitage, 3 bead like fossils and 1 piece of quartz were recovered.
C112	N/A	N/A	N/A	N/A	N/A	Same as C11.
C113	C11	1.26	0.82	0.18	Fill of pit.	Moderately firm light yellow brown clayey/silt with charcoal inclusions. Frequent sub-angular stones also present.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C114	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C115	C120	N/A	0.29	0.35	Posthole.	Loosely compact mid-brown silty soil. Occasional flecks of charcoal. Frequent inclusions of large sub-angular stones, possibly packing stones.
C116	N/A	0.2	0.16	0.15	Posthole.	Irregular shaped feature, with vertical sides and a concave base. The break of slope was sharp at the top and bottom.
C117	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C118	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C119	C120	N/A	0.14	0.12	Posthole.	Moderately compact mid-to dark brown silty soil. Inclusions of large sub-angular stones.
C120	N/A	N/A	0.29	0.62	Posthole.	Circular shaped feature with steep sides and a concave base. The break of slope was sharp at the top and concave at the base.
C121	C110	0.7	0.45	0.26	Basal fill of pit.	Loosely compact dark brown/grey clayey silt. One of the basal fills of C110.
C122	C110	0.65	0.4	0.04	Basal fill of pit.	Basal layer located at south end of C110. Firmly compact dark grey/brown silty clay with charcoal inclusions.
C123	N/A	N/A	N/A	N/A	N/A	Non-archaeological.
C124	C110	1.05	0.52	0.28	Redeposited natural subsoil within C110.	Hard compact light brown silty sand with some gravel inclusions. This was a large redeposit located at the centre of C110.
C125	C110	0.08	0.08	0.1	Fill of pit.	Upper fill of C126. Circular shaped feature, with loosely compact dark brown sandy clay. Approximately 60% charcoal and *c.* 30% pebbles.
C126	N/A	1.05	0.52	0.28	Pit.	Circular shaped feature with steep sides and a flat base. The break of slope was sharp at the top and concave at the base.
C127	C131	6.2	0.1–0.2	0.05–0.015	Fill of arc-shaped feature.	Upper layer of C131. Mid-brown silty soil, rich in charcoal.
C128	C126	0.58	0.56	0.08	Fill of pit.	Basal fill of C128. Loosely compact dark black sandy clay.
C129	C126	0.2	N/A	0.04	Fill of pit.	Burnt clay layer of small circular furnace. Loosely compact mid-red sandy clay. This fill was mainly located at the south of the feature.
C130	C131	6	0.05–0.1	0.05–0.1	Arc shaped feature.	Basal layer of feature. Mid-brown silty clay, with frequent inclusions of charcoal.
C131	N/A	6.8	0.8-1.2	0.2	Arc shaped feature.	Arc shaped feature that has irregular sloping sides and a concave base. The break of slope was gentle at the top and bottom.
C132	N/A	N/A	N/A	N/A	N/A	Same as C125.

Appendix 1.2 Catalogue of Artefacts

Registration Number	Context	Item No.	Simple Name	Full Name	Material	No. of Parts	Description
E3122:1:1	C1	1	Coin	Irish halfpenny	Copper	1	Irish halfpenny issued 1822/3
E3122:1:2	C1	2	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:28:1	C28	1	Burnt flint	Burnt flint debitage	Flint	1	Flake debitage
E3122:29:1	C29	1	Chert	Chert debitage	Chert	1	Flake debitage
E3122:29:2	C29	2	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:3	C29	3	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery sherd
E3122:29:4	C29	4	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:5	C29	5	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:6	C29	6	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:7	C29	7	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:8	C29	8	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:29:9	C29	9	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:71:1	C71	1	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:4	C111	4	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:5	C111	5	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:6	C111	6	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:7	C111	7	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:8	C111	8	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:9	C111	9	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:10	C111	10	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:11	C111	11	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:12	C111	12	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:14	C111	14	Chert	Angularly shattered chert	Chert	1	Angular shatter piece
E3122:111:15	C111	15	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:16	C111	16	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:17	C111	17	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:18	C111	18	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:19	C111	19	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:20	C111	20	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd

Registration Number	Context	Item No.	Simple Name	Full Name	Material	No. of Parts	Description
E3122:111:21	C111	21	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:22	C111	22	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery neck sherd
E3122:111:23	C111	23	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery fragment
E3122:111:24	C111	24	Fossil	Possible bead	Stone	1	Fossil crinoid ossicle, possible bead
E3122:111:26	C111	26	Stone	Possible stone bead fragment	Stone	1	Possible bead fragment
E3122:111:27	C111	27	Quartz	Angularly shattered quartz	Quartz	1	Angularly shattered quartz
E3122:111:29	C111	29	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd
E3122:111:30	C111	30	Chert	Early Neolithic chert flake	Chert	1	Chert
E3122:111:31	C111	31	Chert	Possible chert wedge tool	Chert	1	Possible wedge tool
E3122:111:32	C111	32	Chert	Early Neolithic chert core	Chert	1	Early Neolithic chert core
E3122:111:33	C111	33	Chert	Early Neolithic chert flake	Chert	1	Early Neolithic chert flake
E3122:113:1	C113	1	Pottery	Early Neolithic pottery	Pottery	1	Early Neolithic pottery body sherd

Appendix 1.3 Catalogue of Ecofacts

A total of 36 bulk soil samples were taken during the course of excavation at this site. 26 of these were processed by means of flotation and sieving through a 250/300µm mesh and the results of this are outlined below.

1.3.1 Burnt Bone

Context number	Sample number	Feature	Sample weight (g)
C69	17	Pit C7	7.6g
C111	34	Pit C110	0.2g

1.3.2 Charcoal

Context number	Sample number	Feature	Sample weight (g)
C29	1	Pit C4	0.8g
C56	10	Posthole C20	0.2g
C67	11	Pit C7	0.2g
C69	17	Pit C7	19.0g
C71	16	Posthole C70	0.1g
C73	15	Posthole C25	1.0g
C77	14	Pit C9	14.1g
C104	20	Pit C9	18.5g
C107	26	Same as C113	6.9g
C111	4	Pit C110	0.8g
C111	31	Pit C110	11.1g
C113	27	Pit C11	6.6g
C121	35	Pit C110	0.3g
C127	40	Pit C131	88.2g
C127	41	Pit C131	2.9g
C128	37	Pit C126	11.2g

1.3.2 Carbonised Plant Remains/Hazelnut Shell

Context number	Sample number	Feature	Sample weight (g)
C29	1	Pit C4	1.0g
C69	17	Pit C7	0.2g
C71	16	Posthole C70	0.4g
C127	41	Pit C131	2.2g
C128	37	Pit C126	2.2g

Appendix 1.4 Archive Checklist

Project: M3 – Navan to Kells, Contract 4	Irish Archaeological Consultancy Ltd	
Site Name: Grange 4		
Excavation Registration No.: E3122		
Ministerial Direction: A029/004		
Site director: Carmel Duffy		
Date: April 2010		
Field Records	**Items (quantity)**	**Comments**
Site drawings (plans)	8	14 sheets altogether
Site sections, profiles, elevations	36 section drawings, 2 profile drawings	
Other plans, sketches, etc.	0	
Timber drawings	0	
Stone structural drawings	0	
Site diary/note books	0	
Site registers (folders)	1 folder	
Survey/levels data (origin information)	350	
Context sheets	132 sheets altogether	
Wood Sheets	0	
Skeleton Sheets	0	
Worked stone sheets	0	
Digital photographs	173	
Photographs (print)		
Photographs (slide)		
Finds and Environ. Archive		
Flint/chert	1 flint, 1 quartz, 6 chert pieces	All prehistoric
Stone artefacts	3	Fossils and stone beads
Pottery (specify periods/typology)	30	All prehistoric
Ceramic Building Material (specify types eg daub, tile)		
Metal artefacts (specify types - bronze, iron)	1	Copper alloy coin
Glass	0	
Other find types or special finds (specify)	0	
Human bone (specify type eg cremated, skeleton, disarticulated)	0	
Animal bone	1	
Metallurgical waste	0	
Enviro bulk soil (specify no. of samples)	36	-
Enviro monolith (specify number of samples and number of tins per sample)	0	
Security copy of archive		

APPENDIX 2 SPECIALIST REPORTS

THE PREHISTORIC POTTERY
GRANGE 4, CO. MEATH (E3122)

EOIN GROGAN AND HELEN ROCHE

Summary
The site produced a small assemblage of 24 sherds (plus six fragments, weight: 72g) representing at least six early Neolithic carinated bowls. This material highlights the significance of the core of prehistoric activity in the Kells area.

Early Neolithic pottery
There are 24 worn and fragmented sherds (four neck- and 20 bodysherds, plus seven fragments, weight 53g) from at least seven early Neolithic vessels. The pottery came from features associated with a possible structure, a large pit C110, another pit (C11/C112) cutting this feature, and the topsoil (Duffy 2008). While there are no feature sherds the fabric, firing and the necksherds from Groups IV and V[1] indicate that these are carinated bowls. The material consists of fine, well-fired, fabric with generally low quantities of quartzite inclusions although Group I also contained crushed dolerite. Group III consists of compact dark grey with an unusually high content of occasionally large (up to 3.4 by 3.1mm) quartzite inclusions; while the surfaces were smooth some of these must have been clearly visible giving the pot a distinctive mottled appearance. A vessel of similar fabric (No. 3) came from Phoenixtown 1 (Grogan and Roche 2009a). Groups IV and V have curved to gently curved necks. All of the vessels are fine thin walled pots (thickness 4.5–7.75mm) but a single sherd from Group III, probably from the lower part of the bowl, is 8.91mm thick. It was not possible to estimate the original size of any of the vessels.

Carinated bowls with everted rounded rims, curved necks and simple angle or small step shoulders represent the earliest type of Neolithic pottery (Case 1961: 'Dunmurry-Ballymarlagh styles'; Sheridan 1995: 'classic' carinated bowls) in Ireland. Although not previously recorded in the area a similar small assemblage was recently identified to the northwest at Phoenixtown 1 (Lyne 2008a; Grogan and Roche 2009a). The Grange/Phoenixtown evidence indicates outlying occupation to the southeast of the important early Neolithic concentration focussed on the extensive complex at Kilmainham 1C / 1A (Walsh 2008; Lyne 2008b; Grogan and Roche 2009b; 2009c) and discoveries in the area at Cookstown Great sites 1 and 3 (Lynch 2008; McLoughlin 2008; Grogan and Roche 2009d; 2009e); this emphasises this previously unknown settlement core in the Kells area (McLoughlin and Walsh 2008).

Bibliography
Case, H. 1961 Irish Neolithic Pottery: Distribution and Sequence, *Proceedings of the Prehistoric Society* **9**, 174–233.

Duffy, C. 2008 Interim Report On Archaeological Excavation of A029/004, E3122, Grange 4. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

Grogan, E. and Roche, H. 2009a M3 Navan – Kells. The prehistoric pottery assemblage from Phoenixtown 1, Co. Meath (E3128). Unpublished specialist report prepared for Irish Archaeological Consultancy Ltd on behalf of Meath County Council.

Grogan, E. and Roche, H. 2009b M3 Navan – Kells. The prehistoric pottery assemblage from Kilmainham 1C, Co. Meath (E3140). Unpublished specialist report prepared for Irish Archaeological Consultancy Ltd on behalf of Meath County Council.

[1] Group numbers (Roman numerals) refer to sherds from a distinct vessel where the overall form is not identifiable.

Grogan, E. and Roche, H. 2009c M3 Navan – Kells. The prehistoric pottery assemblage from Kilmainham 1A, Co. Meath (E3141). Unpublished specialist report prepared for Irish Archaeological Consultancy Ltd on behalf of Meath County Council.

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Lynch, P. 2008 Interim Report on Archaeological Excavation of A029/019, E3137, Cookstown Great 1. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

Lyne, E. 2008a Interim Report On Archaeological Excavation of A029/010, Phoenixtown 1. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

Lyne, E. 2008b Interim Report On Archaeological Excavation of A029/053, Kilmainham 1A. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

McLoughlin, G. 2008 Interim Report on Archaeological Excavation of A029/021, E3139, Cookstown Great 3. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

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Sheridan, A. 1995 Irish Neolithic pottery: the story in 1995. In I. Kinnes and G. Varndell (eds), '*Unbaked Urns of Rudely Shape*', 3–21. Oxbow Monograph **55**, Oxford.

