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

E3121: GRANGE 5
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	E3121
Excavation Director	Amanda Kelly
Senior Archaeologist	Shane Delaney
Consultant	Irish Archaeological Consultancy Ltd, 120b Greenpark Road, Bray, Co. Wicklow.
Client	Meath County Council
Site Name	Grange 5
Site Type	Early Bronze Age pit, Iron Age/Early Medieval Cereal Drying Features and Undated Ditches.
Townland	Grange
Parish	Ardbraccan
County	Meath
NGR (Easting)	281170
NGR (Northing)	269738
Chainage	61340
Height m OD	67m OD
RMP No.	N/A
Excavation Start Date	16 November 2006
Excavation Duration	8 days
Report Type	Final
Report Date	21 June 2010
Report By	Amanda Kelly

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.

Consulting Engineers – N3 Meath Consult
Engineer – Peter Thorne and Thomas Meagher
Resident Engineer – Gillian Cogan

Meath County Council, National Roads Design Office
Senior Engineer – John McGrath
Project Archaeologists – Mary Deevy and Maria Fitzgerald
Project Liaison Officer – Catherine Anderson

National Monuments, Department of the Environment, Heritage and Local Government
Archaeologist – Martin Reid

Irish Antiquities Division, National Museum of Ireland
The Duty Officer

Report Contributions
Final Report Management and Production: Fintan Walsh and Gill McLoughlin
Final Report Research: Michelle Brick and Fintan Walsh
Final Report Compilation: Maeve Tobin, Mark Moraghan, John Winfer
Figure Production: Paul Higgins and Graeme Kearney
Final Report Editing: Fintan Walsh and Gill McLoughlin

ABSTRACT

This is a final report of an archaeological excavation at Grange 5 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 Amanda Kelly 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. A029/003 and National Monuments Service (NMS) Excavation Registration No. E3121 which were received from the DoEHLG in consultation with the National Museum of Ireland. The fieldwork took place between 16 – 27 November 2006.

A total area of 850m^2 was opened around Grange 5 to reveal the archaeological features that were identified at the site during archaeological testing under licence 04E0925.

Five pits, two possible postholes and two curvilinear ditches were identified at Grange 5. One of the pits was dated to the early Bronze Age but appeared to be in isolation. Two of the pits had charcoal rich fills with scorched/burnt bases and contained large quantities of charred plant remains including barley, oat and rye. A date in the Iron Age/early medieval period was established for one of these features and these have been interpreted as cereal-drying pits/features. The two curvilinear ditches were undated but respected the features outlined above.

CONTENTS

List of Figures:

List of Plates:

1 INTRODUCTION

This report presents the results of the archaeological excavation of Grange 5 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 Amanda Kelly of Irish Archaeological Consultancy Ltd (IAC) under Ministerial Direction No. A029/003 and NMS Registration No. E3121. 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 5 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 16–27 November 2006.

Grange 5 is located in the townland of Grange, *c.* 2km south of the current N3 and *c.* 9km south-east of Kells town (County Meath OS sheet 17).

The site was assigned the following identification data:

Site Name: Grange 5; Ministerial Direction Number: A029; Excavation Registration Number: E3121; Route Chainage (Ch): 61340; NGR: 281170/269738.

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 (Gowen 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 no archaeological sites and areas of archaeological potential within 500m of Grange 5 (Ministerial No.: A029/003).

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 1 under Licence No. 02R058 (Bartlett 2002). 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:

Nothing of note was identified in the field in which Grange 5 was located.

1.2.3 Testing

Grange 5 was identified as a result of archaeological assessment undertaken by IAC Ltd. in 2005 (Ronayne 2005). The testing revealed a large pit with a possible posthole or charcoal-enriched area within it and a smaller posthole was close by. Large amounts of charcoal were present in these features and they seemed to be the result of an activity of burning. No datable artefacts were recovered from these features but it was suggested that they could be representative of domestic activity, possibly prehistoric in date.

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 850m². 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 kilns and hearths 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 samples. All calibrated radiocarbon dates in this report are quoted to two Sigma. Dating of the site also involved lithic 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

The site at Grange 5 comprised a small group of pits, two possible cereal-drying pits, possible postholes and two curving ditches. One of the pits was dated to the early Bronze Age (Phase 1) and one of the cereal-drying pits to the Iron Age/early medieval period (Phase 2). The remainder of the features are undated and could be related to either phase of activity.