Walsh, F. 2008 Interim Report on Archaeological Excavation of A029/022, E3140, Kilmainham 1C. M3 Clonee–North of Kells. Unpublished Report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

CATALOGUE

The excavation number E3122 and Ministerial Direction Number A029/004 are omitted throughout: only the context number, in **bold**, followed by the find number is included (*e.g.* **29**:5). Numbers in square brackets (*e.g*. **29**:[4, 6–9]) indicate that the sherds are conjoined. The thickness refers to an average dimension; where relevant a thickness range is indicated. Vessel numbers have been allocated to pottery where some estimation of the form of the pot is possible, or where the detailed evidence of featured sherds (*e.g*. rims, shoulders), decoration or fabric indicates separate pots. Group numbers (Roman numerals) refer to sherds from a vessel where the overall form is not identifiable principally due to the absence of sufficient feature (rim/ neck/ shoulder) sherds. Individual sherds that could not be definitely ascribed to either category are described separately; these may come from further pots that are not, however, included in the calculations of minimum and maximum numbers of vessels. The inclusions were examined using simple magnification and in some cases attribution reflects probable, rather than certain, identification.

Early Neolithic pottery

Possible structure and pits, fill C29 of pit C4

Group I. This is represented by seven worn bodysherds (**29**:[4, 6–9], 2, 3; one fragment: **29**:5) from a fine vessel. The grey to red-brown fabric has a dark grey core and inner surface. There is a low to medium content of crushed dolerite (≤ 2.5 x 2mm, occasionally up to 8 x 3mm) and quartzite inclusions (≤ 1.75 x 1.5mm). Body thickness: 5.98mm; weight: 18g.

Fill C71 of posthole C70

Group VII. This is represented by a single large worn bodysherds (**71**:1) from a fine vessel. The buff fabric has a dark grey core and a buff to grey inner surface. There is a low to medium content of crushed quartzite inclusions (up to 3.1 x 2.2mm). Body thickness: 7.76mm; weight: 19g.

Large pit C110 with cremation burials, fill C111[2]

Group II. This is represented by three sherds (two necksherds: **111**:15, 22; one bodysherd: **111**:5) from a fine vessel of distinctive dark grey fabric with a high content of crushed quartzite inclusions (≤ 2 x 1mm, occasionally up to 3.4 x 3.1mm). Neck thickness: 6.02mm; body: 5.92mm; weight: 8g.

Group III. This is represented by six bodysherds (**111**:[16, 18–19], 17, 20, 29) from a fine vessel of red-buff fabric with a dark grey core and internal surface. A blackened accretion occurs on the inner surface. There is a low content of crushed quartzite inclusions (≤ 2 x 1mm, occasionally up to 2.5 x 2mm). Body thickness: 6.59–8.91mm; weight: 12g.

Group IV. This is represented by three small worn necksherds (**111**:[10, 12], 11) from a fine vessel of red-brown fabric with a dark grey core and dark red-brown internal surface. There is a medium content of crushed quartzite inclusions (≤ 2 x 1mm, occasionally up to 3 x 2mm). Neck thickness: 7.14mm; weight: 4g.

Group V. This is represented by a single necksherd (**111**:21) from a fine vessel with a curved neck; the sherd is from immediately above the shoulder. The fabric is dark grey throughout and there is a medium content of generally crushed quartzite inclusions (≤ 1mm, occasionally up to 2.2 x 2mm) and some mica flecks. Neck thickness: 6.1–6.89mm; weight: 4g.

[2] **111**:1–3 and 5 are stones.

Other sherds
This context also produced a small bodysherd (**111**:4; six fragments: **111**:6–9, 23); weight: 2g.

Fill C113 of pit C11/C112 of C110
This produced a single bodysherd (**113**:1) of dark grey fabric with a very low content of sandgrade quartzite inclusions; body thickness: *c.* 4.47mm; weight: 1g.

Topsoil C1
Group VI. This is represented by a single bodysherd (**01**:2) of buff fabric with a grey core and a medium content of quartzite inclusions (up to 2.6 x 2mm). There is sooting on the outer surface. Body thickness: 5.44mm; weight: 3g.

Vessel No.	Context/feature	Number of sherds	Rimsherds	Necksherds	Shouldersherds	Bodysherds	Fragments	Inclusions	Vessel size (cm)	Weight (g)	Pottery type
Group I	**29**	7	0	0	0	7	1	D Q	-	18	ENCB
Group VII	**71**	1	0	0	0	1	0	Q	-	19	ENCB
Group II	**111**	3	0	0	0	3	0	Q	-	8	ENCB
Group III	**111**	6	0	0	0	6	0	Q	-	12	ENCB
Group IV	**111**	3	0	3	0	0	0	Q	-	4	ENCB
Group V	**111**	1	0	1	0	0	0	Q	-	4	ENCB
Other	**111**	1	0	0	0	1	6	Q	-	2	ENCB
Group VI	**01**	1	0	0	0	1	0	Q	-	4	ENCB
Other	**113**	1	0	0	0	1	0	Q	-	1	ENCB
Total		***24***	***0***	***4***	***0***	***20***	***7***			***72***	***ENCB***

D dolerite L large vessel

Table 1. Details of early Neolithic pottery including individual vessels from Grange 4, Co. Meath.

THE LITHICS
GRANGE 4 (E3122)
EIMEAR NELIS

JULY 2009

Introduction

During archaeological mitigation at the M3 Navan to Kells road scheme, excavations uncovered a number of archaeological sites. The project yielded a large assemblage of chipped, ground and unworked stone artefacts from numerous sites. This report documents the analysis of the chipped stone assemblage from Grange 4 (A029/004, E3122).

Methodology

All recovered artefacts were presented for analysis, and were studied visually and catalogued using SPSS (V13) for Windows. For each artefact, the following details were recorded: contextual information (including context/feature/sample number, northings and eastings where available), basic condition, extent of abrasion, material, colour, cortex, basic character and detailed classification, platform and termination type (where relevant for chipped stone), detail of working (where relevant), length (L), breadth (B), thickness (T), fragment size (mm) and mass (g). The criteria upon which these attributes have been selected, and the analytical methodology deployed, are presented in some detail elsewhere (Nelis 2003).

Grange 4

A small assemblage of 8 flint and chert artefacts was found during excavations at Grange 4 (A029/004; E3122) (Duffy 2008). The archaeological remains consisted of prehistoric pits and postholes. The basic composition of the assemblage is given below (Table 1).

Unique No	Context	Material	Basic Character	Classification	Condition	Cortex	Fragment size (mm)	Length (mm)	Breadth (mm)	Thickness (mm)	Mass (g)
E3122:28:1	1	Flint	Flake	Flake shatter: indeterminate	Burnt	Secondary	19	0	14	3	0.71
E3122:29:1	1	Chert	Flake	Flake shatter: indeterminate	Abraded	Tertiary	15	0	7	5	0.58
E3122:111:14	1	Chert	Ang shatter	Angular shatter	Abraded	Tertiary	0	15	12	7	1.12
E3122:111:27	1	Quartz	Ang shatter	Angular shatter	Abraded	Tertiary	0	18	12	5	1.31
E3122:111:30	1	Chert	Flake	Flake shatter: medial fragment	Abraded	Secondary	9	0	15	5	0.90
E3122:111:31	1	Chert	Modified	Bipolar: ?Wedge tool	Abraded	Secondary	0	13	20	5	1.44
E3122:111:32	1	Chert	Core	Bipolar	Abraded	Secondary	0	22	23	9	4.49
E3122:111:33	1	Chert	Flake	Bipolar	Abraded	Secondary	0	21	15	5	1.68

Table 1: M3 Contract 4 Navan to Kells: Grange 4 (A029/004) (E3122): showing basic composition of the flint and chert chipped stone assemblage.

Assemblage composition

No unworked material was recovered, with the assemblage being mainly comprised of flake (4 pieces) and angular (2 pieces) debitage. A small bipolar core and a modified tool were also found (Table 1); the latter is a small wedge tool, based on a bipolar flake. The prominent material found is chert (6 pieces), with only one piece of burnt flint and a piece of abraded quartz being recovered.

General provenance of assemblage

The assemblage was recovered from a small number of pits, relating to prehistoric activity (Table 2); these are: C28, the fill of pit C3 (1 piece), C29, the fill of pit C4 (1

piece), both of which form part of a possible structure, and C111, the fill of a large pit C110 (6 pieces) (*ibid*., 8–20). All of these fills also yielded sherds of an early type of carinated ware, indicating early Neolithic occupation activity (Grogan and Roche 2008).

Context No	Description	Unworked	Core	Flake Debitage	Angular shatter	Modified	TOTAL
28	Fill of pit C3	-	-	1	-	-	1
29	Fill of pit C4	-	-	1	-	-	1
111	Fill of Pit C110	-	1	2	2	1	6
	TOTAL	-	1	4	2	1	8

Table 2: M3 Contract 4 Navan to Kells: Grange 4 (A029/004) (E3122): showing distribution and basic composition of the flint assemblage.

Condition

Most of the assemblage was quite weathered or in an abraded condition, and this constitutes all of the artefacts found in the pit fill C111 (6 pieces: 2 flake shatter, 2 angular shatter, 1 core) and the flake fragment found in C29; the flake fragment found in C28 had been subject to burning. The fragments found in C28 and C29 were barely recognisable as shattered flakes, such was the level of breakage they exhibited: burning would have caused the shattering of the former piece (E3122:28:1), but the latter shows multiple points of breakage, which seems to have been caused by thermal weathering on an already broken piece. The source of raw material could not be determined, but it was noticeable that the quality was generally quite poor.

***Discussion*:**

A small assemblage, mainly comprised of chert, and dominated by bipolar reduction techniques, was found in the fills of pits associated with structure features (C28, C29) and a pit (C111). All of these fills also yielded sherds of an early type of carinated ware, indicating early Neolithic occupation activity (Grogan and Roche 2008); although initial post-excavation analysis indicated a putative Bronze Age date for these features, pending the results of pottery analysis: (Duffy 2008). The chert artefacts are in a weathered condition, and the poor quality of the raw material is noticeable. The assemblage is few in number and does not contain any clearly datable artefact types, but there are some knapping trends and artefact types which nonetheless merit discussion.

Technology and Chronology

Evidence of primary knapping dominates the assemblage and in all cases where it could be determined, bipolar reduction methods were found; there was no clear evidence, therefore, for the use of platform reduction techniques, which tend to be more commonly found than bipolar methods in all periods during Irish prehistory. It is also unusual to find an assemblage mainly comprised of chert, with flint tending to be the most commonly utilised material found at prehistoric sites. This evidence indicates that raw material availability was limited to small-scale, poor quality material, and the minimalistic reduction techniques applied may indicate an acknowledgement of the inherent limitations of the available material, as well as perhaps a requirement for nothing more than simple, low-value tools.

In an Irish context, it had long been assumed that bipolar working did not emerge until the late Neolithic/early Bronze Age, however, finely controlled bipolar working is found at early Neolithic sites such as Thornhill, Co Derry and Ballynagilly, Co Tyrone (Nelis 2003) and throughout the Neolithic period at sites where raw material is poorly resourced and/or small in scale. It is entirely probable, therefore, that the bipolar material found at Grange 4 is contemporary with the early Neolithic pottery assemblage.

The single modified tool which was found is a small chert wedge tool, which exhibits some retouch as well as edge damage through use, and was based on a small bipolar flake (E3122:111:31; Plate 1); this also represents the finest quality raw material found, within an assemblage which is mainly comprised of poor quality material. Wedge tools are present in most Neolithic chipped stone assemblages, in both ritualized (e.g. Ballynahatty, Co Down) and domestic (e.g. Thornhill, Co Derry) contexts, where it is inferred that they were used to split/chop bone and/or wood (Nelis 2003). They tend to be associated with bipolar rather than platform reduction techniques, and are therefore mainly formed on small bipolar cores or flakes, or are retouched using bipolar flaking.

A small bipolar core was also found (E3122:111:32). It is possible that this piece could also have functioned as a wedge tool, but its poor material quality has meant that resulting edge damage or retouch is not visible. In terms of raw material and reduction technique, it was similar to a small bipolar flake recovered from the same deposit (E3122:111:33; Plate 2). An attempt to directly conjoin these pieces was unsuccessful; however, based on their visual similarities, it is highly probable that they represent two pieces of a reduction sequence. This indicates that although the cremation pit fill C111 contained only a small number of artefacts, these included at least two (and possibly more) artefacts from a single knapping episode, but the fact that no direct refits were discerned indicates that only part of the debitage from this knapping episode was included in the pit fill. This does, however, indicate that artefact residually is unlikely and, furthermore, it would seem that curation of debitage was quite limited. This would suggest that the lithic assemblage is contemporary with its associated pottery assemblage (i.e. indicating an early Neolithic date for these features), rather than representing residual elements of significantly earlier knapping episodes.