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 subsoil comprised compacted silts, sands and gravels (C2).

2.2 Phase 1: Early Bronze Age Pit

One of the pits identified at Grange 5 was dated to the early Bronze Age.

2.2.1 Pit C27

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C13	C27	0.82	0.52	0.27	Loose grey sandy, charcoal rich, silt fill.	Fill of pit.
C27	N/A	0.82	0.52	0.27	Oval pit, flat base.	Cut of pit.

Finds: None.

Interpretation:

This pit contained a charcoal-rich fill (Figure 5; Plate 2). A sample of C13 was sent for charcoal analysis and was found to contain oak (Quercus sp.) as well as a small quantity of ash (Fraxinus excelsior) (O'Donnell, Appendix 2.2). A fragment (0.05g) of this ash charcoal was chosen for AMS dating. The charcoal returned an AMS result of 3810+/-21 BP (UBA 11100). The 2 Sigma calibrated result for this was 2335–2148 BC (Appendix 2.4), dating this pit to the early Bronze Age. The majority of charcoal recovered from this context was however oak (*Quercus* sp.). Pit C21, adjacent to C27, and pit C20 (Cf. Section 2.4) had similar fills to C27. These three pits were also morphologically different to the Iron Age/early medieval pits described below, and therefore it is possible that C20, C21 and C27 are contemporary.

2.3 Phase 2: Iron Age/Early Medieval Cereal-Drying Pits

Two pits were characteristically similar. Both were circular and had a distinct level of charcoal at the base and the edges of the pits were scorched red.

2.3.1 Possible Cereal-Drying Pits

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C3	N/A	1	0.84	0.12	Oval pit, gentle sloping sides and base.	Cut of pit.
C4	C3	1.05	0.8	0.05	Red/yellow baked clay.	*In situ* burning.
C5	C3	0.22	0.28	0.03	Loose brown/black charcoal-rich silty clay.	Fill of pit.
C16	N/A	1.7	0.2	0.05	Deposit of red burnt clay.	Deposit/surface firing.
C17	C24	0.82	0.76	0.08	Reddened burnt clay.	*In situ* burning.
C18	C3	0.8	0.46	0.11	Dark grey silty clay.	Fill of pit.
C19	C3	0.8	0.48	0.02	Loose black/brown charcoal deposit.	Charcoal layer.
C23	C24	0.79	0.68	0.18	Loose, grey/brown silty.	Fill of pit.

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C24	N/A	0.82	0.76	0.32	Oval, steep sides with gently curving base.	Cut of pit.
C26	C24	0.62	0.59	0.07	Loose black charcoal-rich sandy silt	Charcoal layer.

Finds: None

Interpretation:
The main archaeological features on the site were represented by two oval pits originally interpreted as hearths (C3 and C24) located in close proximity to each other (approximately 4m apart) in the south-eastern quadrant of the site (Figures 5–6; Plates 3–5). They contained heat-shattered stones and charcoal-rich material in their upper fills. Their fire-reddened cuts indicated that *in situ* burning had occurred. The similarity between the fills, shape and size of the pits would suggest that these two features were contemporary and performed the same function (Figures 5–6). The fire-reddened deposit (C16) which represented surface burning immediately south of C3 could also be associated with these features.

A total of 863 barley grains were recovered from a sample of C26, the charcoal rich deposit within C24. A small quantity of cultivated oat grains (*Avena sativa)* were also identified as well as carbonised wild seeds (nutlets) from knotgrass (*Polygonum* sp.) and dock (*Rumex* sp) (Lyons, Appendix 2.3). Hazel (*Corylus avellana*), pomaceous fruitwood (Maloideae) and oak (*Quercus* sp.) charcoal were also identified from a sample of this context (O'Donnell, Appendix 2.2). Oat and barley grains were found in C17, the *in situ* burning deposit at the base of the pit, along with knotgrass and other unidentifiable seeds. A notable cereal grain assemblage was also recovered from C23, the upper fill of this pit. Barley, rye (*Secale cereale*) and oat (*Avena* sp.) were all identified as well as seeds (nutlets) from knotgrass (*Polygonum* sp.).

Barley was also identified from pit C3 (upper deposit C5) while Barley and unidentifiable grains were also found in C18, the upper fill of pit C3. A sample of C5, was also found to contain willow (Salix sp.) and hazel (*Corylus avellana*) charcoal (O'Donnell, Appendix 2.2).

Lyons considers the carbonised plant remains assemblage to be typical of a medieval cereal assemblage, and suggests that medieval crop drying activities were being undertaken at the site (Appendix 2.3).

A charred Barley grain (*Hordeum* sp.) weighing <0.1g identified from a sample of fill C26, the charcoal-rich deposit in pit C24, was chosen for AMS dating. The cereal grain returned an AMS result of 1578+/-23 BP (UBA 11099). The 2 Sigma calibrated result for this was AD 424–541 (Appendix 2.4). This date confirms a late Iron Age/early medieval date for pit C24, and possibly pit C3 (by association).

The sequence of fills (*in situ* burning – charcoal deposit – loose soil in-fill) is consistent with that of cereal-drying kilns of this period, and despite the fact that these features do not conform to the standard 'figure of eight' cereal-drying kiln shape characteristic of this period it is likely that these two pits were utilised as part of a cereal-drying process. This interpretation has been endorsed by environmental specialist Susan Lyons (Appendix 2.3).

2.4 Undated Features

A number of features could not be dated and may belong to ether the Bronze Age or Iron Age/early medieval phase.

2.4.1 Pits C20 and C21

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C8	C21	1.31	1.07	0.13	Loose grey/brown sandy silt	Fill of pit.
C14	C20	0.86	0.44	0.08	Charcoal-rich brown/blackish.	Fill of pit.
C20	N/A	0.86	0.44	0.08	Oval pit with steep sides.	Cut of pit.
C21	N/A	1.31	1.07	0.13	Irregular, gently sloping sides, uneven base.	Cut of pit.

Finds: None.

Interpretation:

These two pits (C20 and C21) both contained charcoal-rich fills, similar to early Bronze Age pit C27 and may be contemporary (Figure 5; Plate 6). The fill sequence in these pits was markedly different to that of the cereal-drying pits.

2.4.2 Possible Postholes

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C11	N/A	0.17	0.14	0.07	Circular, vertical sides and flat base.	Cut of posthole.
C12	C11	0.17	0.14	0.07	Loose brown/black silty clay.	Fill of posthole.
C22	C25	0.2	0.16	0.08	Loose grey brown sandy silt.	Fill of posthole.
C25	N/A	0.2	0.16	0.08	Circular, vertical sides and a flat base.	Cut of posthole.

Finds: None

Interpretation:

These two postholes (C25 and C11) were located to the east of ditch C6 (posthole C25; Plate 8) and south-east of pit C3 (posthole C11). Posthole C11 was located along the edge of the linear ditch cut C6. These two features were very shallow and the function and relationship to the other features on site could not be determined.

2.4.3 Ditches C6 and C9

These two ditches were contemporary and respected the main body of activity including the two cereal-drying pits (C3 and C24). They are however undated and may be post-medieval.

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C6	N/A	35.5+	0.7	0.35	Linear ditch, steep sides, u-shaped base	Cut of linear ditch.
C7	C6	35.5+	0.7	0.35	Loose brown/grey silty clay.	Fill of ditch.
C9	N/A	11.75+	0.9	0.38	Linear ditch, steep sides, U-shaped base.	Cut of ditch.
C10	C9	11.75+	0.9	0.38	Medium grey brownish silty sandy soil.	Fill of ditch.

Finds:

Context	Find Number	Material	Period	Description
C10	E3121:10:1	Flint	Unknown	Cutting tool: bipolar flake.

Interpretation:

Ditch C6 ran on a north–south axis, parallel to the eastern baulk of the site and existing field boundary, but curved towards the west, around hearth cut C3, where it eventually tapered out (Figure 5; Plate 1). This ditch was associated with a similar

linear ditch (C9) which ran on a north–south axis from the south of the site (Figure 5). Ditch C9 yielded a piece of worked flint (E3121:10:1). This is a small bipolar flake with signs of having been used as a cutting tool. Bipolar working is a technique found across Ireland from the Neolithic period onwards, but the majority of material resulting from this technique, including this example is not datable and therefore, it does not offer any help in dating the ditch (Nelis, Appendix 2.1).