Plate 1: Grange 4 (E3122:111:31): Chert wedge tool.

Plate 2: Grange 4: Chert bipolar core E3122:111:32 (left) and chert bipolar flake E3122:111:32 (right).

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NUMISMATIC FINDS
GRANGE 4 E3122
JOHN STAFFORD-LANGAN

MAY 2009

Site: Grange 4
Ministerial Direction Number: A029/004
Context: 1
Find no.: E3122:001:1
Description: CU Alloy Coin
Conservation No.: 4664

This find is an Irish copper halfpenny of George IV, minted in London in 1822.

Coins of this type circulated in Ireland from their issue dates (1822 and 1823) until 1860 when they were withdrawn from circulation with the introduction of a lighter bronze coinage.

The coin is heavily corroded but the distinctive reverse harp design used on the 1822–1823 issue is still apparent as is the date below the harp. The portrait and the balance of the legends are corroded beyond recognition.

The coin had seen some circulation wear before deposition, but is not significantly worn. The date of deposition of the coin is probably around 1840 or slightly later

POSSIBLE STONE BEADS
MATTHEW PARKES

JULY 2009

Three pieces of stone were recovered from the site that may have been used as beads.

Find Number E3122:111:24
This is almost certainly a fossil crinoid ossicle that may have been used as a bead because it had a natural hole in the centre. These 'polo mint' shaped discs were very common in the Carboniferous seas over Ireland around 330 million years ago. They are also known as sea lilies - the animal had a long stalk made up of these discs with a fleshy stalk through the central holes. When the animal died they fell to the sea floor and sometimes form the bulk of limestone rocks in some parts of Ireland. In this case the fossil has had a more complex history - shortly after death, the ossicle was dissolved away (the calcite is soluble) and then another mineral, possibly silica or quartz replaced the calcite, but was growing into a void in the case. Small central cavity remains.

Find Number E3122:111:28
This is probably not a fossil and I can perceive little sign of it having been used as a bead. It is a chocolate brown colour and displays many small holes. It is too small to be totally positive, but it appears to be a fragment of a volcanic rock which had lots of gas bubbles in it which formed holes as it cooled (pumice is a good analogy). It could be termed a vesicular lava.

Find Number E3122:111:26
This is possibly a worked bead, as it has a concave, worked looking segment that may have been the hole. I do not think it is/was a fossil. There is no regularity of shape or other characteristics to suggest it was also a crinoid ossicle. It appears to be a decalcified sandstone or siltstone - the quartz grains were held together by a carbonate cement which has since been dissolved away leaving the poorly consolidated silica grains. The small 'worked' section could have been simply a scrape from a trowel or similar during excavation.

THE CHARCOAL REMAINS
GRANGE 4 E3122
LORNA O'DONNELL

FEBRUARY 2010

1 Introduction

A curvilinear feature, a pit that contained burnt bone and a cluster of postholes, stakeholes and pits were excavated at Grange 4, Co. Meath. This site was excavated as part of Contract 4 of the M3 Navan–Kells bypass (Duffy 2008). Radiocarbon dating indicates the site was in use during the Neolithic, middle Bronze Age and early medieval period. The aim of the charcoal analysis is to provide a floristic background to the area. The analysis can also identify any fuel selection patterns at Grange 4.

2 Methodology (After IAC Ltd)

2.1 Processing

- A mechanical flotation tank using a pump and water recycling system is used for soil flotation
- The soil is washed using a 1mm mesh in the flotation tank and a 300 micron and 1mm sieve is used to catch floated material.
- The volume of all soil samples are recorded in litres using a measuring jug.
- The sample is then placed into the 1mm mesh in the flotation tank, the tank is then filled with water and the sample washed. Any large lumps of soil can be carefully broken down by hand, but the jets of water in the flotation tank gently clean the rest of the sample.
- Once the sample is clean (just stones, charcoal, artefacts remaining in the mesh) the tank is filled up with water and at this stage any floating material (charcoal, seeds etc) should flow over the spout and into the sieves.
- The retent is then gently poured into a labelled tray (containing site code, site name, sample number and context number) and place on a shelf to dry.
- The flots are securely packaged in tissue, labelled and hung up to dry. This prevents any loss of light material (seeds) which could result once the flots are dry and being moved (if they are dried on trays).
- Before washing a new sample all equipment used (measuring jugs, 1mm mesh, sieves etc) are thoroughly washed using clean water.
- The large black settling tanks (and water) are cleaned between every site, or if a large site is being processed, every 1–2 weeks.
- Any samples containing a high clay content will be soaked in water for 1–2 days to aid the sieving process.

2.2 Charcoal identification

Each piece of charcoal was examined and orientated first under low magnification (10x–40x). They were then broken to reveal their transverse, tangential and longitudinal surfaces. Pieces were mounted in plasticine, and examined under a binocular microscope with dark ground light and magnifications generally of 200x and 400x. Each taxon or species will have anatomical characteristics that are particular to them, and these are identified by comparing their relevant characteristics to keys (Schweingruber 1978; Hather 2000 and Wheeler *et al* 1989) and a reference collection supplied by the National Botanical Gardens of Ireland, Glasnevin. It was aimed to identify fifty fragments per sample.

2.3 Details of charcoal recording

The general age group of each taxa per sample was recorded, and the growth rates were classified as slow, medium, fast or mixed. It was not within the scope of this project to measure all the ring widths from the charcoal, however, some measurements were taken with a microscopic graticule in order to make the scale of slow, medium and fast growth less subjective. Slow growth within the charcoal from

this site was considered to be approximately 0.4mm per annum, medium approximately 1mm per annum and fast approximately 2.2mm per annum.

The ring curvature of the pieces was also noted – for example weakly curved annual rings suggest the use of trunks or larger branches, while strongly curved annual rings indicate the burning of smaller branches or trees (Fig. 1). Tyloses in vessels in species such as oak can denote the presence of heartwood. These occur when adjacent parenchyma cells penetrate the vessel walls (via the pitting) effectively blocking the vessels (Gale 2003, 37). Insect infestation is usually recognised by round holes, and is considered to be caused by burrowing insects. Their presence normally suggests the use of decayed degraded wood, which may have been gathered from the woodland floor or may have been stockpiled.

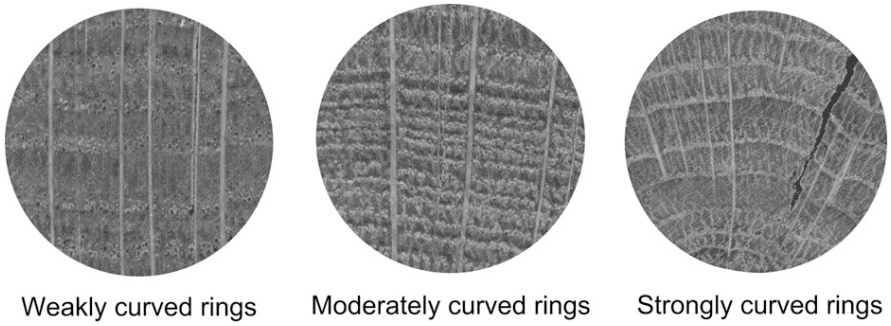

Fig. 1 Ring curvature. Weakly curved rings indicate the use of trunks or large branches (After Marguerie and Hunot 2007 1421, Fig. 3).

3 Results

Charcoal was identified from ten contexts from Grange 4. This included pits, postholes, cremation pits, furnace and the fill of a curvilinear feature. Seven wood taxa were identified in total from the site. The results are dominated by oak (*Quercus* sp.) followed by ash (*Fraxinus* sp.) and hazel (*Corylus avellana*). Alder (*Alnus* sp.), pomaceous fruitwood (Maloideae), willow (*Salix* sp.) and elm (*Ulmus* sp.) were also identified.

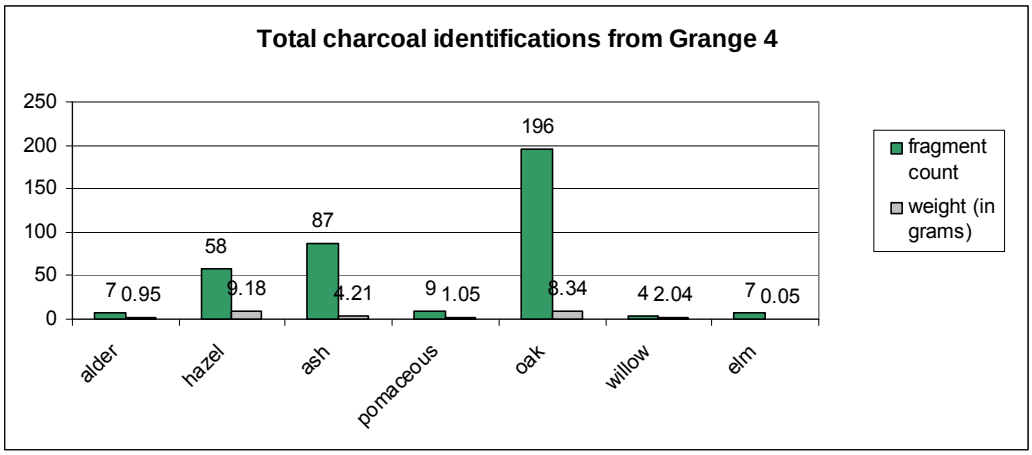

Fig. 2 Charcoal identifications from Grange 4

Charcoal was identified from pits and postholes at Grange 4. Pit **C9** (fill **C77**) contained only oak. In comparison, pit C110 (fill **C111**) was dominated by oak, with a

small amount of pomaceous fruitwood and hazel also identified. Pit fill **C113** was associated with pit **C110**. Oak only was identified from here which compares well to **C110**. In contrast to the other pits at the site, pit **C7** (fill **C69**) was dominated by ash, with some alder, pomaceous fruitwood and willow also identified.

Charcoal was identified from two postholes. Posthole **C20** (fill **C56**) contained hazel, ash and oak charcoal fragments. Posthole **C25** (fill **C73**) contained hazel and oak fragments. The level of charcoal is very low in these postholes, it is unlikely that they represent the remains of posts burnt *in situ*.

Samples from two pits were submitted for analysis. The level of charcoal in pit **C4** (fill **C29**) is very low, ten fragments in total of hazel, oak and elm were identified from here. In contrast, the level of charcoal in pit **C62** (fill **C104**) is considerably higher. The charcoal from here is dominated by oak; hazel and ash were also identified.

One sample was examined from **C128**, fill of **C126**. Ash only was identified from here. Charcoal was also examined from the fill (**C127**) of a curvilinear feature (**C131**). The results are dominated by hazel, with some alder and willow.

A Neolithic date has been received from posthole **C20** while pit **C4** contained Neolithic pottery. Hazel, ash, oak and elm must have been growing in the Grange vicinity during the Neolithic period. Hazel and oak have also been identified from the middle Bronze Age posthole **C25**. An early medieval date has been received for one of the pits **C69**, indicating that alder, ash, pomaceous fruitwood and willow were growing in the vicinity at that time. The charcoal identifications are different from the early medieval sample than the Neolithic and Bronze Age ones. A greater sample set would be needed to investigate this further.

The charcoal from postholes **C20** and **C25** and from the pit **C4** probably represent on site domestic burning. In contrast, the fill of pit **C62** and the curvilinear **C131** were dominated by oak and hazel respectively. It may be the case that these represent a dump of burnt structural material.

4 Local environment

The charcoal results from Grange 4 indicate that the site was located close to oak woodlands. The oak present is most likely pedunculate (*Quercus robur*) or sessile oak (*Quercus petraea*), both are native species. Pedunculate oak is common on heavy clay lowland soils whereas sessile oak thrives on the lighter loams characteristic of higher ground (Gale and Cutler 2000). Hazel can grow as a tree or as a scrub, and is frequently found growing in association with oak as an understorey tree.

It is unlikely that these woodlands were closed canopy in nature, as a number of the trees identified from Grange 4 require light to grow, including ash and the pomaceous fruitwood type. Ash trees prefer moist, well drained and fertile soils. It is very intolerant of shade (Lipscombe and Stokes 2008, 188).

The Pomoideae group (pomaceous fruitwood), a sub family of the Rosaceae includes crab apple, wild pear, rowan/whitebeam and hawthorn. Crab apple (*Malus sylvestris*) is a tree of hedges, copses and oak woodland, thriving in fertile and heavy soils. It often grows singly, with large distances between individual trees (Lipscombe and Stokes 200, 78). Wild pear (*Pyrus pyraster*) can grow on woodland edges and also can be found growing in a solitary situation (Lipscombe and Stokes 2008, 114 ; Stuijts 2005, 142). Rowan (*Sorbus aucuparia*) is a tough colonizer which can tolerate peaty soils and exposed conditions. It needs plenty of light to thrive (Hickie 2002, 65).

It is a tree of mountains, woodlands and valleys, growing on a wide range of soils, including chalks, acid soils and even peat (Lipscombe and Stokes 2008, 120). Whitebeam (*Sorbus aria*) grows up to 20m high and has a preference for limestone soils (Orme and Coles 1985, 11). Hawthorn (*Crataegus monogyna)* can thrive in all but the most acid of soils (Gale and Cutler 2000). As wild pear is not a native Irish species, it is likely that the charcoal represents other types encompassed in the Pomoideae group.

A wetland element is indicated by the presence of alder. This tree can often be seen growing alongside rivers, lakes, on marshes or in fens. It can form alder carr when its roots are in water. It is able to survive on these wet sites (which generally lack the nitrates needed for growth) as its roots have nodules which contain nitrogen fixing bacteria that extract nitrogen from the air (Lipscome and Stokes 2008, 134). In comparison to alder, willow will also grow in wet areas. The main Irish native willows are grey willow (*Salix cinerea*), goat willow (*Salix caprea*) and eared willow (*Salix aurita*). Elm trees will grow well on rich, alluvial soils and do prefer riverine habitats (Gale and Cutler 2000, 264).

5 Summary

Charcoal was identified from ten contexts at Grange 4. Seven wood types were identified. The charcoal results indicate the site was located close to oak woodlands which were probably not closed canopy in nature. A wetland element is also noted with the identification of alder and willow. Charcoal from the nearby Grange 5 site was also dominated by oak (O'Donnell 2010).

Hazel, ash, oak and elm were identified from Neolithic deposits. In comparison, hazel and oak were identified from Bronze Age deposits. A slight difference in charcoal results is noted from the early medieval pit, with the presence of alder, ash, pomaceous fruitwood and willow.

Most of the pits were dominated by oak, with one exception which was dominated by ash. It was not possible to say what trees were used as posts, as they do not appear to have been burnt *in situ*.

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Table 1 Charcoal identifications from Grange 4

Sample number	Context number	Feature type	Wood taxon	Flot weight	No. of fragments	Charcoal weight (grams)	Size of fragments (mm)	No. of growth rings	Growth	Ring curvature	Insect holes	Tyloses	Comment
1	C29	Fill of pit C4, associated with possible structure (E neo pottery)	*Corylus avellana* (hazel)	0.8g	1	0.04	3	2					Extremely small flot
1	C29	Fill of pit C4, associated with possible structure (E neo pottery)	*Quercus* sp. (oak)	0.8g	2	0.14	2–4	2					Extremely small flot
1	C29	Fill of pit C4, associated with possible structure (E neo pottery)	*Ulmus* sp. (elm)	0.8g	7	0.05	2–4	2–3					Extremely small flot
10	C56	Posthole C20 in structure	*Corylus avellana* (hazel)	0.2g	3	0.1	2–4	1–2					Extremely small flot
10	C56	Posthole C20 in structure	*Fraxinus* sp. (ash)	0.2g	1	0.05	2–4	1					Extremely small flot
10	C56	Posthole C20 in structure	*Quercus* sp. (oak)	0.2g	1	0.05	2–4	1–2					Extremely small flot
14	C77	Fill of pit C9	*Quercus* sp. (oak)	14.1g	50	2.51	5–10	2–5	Slow	Weakly curved		Present	
15	C73	Posthole C25 in structure	*Corylus avellana* (hazel)	1.1	2	0.1	3	2					
15	C73	Posthole C25 in structure	*Quercus* sp. (oak)	1.0g	1	0.02	3	2					Extremely small flot
17	C69	Basal fill of pit C7	*Alnus* sp. (alder)	19.0g	6	0.79	5–10	4–5		Strongly curved			
17	C69	Basal fill of pit C7	*Fraxinus* sp. (ash)	19.0g	35	2.23	5–10	2–11		Strongly curved			

Sample number	Context number	Feature type	Wood taxon	Flot weight	No. of fragments	Charcoal weight (grams)	Size of fragments (mm)	No. of growth rings	Growth	Ring curvature	Insect holes	Tyloses	Comment
17	C69	Basal fill of pit C7	Maloideae spp. (pomaceous)	19.0g	8	1	5–6	4–5					
17	C69	Basal fill of pit C7	*Salix* sp. (willow)	19.0g	1	0.08	5	5					
20	C104	Fill of shallow pit C62	*Corylus avellana* (hazel)	18.5g	2	0.09	5	4	Medium	Strongly curved			
20	C104	Fill of shallow pit C62	*Fraxinus* sp. (ash)	18.5g	1	0.01	4	3					
20	C104	Fill of shallow pit C62	*Quercus* sp. (oak)	18.5g	47	2.29	5–7	4–5	Slow	Weakly curved			
27	C113	Associated with pit C110	*Quercus* sp. (oak)	6.6g	50	1.37	5–10	2–5	Slow	Weakly curved		Present	
31	C111	Fill of pit C110	*Corylus avellana* (hazel)	11.1g	4	0.2	5–6	2–6	Medium				
31	C111	Fill of pit C110	Maloideae spp. (pomaceous)	11.1g	1	0.05	3	3					
31	C111	Fill of pit C110	*Quercus* sp. (oak)	11.1g	45	1.96	5–10	2–4	Medium	Weakly curved		Present	
37	C128	Fill of circular furnace C126	*Fraxinus* sp. (ash)	11.2g	50	1.92	3–4	2–3	Medium	Strongly curved			Roundwoods, some only partially burnt
40	C127	Upper fill in curvilinear feature C131	*Alnus* sp. (alder)	88.2g	1	0.16	4	4	Medium				
40	C127	Upper fill in curvilinear feature C131	*Corylus avellana* (hazel)	88.2g	46	8.65	3–7	4–5	Medium	Strongly curved			
40	C127	Upper fill in curvilinear feature C131	*Salix* sp. (willow)	88.2g	3	1.96	4–11	3–4	Fast	Strongly curved			Roundwoods

THE PLANT REMAINS
GRANGE 4 (E3122)

SUSAN LYONS MSC MIAI

JOB CODE: PR/088.31

NOVEMBER 2009

1 Introduction

Five flot samples was analysed from excavations associated with the prehistoric funerary activity recorded at Grange 4, Co. Meath. Grange 4 was excavated as part of the archaeological mitigation programme associated with Contract 4 of the M3 Navan Kells and Kells Bypass, which formed part of the proposed M3 Clonee to North Kells Motorway Scheme. The site consisted of prehistoric activity in the form of pits, postholes and stakeholes (Duffy, 2008).

The primary objective of the plant remains project is to identify, analyse and interpret the charred and any waterlogged botanical remains present in order to help with understanding the change in the floral environment and activities at the site over time and to help with highlighting the function of certain areas of the site or indeed the features recorded within. This report will later form part of an overall scheme-wide report encompassing all sites along the M3 Clonee to North Kells Motorway Scheme (Lyons, *forthcoming)*.

2 Methodology

2.1 Sample processing (after IAC Ltd)

- A mechanical flotation tank using a pump and water recycling system is used for soil flotation
- The soil is washed using a 1mm mesh in the flotation tank and a 300 micron and 1mm sieve is used to catch floated material.
- The volume of all soil samples are recorded in litres using a measuring jug.
- The sample is then placed into the 1mm mesh in the flotation tank, the tank is then filled with water and the sample washed. Any large lumps of soil can be carefully broken down by hand, but the jets of water in the flotation tank gently clean the rest of the sample.
- Once the sample is clean (just stones, charcoal, artefacts remaining in the mesh) the tank is filled up with water and at this stage any floating material (charcoal, seeds etc) should flow over the spout and into the sieves.
- The retent is then gently poured into a labelled tray (containing site code, site name, sample number and context number) and place on a shelf to dry.
- The flots are securely packaged in tissue, labelled and hung up to dry. This prevents any loss of light material (seeds) which could result once the flots are dry and being moved (if they are dried on trays).
- Before washing a new sample all equipment used (measuring jugs, 1mm mesh, sieves etc) are thoroughly washed using clean water.
- The large black settling tanks (and water) are cleaned between every site, or if a large site is being processed, every 1–2 weeks.
- Any samples containing high clay content will be soaked in water for 1–2 days to aid the sieving process.

2.2 Quantification and identification of plant remains

The flot samples are viewed under a low powered binocular microscope (Nikon SMZ645) at magnification x0.8 to x5 and any carbonised or potentially waterlogged botanical materials were identified to genus/species level where applicable. Where preservation allowed, all charred and waterlogged plant remains recovered were identified to species level where applicable and the constituents quantified numerically.

Those plant remains which were abraded or fragmented were recorded using an abundance key to highlight the concentrations of material identified from each sample;

+ = rare (1–10) ++ = occasional (11–50)
+++ = common (51–100) ++++ = abundant (>100)

To fully identify charred remains, a series of morphological characteristics are recorded, which includes length, breadth, shape on the longitudinal and transerve planes, texture of the seed coat (smooth or reticulate), attachments (pappus), scars (hilum) and the presence of the embryo and endosperm components in cereal grains (Pearsall, 2000, 135–6). Cereal chaff fragments were noted for glume base angle, ventral/dorsal keels, nerves, size of lemma scars etc (Hillman, 1981).

Plant species are made using reference to the author's seed collection and standard seed atlases and references; *Flora of the British Isles* (Clapham, A R, Tutin, T G, Warburg, E F, 1957), *Zadenatlas der Nederlandsche Flora* (Beijerinck, W.1976), *New Flora of the British Isles 2nd Edition* (Stace, C, 1997) and *Digital Seed Atlas of the Netherlands* (Cappers, R.T.J., R.M. Bekker and J.E.A. Jans, 2006).

3 Results

Five samples from the following contexts were submitted for archaeobotanical analysis – C29 (fill of pit C4), C71 (fill of posthole C70), C69 (fill of pit C7), C127 (layer under C131) and C128 (fill of pit C126).

The results are summarised in **Table 1.**

***Wood charcoal* –** Charcoal was recorded in low to high concentrations from the majority of the features selected for archaeobotanical analysis, with the highest concentrations noted from furnace C126. The material was very fragmented and in minute fibres in many cases with average fragment size of <10mm diameter

***Carbonised cereal remains* -** Carbonised cereal grains were recorded in noticeable quantities from C127 (fill of C131) and C128 (fill of C126). Just two barley grains were identified from C69 (fill of pit C7). While barley (*Hordeum* sp.) and oat (*Avena* sp.) were both identified from these deposits, barley was the dominant grain recorded from C127, and oat the dominant cereal type recovered from C128. The oat grain was in a poor state of preservation for the most part but based on grain size and the absence of a distinct basal scar (suckermouth) (Stanton, 1955, 103), the cultivated/common oat type (*Avena sativa)* is likely to be the most common oat species recorded from the assemblage. A low concentrations of oat chaff components [awns and palea/lemma (hulls)], were also identified, however these were very fragmented definitive identifications were difficult to undertake.

A number of vesicular and eroded grains were also recorded from C128 and these appear in the tables as indeterminate grain. Cereal grains can become eroded and abraded as a result of charring at high temperatures, that the grain was damp when burnt or that this material had degraded due to redeposition and/or exposure.

***Carbonised nutshell* –** Carbonised nutshell, tentatively identified as hazelnut (*Corylus avellana)* shell was identified from C29 (fill of pit C4) and C71 (fill of posthole C70), Hazelnut shell is also a frequent occurrence on archaeological sites (Moffett *et al,* 1989; Greig, 1991) and its presence is usually interpreted as:

- the waste debris of gathered foodstuffs that have been discarded onto fires

- the remnants of drying or parching hazelnuts near or over a fire.
- material collected with hazel wood for fuel or kindling

Since the hazelnut shell recovered at Grange 4 is in such small quantities, its origin here is uncertain.

4 Discussion

4.1 Carbonisation of plant remains

Charred plant remains are those which have been heated to more than about 200° C, but where there is not enough oxygen to complete the burning process. Instead, the organic components are converted to a more carbon-rich resilient material or to carbon itself rather than to ash (Broadman & Jones, 1990). Despite being subjected to high temperatures, many charred remains retain a morphology or exterior detail which can aid plant identification to genus or even species level. Some remains are found in the same place that they were charred (hearths, fires, kilns, ovens, burnt stores). More are found thinly spread and scattered across a wider area entering deposits such as occupational layers, pits and potholes for example. Over time, this material can move and be re-distributed due to disturbances such as soil movement, extreme climatic conditions, root penetration or worm/animal action. The carbonisation process obviously affects different species and plant components in different ways, where finer, lighter material can be destroyed more easily than larger elements. It most therefore be noted that the charred plant remains recovered from archaeological features can as much reflect the results of the carbonisation process as how and what plant remains were used on a site.

4.2 Carbonised plant remains from Grange 4

Charcoal is a common result of occupational activity on archaeological sites and usually reflects the use of hearths in and around the site and/or cleaning out and dumping of this burnt debris into nearby open features. At Grange 4 the charcoal for the most part is likely to represent the remains of firing debris associated with the funerary or industrial activity carried out at the site. Charcoal would have been dumped or discarded into nearby open features and become mixed with other occupational deposits over time, which may account for this material from C4 and C131.

The carbonised cereal assemblage was made up of barley and oat. Barley has been cultivated from the prehistoric period to the present day (Monk, 1986), while the cultivation of oat is primarily dated from the early medieval period in Ireland (Monk, 1986). The presence of both crops at the site collectively is indicative of a medieval crop assemblage and therefore some degree of crop drying activity at the site. Pit C126 (C128) showed signs of *in situ* burning (Duffy, 2008, 18) and this coupled with the high incidence of carbonised cereal grain suggests that this feature may have functioned as a corn drying kiln or crop storage facility, which may have burnt down. The fact that the grain was left *in situ* implies that this feature was not cleaned out properly and may have been re-used or abandoned. Based on the higher oat grain content, it is likely to have been the last crop kilned or stored within this feature. It is difficult to ascertain however whether the remains reflect one or more burning episodes. The presence of barley may represent residual material from earlier kilning activities.

In contrast, barley was the dominant crop type recorded from curvilinear C131 (C127). In the absence of *in situ* burning, it is most likely that this deposit represent a dumping of discarded charred remains from nearby kilning activities. Kilns would have required periodic cleaning of charred grain as part of their regular maintenance.

These charred grains and cereal remains would have been dumped close by into open ditches and gullies and spread over the surrounding areas (Lyons, 2008). This is therefore likely to account for the charred cereal remains from C127. It is difficult to ascertain if the cereal assemblage recorded from C127 is from activities associated directly with C128. It may also represent a series of different kilning episodes which were discarded over a period of time. Such charred remains can also become re-deposited and re-distributed across a site and become incorporated with other deposits. This may account for the presence of barley grains from pit C7 (C69), which returned a medieval date of AD 666–772 (2 Sigma Calibration).

An interesting observation is the presence of oat chaff from C128. After a harvest, the cultivated crop goes through a series of processing procedures where the product (grain) and the various by-products (chaff, straw and weed seeds) are separated from each other (van der Veen, 1989). The absence of weeds and chaff from a carbonised cereal assemblage can indicate that cereals were either being prepared for long-term storage or for grinding and milling. Grains would require full processing (removal of chaff and weeds) prior to storage to prevent spoilage of the crop. In the event of a wet summer however, the grain can be stored as semi-cleaned spikelets (van der Veen, 1989, 304). This would therefore account for chaff in a cereal assemblage. It is important to note however that a mixture of cereal chaff and wood forms a very suitable fuel for parching grain (Hillman, 1981).

5 Summary

Five samples representing a series of postholes associated prehistoric funerary activity and a series of pits/furnace deposits were selected for archaeobotanical analysis. The only features to contain a sizeable number of charred cereal grains were curvilinear C131 and pit C126. The presence of oat and barley collectively indicates a possible medieval crop assemblage. It is likely that C126 functioned as a medieval corn drying kiln, while C131 may have been used as a dumping ground for nearby kilning debris. Whether both features are directly associated however is difficult to ascertain.

6 Recommendations

1 There is no further identification work required on the sample submitted for Grange 4. Any additional processed samples associated with features excavated at the site should also be scanned to determine if there are any other plant remains present, which may help with the interpretations put forward.
2 A record of the methodology and results of this assessment should be included in any final report.

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Table 1. Composition of plant remains from Grange 4 (E3122)
Key: + = rare (1–10), ++ = occasional (11–50), +++ = common (51–100) and ++++ = abundant (>100)

Feature	Context number	Sample Number	Flot volume (grams)	Context description	Wood charcoal	Carbonised cereal grains	Carbonised cereal chaff	Carbonised nutshell	Comments
Possible Pits & Structure	29	1	1 grams	Fill of pit C4	+			++++	1 gram of nutshell
	71	16	0.4 grams	Fill of posthole C70					
Plt	69	17	0.2 grams	Basal fill of cremation pit C7	+				
Curvilinear Feature	127	41	2.2 grams	Upper layer of C131, arc shaped feature	+	+++			Oat (x3) Barley (x42)
Dispersed Pits	128	37	2.2 grams	Basal fill of small circular pit C126	+++	++++	+		Oat (x67) Barley (x4) Cereal indet +++ Cereal chaff (palea & lemma +; awns +)

THE FAUNAL REMAINS
GRANGE 4 (E3122)

MARGARET MCCARTHY

DECEMBER 2009

The features from this excavation site contained such small quantities of bone that they provide no useful information. Just five calcined fragments of indeterminate bone were recovered from the upper fill (C111) of a large sub-circular pit (C110).

OSTEOLOGICAL ANALYSIS OF THE BURNT BONE GRANGE 4 E3122

JENNIE COUGHLAN

AUGUST 2009

Summary
This report details the results of the analysis of burnt bone, originally interpreted as possible cremated bone by the excavator, recovered during archaeological investigations in the townland of Grange, Co. Meath. Excavations at Grange 4 (A029/004) were directed by Carmel Duffy for Irish Archaeological Consultancy Ltd. as part of a series of archaeological investigations along the proposed route of the M3 Clonee to the north of Kells road scheme.

A small quantity of cremated bone was recovered from the fill of a prehistoric pit (C7), located at the southern end of the excavation. Osteological analysis of the burnt bone was undertaken to quantify and, where possible, identify the skeletal elements contained within the deposits and, where applicable, to assess the demographic and pathological profile of the individual(s) interred. Additional consideration was given to aspects of bone colouration and fragmentation as evidence for pyre technology.

1. Introduction

Excavations at Grange 4 uncovered the remains of a small number of archaeological features which have been provisionally dated to the Neolithic, Bronze Age and early medieval period. Identified features included a series of post- and stakeholes, which appear to have defined the limits of a possible structure, and a small number of isolated pits and postholes. C7, a circular pit located near the southern limit of the excavation, produced 7.6g of burnt bone (Table 1.1). Archaeological interpretation suggested that this pit represented the remains of a cremation burial.

Cut	Fill	Weight of bone (g)	Description of context	Dimensions	Depth	Date	Additional comments
7	69	7.6g	Circular pit	0.70m x 0.70m	0.15m	Prehistoric	Pit contained a small quantity of undiagnostic burnt bone fragments

Table 1.1 Total weight of burnt bone

2. Materials and Process

All burnt bone was separated from the surrounding matrix prior to analysis as part of post-excavation procedures. The bone from each context was examined in accordance with standards recommended by BABAO and the IFA (Guidelines to the Standards for Recording Human Remains, Brickley and McKinley 2004). Each sample was sieved through laboratory-grade stack sieves of 2mm, 5mm and 10mm diameter mesh and the material from each sieve was weighed to the nearest 0.1gram. All material was examined macroscopically.

Once the bone from each sample was sieved, each sieved portion of bone was weighed as a whole and examined for identifiable bone. Identifiable human skeletal elements were divided into five main categories during osteological analysis; namely skull, axial, upper limb, lower limb and unidentified long bone. Identified elements were weighed separately and described in detail.

3. Reasons for Analysis and Scope of Reporting

Osteological analysis is undertaken to determine the demographic and pathological profile of an individual or population group. The osteological analysis of cremation burials considers various aspects of the burial deposit including the total weight of bone, identification of individual skeletal elements and minimum number of individuals represented in the deposit. The identification of demographic and pathological details is more difficult in cremated remains as the fragmented and fire-

damaged nature of the bone can limit the amount of information retrieved during analysis. In addition to individual details the analysis of cremated remains can also reveal aspects of cremation ritual, including pyre technology and depositional practices.

4. Osteological analysis

C7 was a circular pit with a diameter of 0.70m and a maximum depth of 0.15m. The basal fill of the pit (C69) contained a total of 7.6g of fully oxidised burnt bone fragments. The total number of fragments presented for analysis was approximately 160.

The cremated remains were affected by high levels of fragmentation, with the majority of bone fragments ranging between 5mm and 2mm in diameter (Table 4.1). None of the recovered fragments were greater than 10mm in diameter. The maximum recorded length of a single fragment was 18.8mm. In addition to the high levels of fragmentation the bone remains were also affected by moderate to severe surface erosion.

cut	fill	sample	10mm (g)	%	5mm (g)	%	2mm (g)	%	<2mm (g)	%	Total (g)	max. length
7	**69**	**17**	-	-	1.6	*21.1*	6.0	*78.9*	<0.1	-	7.6	18.8mm

Table 4.1 Quantification of cremated bone: C7

Levels of fragmentation impacted on the identification of skeletal elements in this deposit and all recovered fragments were undiagnostic of species.

5. Summary

Excavations at Grange 4 uncovered the remains of a series of archaeological features of prehistoric date. Amongst these was a small circular pit (C7) which produced a quantity (7.6g) of fully oxidised burnt bone remains. Data from modern crematoria suggests that the weight of bone produced by a single adult individual during the cremation process would commonly range from approximately 1000.5g to 2422.5g (McKinley 1993). It has been found, however, that cremated bone deposits from archaeological contexts frequently contain smaller quantities of burnt bone. This discrepancy in expected cremated bone weight versus recovered bone weight can be contributed to a variety of factors including partial and/or preferential collection of specific skeletal elements for deposition and/or post-depositional disturbance. In this example the weight of bone recovered from the pit was more comparable to a 'token' deposit rather than a cremation burial. Unfortunately high levels of fragmentation and surface erosion impacted on the amount of information retrievable during analysis and, while this pit may relate to ritual depositional practices this could not be confirmed through osteological analysis.

Appendix 2.8 Radiocarbon Dating Results – QUB Laboratory

The “Measured radiocarbon age” is quoted in conventional years BP (before AD 1950). The error is expressed at the one-sigma level of confidence.

The “Calibrated date range” is equivalent to the probable calendrical age of the sample material and is expressed at the one Sigma (68.3% probability) and two-Sigma (95.4% probability) level of confidence.

Calibration dataset:
Calibration programme: CALIB REV5.0.2 - used in conjunction with Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215–230.

Context	Sample No	Material	Species id/ Weight	Lab	Lab Code	Date Type	Calibrated date ranges	Measured radiocarbon age (BP)	13C/12C Ratio ‰
C69 Cremation pit	17	Charred cereal	*Hordeum Sp.* Barley (<0.1g)	QUB	UBA11126	AMS(Std)	AD 673–767 (1 sigma), AD 666–772 (2 sigma)	1291+/-27	-25.2
C73 Posthole	15	Charcoal	*Corylus avellana* Hazel (0.1g)	QUB	UBA11127	AMS(Std)	1442–1407 BC (1 sigma), 1493–1326 BC (2 sigma)	3145+/-23	-27.9
C71 Posthole	16	Hazelnut shell	Single item	QUB	UBA11128	AMS(Std)	2568–2487 BC (1 sigma), 2574–2474 BC (2 sigma)	4008+/-25	-28.0

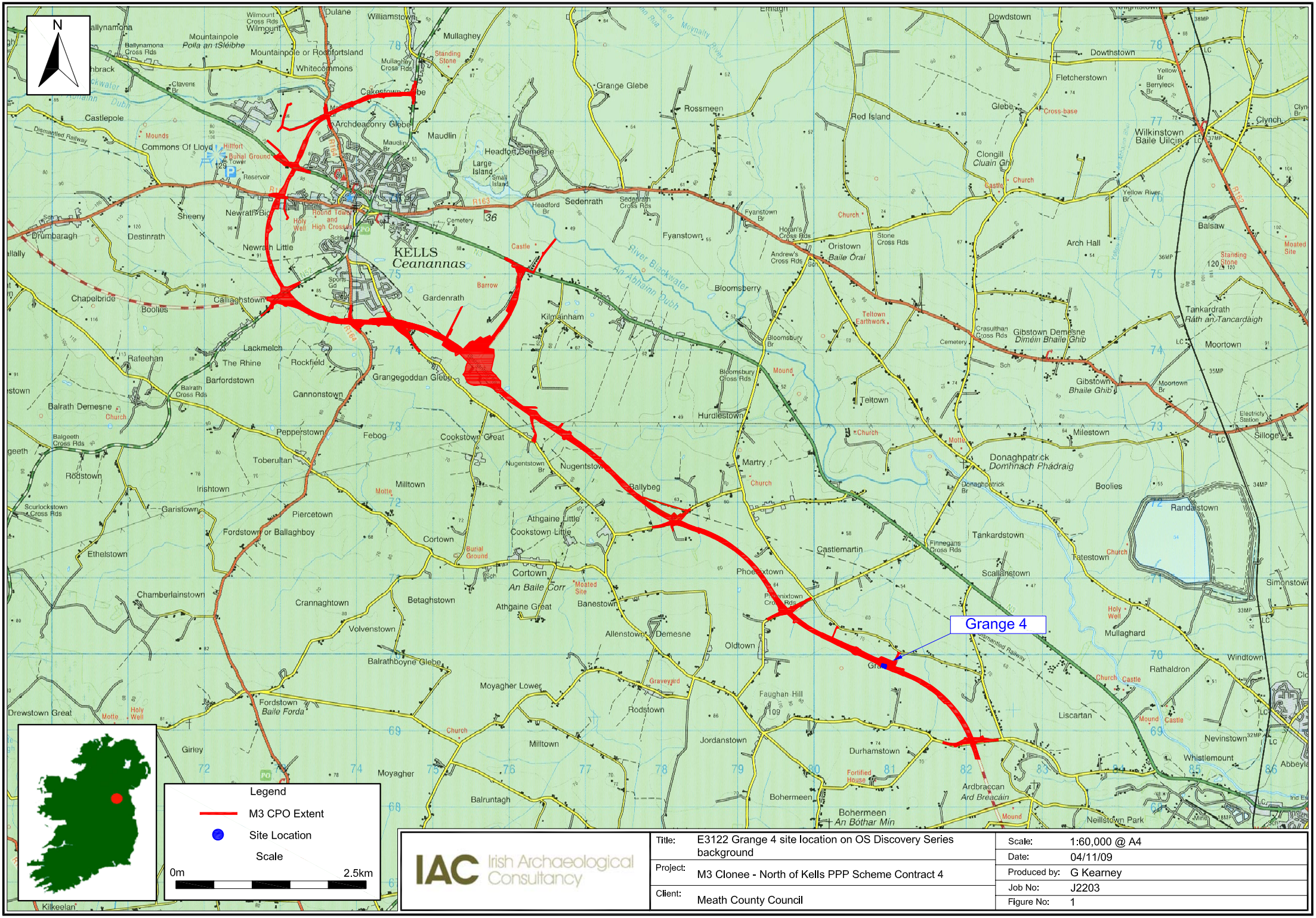
APPENDIX 3 LIST OF RMP SITES IN AREA

RMP No	Description
ME024:003	Enclosure Site
ME024:007	Church Site Possible
ME024:008	Rectilinear Enclosure

See Figure 2 for locations

APPENDIX 4 LIST OF M3 CONTRACT 4 SITE NAMES

Site Name	Director	Contract site reference no.	Excavation Registration No.
Ardbraccan 5	Carmel Duffy	A029-001	E3119
Ardbraccan 6	Ciara MacManus	A029-002	E3120
Grange 5	Amanda Kelly	A029-003	E3121
Grange 4	Carmel Duffy	A029-004	E3122
Grange 3	Amanda Kelly	A029-005	E3123
Grange 2	Amanda Kelly	A029-006	E3124
Grange 1	Patricia Lynch	A029-007	E3125
Phoenixtown 5	Tim Coughlan	A029-008	E3126
Phoenixtown 6	Ed Lyne	A029-009	E3127
Phoenixtown 1	Ed Lyne	A029-010	E3128
Phoenixtown 2	Ed Lyne	A029-011	E3129
Phoenixtown 3	Ed Lyne	A029-012	E3130
Phoenixtown 4	Ed Lyne	A029-013	E3131
Ballybeg 1	Patricia Lynch	A029-014	E3132
Ballybeg 2	Patricia Lynch	A029-015	E3133
Nugentstown 3	Patricia Lynch	A029-016	E3134
Nugentstown 2	Patricia Lynch	A029-017	E3135
Nugentstown 1	Patricia Lynch	A029-018	E3136
Cookstown Great 1	Patricia Lynch	A029-019	E3137
Cookstown Great 2	Gill McLoughlin	A029-020	E3138
Cookstown Great 3	Gill McLoughlin	A029-021	E3139
Kilmainham 1A	Ed Lyne	A029-053	E3141
Kilmainham 1B	David Bayley	A029-054	E3142
Kilmainham 1C	Fintan Walsh	A029-022	E3140
Kilmainham 2	David Bayley	A029-023	E3143
Kilmainham 3	Yvonne Whitty	A029-024	E3144
Gardenrath 2	David Bayley	A029-025	E3145
Gardenrath 1	David Bayley	A029-026	E3146
Town Parks 1	Gill McLoughlin	A029-027	E3147
Town Parks 2	Catriona Gleeson	A029-028	E3148
Town Parks 3	Catriona Gleeson	A029-029	E3149
Town Parks 4	Yvonne Whitty	A029-030	E3150
Town Parks 5	Yvonne Whitty	A029-031	E3151
Town Parks 6	Yvonne Whitty	A029-032	E3152
Newrath Little 3	James Kyle	A029-033	E3153
Newrath Little 2	Yvonne Whitty	A029-034	E3154
Newrath Little 1	James Kyle	A029-035	E3155
Town Parks / Commons of Lloyd 1	David Bayley	A029-036	E3156
Commons of Lloyd 1	Yvonne Whitty	A029-037	E3157
Cakestown Glebe 2	Patricia Lynch	A029-038	E3158
Cakestown Glebe 1	Patricia Lynch	A029-039	E3159
Ballybeg 3	Tim Coughlan	A029-040	E3160
Ballybeg 4	Patricia Lynch	A029-041	E3162



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	Project:	M3 Clonee - North of Kells PPP Scheme Contract 4	Date: 04/11/09
	Client:	Meath County Council	Produced by: G Kearney
			Job No: J2203
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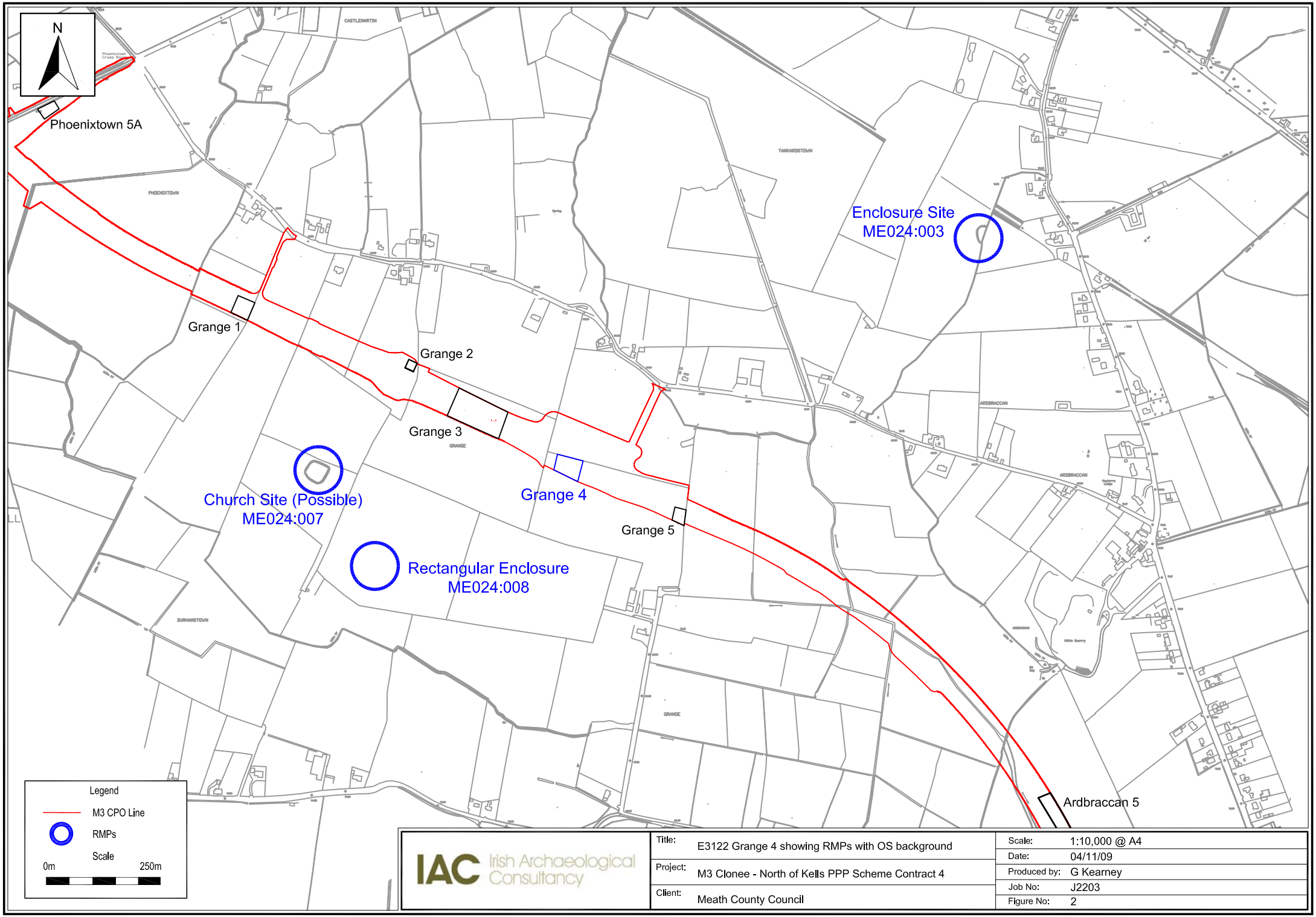

IAC Irish Archaeological Consultancy

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Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

Scale:	1:10,000 @ A4
Date:	04/11/09
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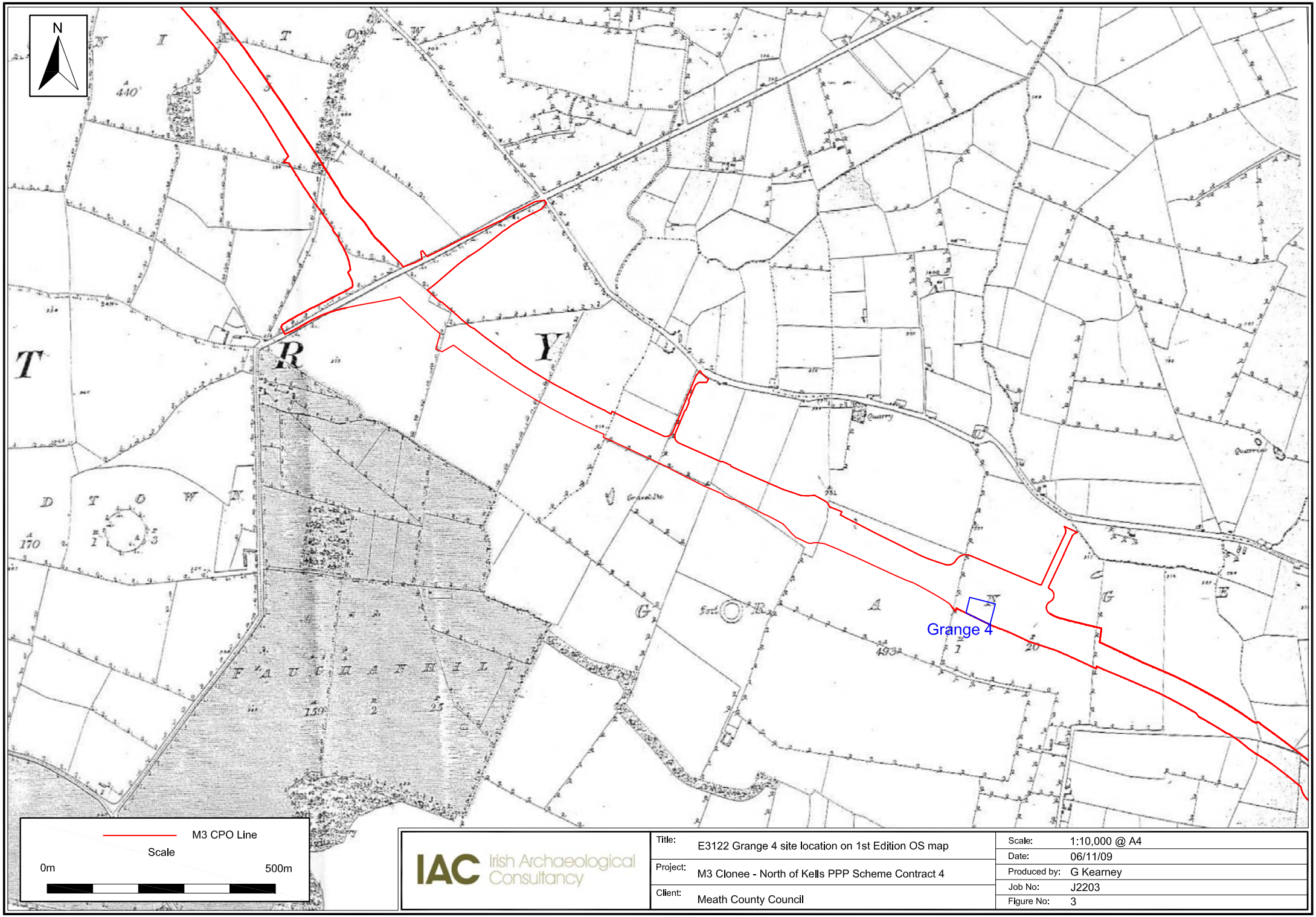
Job No:	J2203
Figure No:	2



IAC Irish Archaeological Consultancy

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Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

Scale:	1:10,000 @ A4
Date:	06/11/09
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Job No:	J2203
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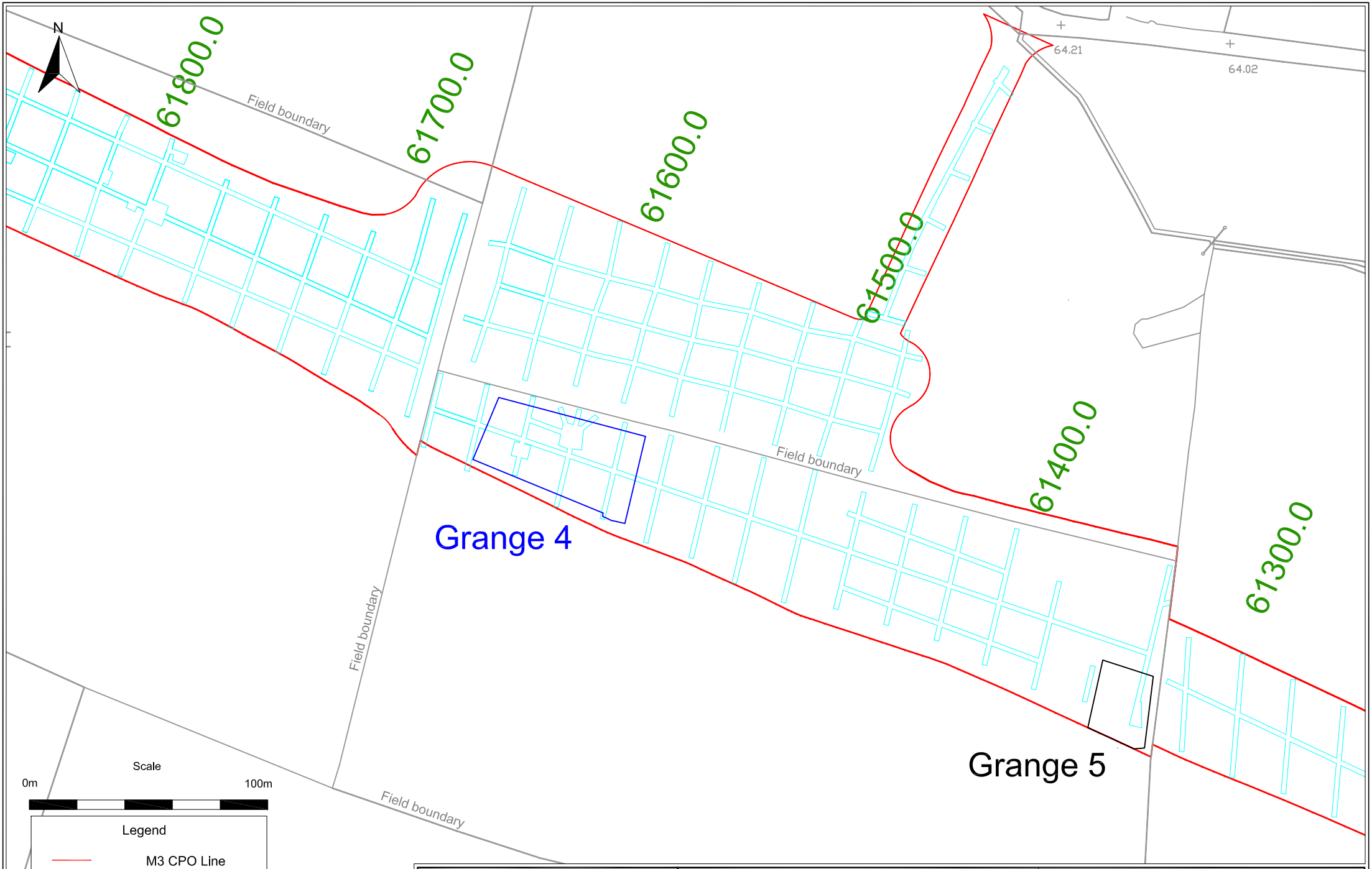

IAC Irish Archaeological Consultancy

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Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

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Date:	09/11/09
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Job No:	J2203
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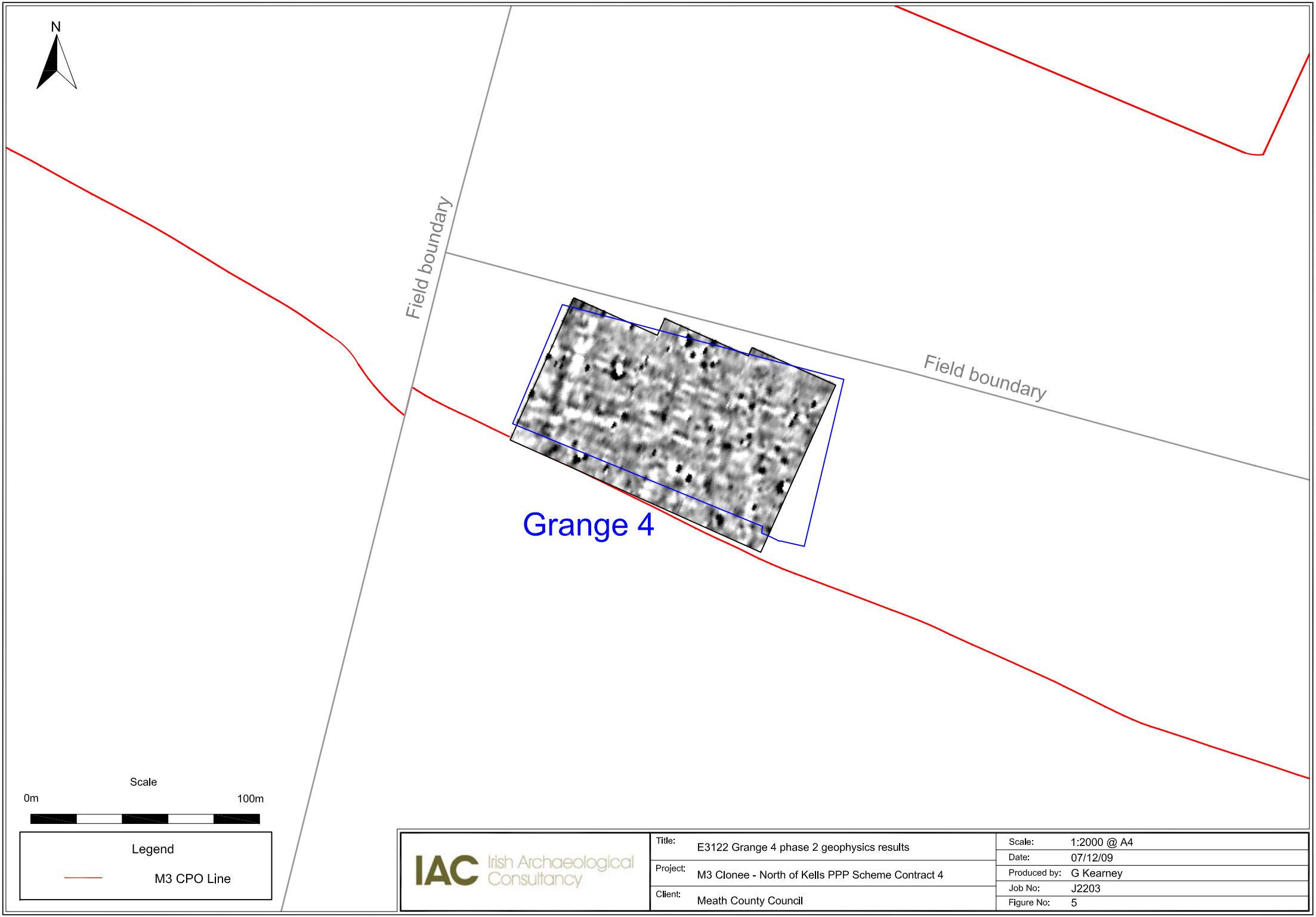

IAC Irish Archaeological Consultancy

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Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

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Date:	07/12/09
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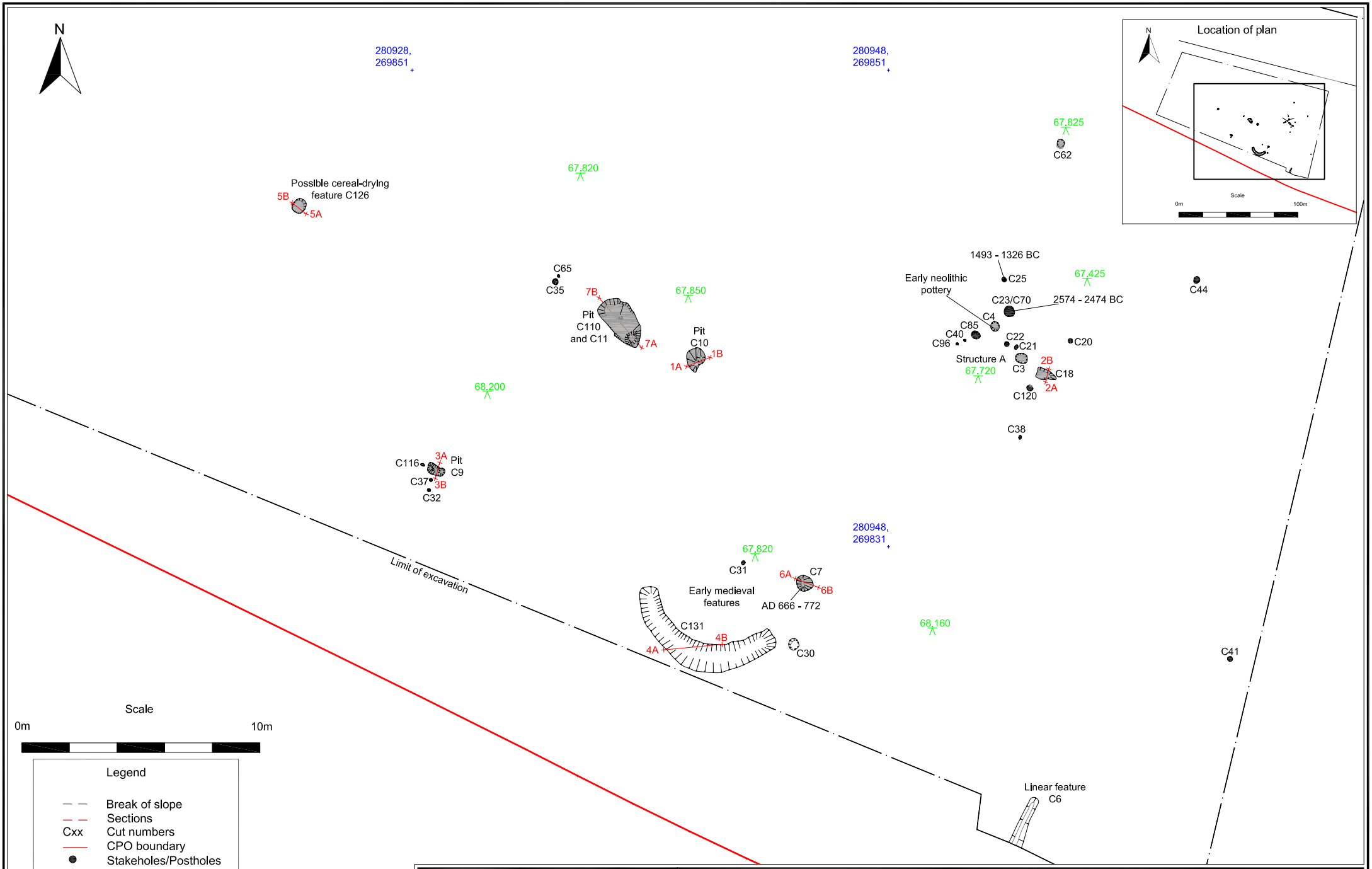
Job No:	J2203
Figure No:	5

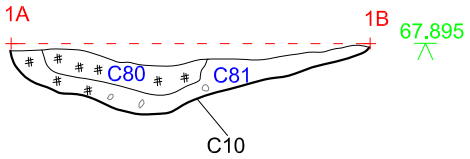


IAC Irish Archaeological Consultancy

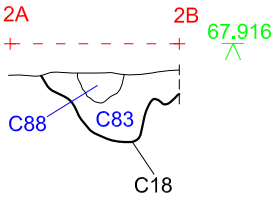
Title:	E3122 Grange 4 plan of site
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

Scale:	1:200 @ A4
Date:	07/12/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	6

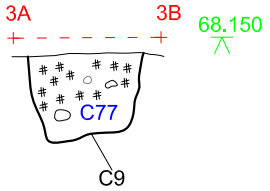
SSE facing section of C10



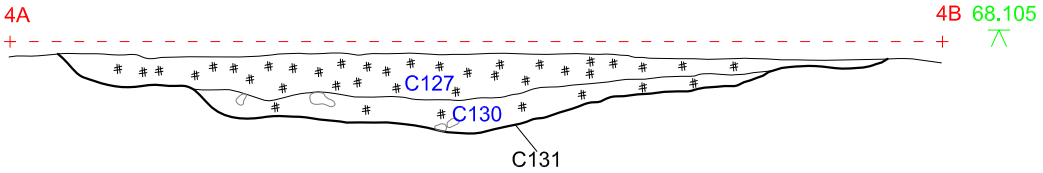
East facing section of C18



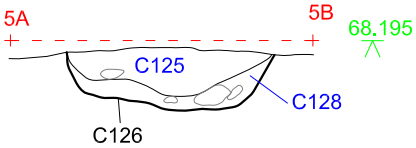
West facing section of C9



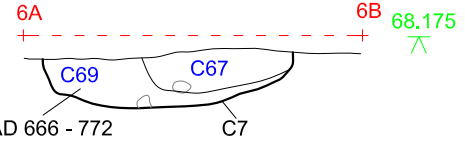
South facing section of C131



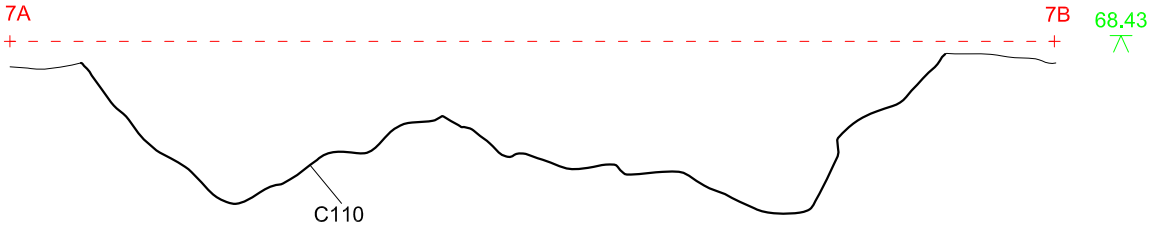
Northeast facing section of C126



SSW facing section of C7



Southeast - northwest profile of C110



Scale

0m 1m

Legend

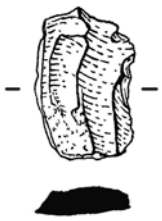
Cxx	Cut Numbers
Cxx	Fill Numbers
	Stone
#	Charcoal
xx.xxx	Levels - metres OD

IAC Irish Archaeological Consultancy

Title:	E3122 Grange 4 sections
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

Scale:	1:20 @ A4
Date:	07/12/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	7

E3122:111:31



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		Date:	27/04/10
	Project: M3 Clonee - North of Kells PPP Scheme Contract 4	Produced by:	G Kearney
		Job No:	J2203
	Client: Meath County Council	Figure No:	8

Plate 1: E3122 Grange 4 pit C110/C11, during excavation, facing north, showing C113 *in situ.*

Plate 2: E3122 Grange 4 pit C110/C11, post-excavation, facing north-east.

Plate 3: E3122 Grange 4 pit C10, mid-excavation, facing NNW.

Plate 4: E3122 Grange 4 Structure A posthole (C85), during excavation, facing east.

Plate 5: E3122 Grange 4 Structure A pit (C4), during excavation, facing south-west.

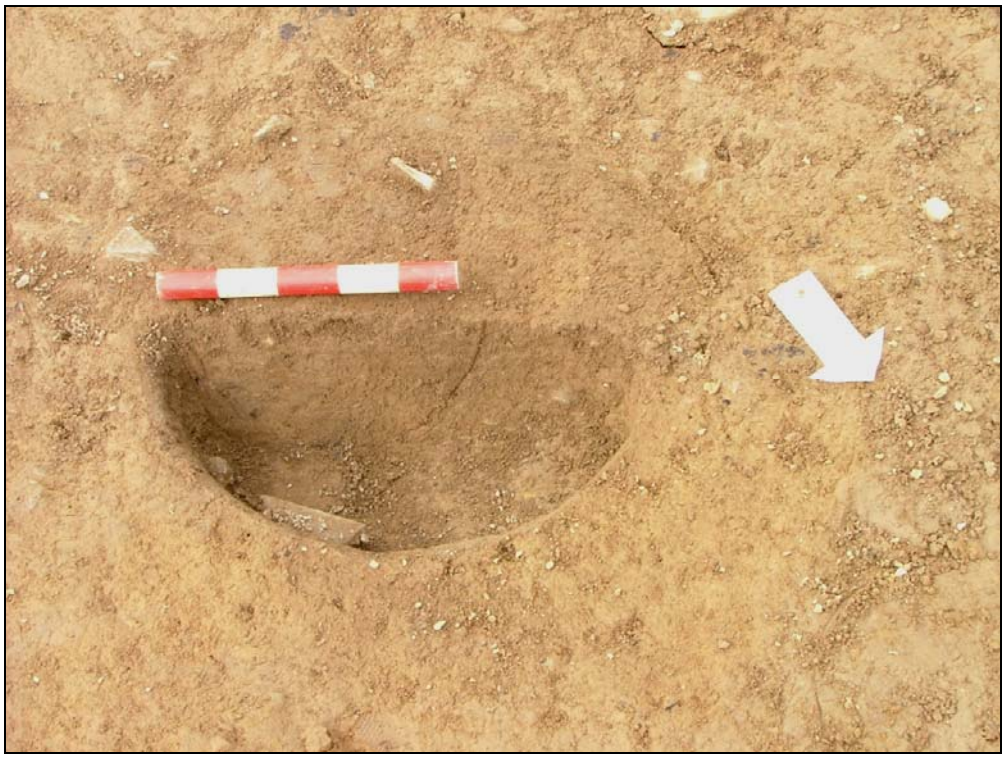

Plate 6: E3122 Grange 4 Structure A posthole (C70), mid-excavation, facing south-west.

Plate 7: E3122 Grange 4 Structure A posthole (C23), post-excavation, facing north.

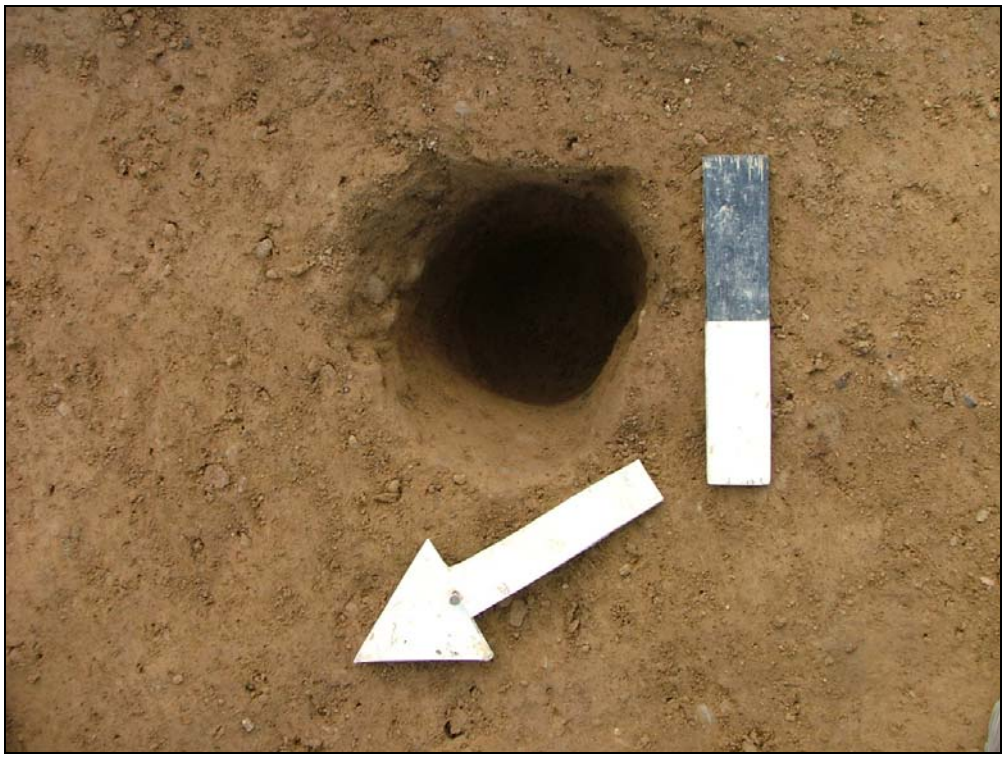

Plate 8: E3122 Grange 4 Structure A posthole (C22), post-excavation, facing south-east.

Plate 9: E3122 Grange 4 Structure A posthole (C25), mid-excavation, facing east.

Plate 10: E3122 Grange 4 curvilinear feature C131, post excavation, facing south-east.

Plate 11: E3122 Grange 4 pit C7, mid excavation, facing north.

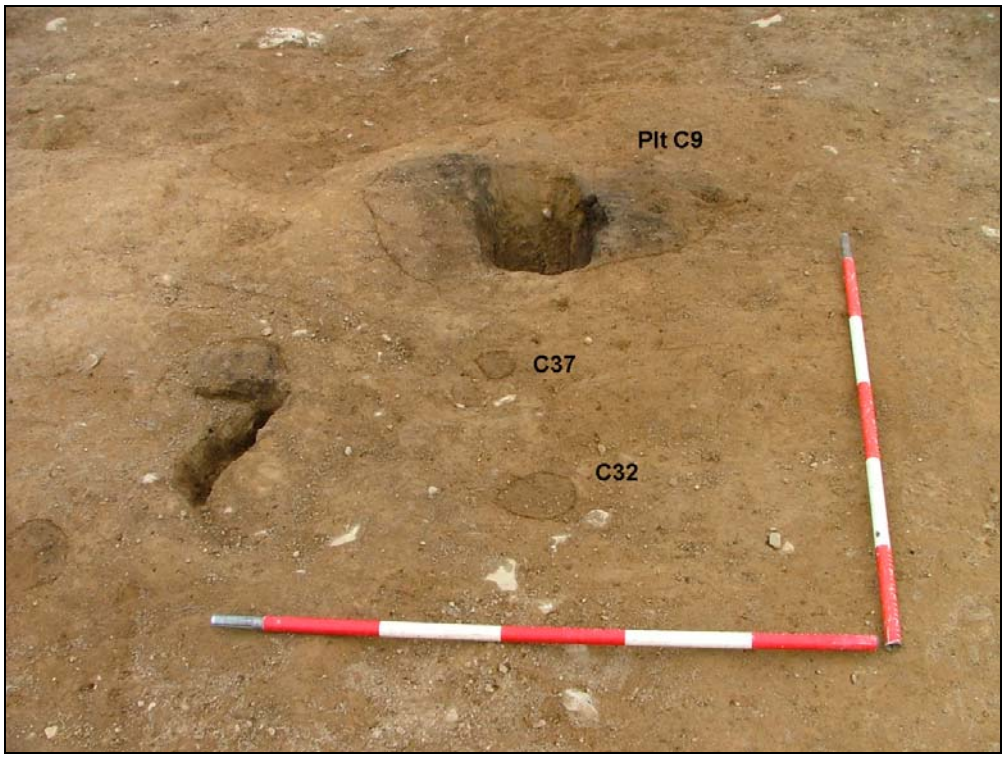

Plate 12: E3122 Grange 4 pit C9 and associated stakeholders/postholes, mid-excavation, facing north.

Plate 13: E3122 Grange 4 pit C126, mid excavation, facing south-east.