2.5 Topsoil

Contexts:

Context	Fill of	L(m)	W(m)	D(m)	Basic Description	Interpretation
C1	N/A	N/A	N/A	0.3–0.4	Brown grey sandy garden soil.	Topsoil.

Finds:

Context	Find Number	Material	Period	Description
C1	E3121:1:1	Flint	N/A	Unworked abraded lump.

Interpretation:
The topsoil on this site was consistent in depth and composition; yielding an average depth of 0.3–0.4m throughout. The topsoil was composed of brown moisture-rich garden soil lying directly over natural subsoil comprised of silts, sands and gravels. A piece of flint recovered form the topsoil has been identified as a natural abraded lump (Nelis, Appendix 2.1).

3 SYNTHESIS

The synthesis presents the combined results of all of the archaeological analysis carried out at Grange 5. 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 developed 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 5 was located at 67m above sea level in a relatively flat rectangular-shaped arable field. The field is bounded on all four sides by hedgerows. The site is located in the north-eastern quadrant of the field. The nearest watercourse is located *c.* 300m to the east, a south–north flowing stream. A third class road is located about 250m to the north. The general relief of the area is flat and other prehistoric sites may have been visible from Grange 5 e.g. Grange 4 and Grange 3. Mature hedgerows presently obstruct the visibility. There are several recorded archaeological monuments in the vicinity of Grange 5. All of these sites date to the early medieval and medieval periods.

3.2 The Archaeological Landscape – the Bronze Age and Iron Age

As part of the general research relating to sites along the scheme and the specific research relating to Grange 5, 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 5 has been identified as being Bronze Age and Iron Age in date

3.2.1 General Bronze Age Landscape of the Scheme

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 (Kelly 2010a). At Kilmainham 3 (Whitty 2010b), 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 2010b). 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. 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 (Kelly 2010a), Nugentstown 1 (Structure 3: 1186–978 BC; Lynch 2010b), Phoenixtown 3 (Structure 1: 1503–1415 BC – 1435–1303 BC; Lyne 1010b), Cakestown Glebe 2 (Structure 1: 1122–939 BC and 993–838BC, Structure 2: 1215–1013 BC; Lynch 2010a), Kilmainham 1A (Structure 3: 1436–1314 BC – 1419–1269 BC; Lyne 2010c), and Town Parks 3 (late Bronze Age structure: 1019–906 BC; Gleeson 2010). 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).

Burnt Mound Activity

As part of the archaeological investigations conducted in advance of the construction of the M3 Clonee–North of Kells Road Scheme 41 sites exhibiting evidence for hot stone technology were excavated (O’Connor 2007, 2). In addition to these, burnt mound activity was present at 15 of the sites excavated along Contract 4 of the scheme. Nine of these have been identified as dating to the Bronze Age.

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.

3.2.2 General Iron Age Landscape of the Scheme

A small number of features dating to the Iron Age period (800 BC–AD 500) were excavated in advance of Contract 4 of the M3 Clonee–North of Kells Road Scheme. This primarily comprised of industrial activity including metalworking furnaces and cereal-drying kilns while possible funerary evidence in the form of two ring-ditches was also identified. Within the wider landscape there are important Iron Age foci, most notably Tara. The Tara complex dates as far back as the Neolithic and includes the passage tomb known as the Mound of the Hostages. The site was occupied throughout prehistory as a place of burial and ritual and continued in use into the Iron Age when it became the seat of the high Kings of Ireland. The complex served as a Royal site during the Iron Age and consisted of a hilltop enclosure known as Ráth na Rígh (Roche 2002). This site played a major political and ceremonial role in Ireland during this period.

To the east Brú na Bóinne was also a major Iron Age centre. A large Iron Age ditch surrounds one of the Passage Tombs at Knowth (Eogan 1995) and a house/houses were constructed in the centre of the large tumulus at the site (Eogan 1971). Further afield Iron Age occupation has also been recorded at Site 17, Lagavooren (Murphy & Clarke 2003) and at Site 2, Sheephouse, Co. Meath (Moore 2003), both of which had evidence of occupation prior to this period and were excavated in advance of the M1 Drogheda Bypass. A semi-circle of postholes indicate the presence of a hut at Claristown 2 (Russell 2003a) approximately 40km ESE of Kells and similarly, a circular hut structure also dating to the Iron Age was excavated at Colp West, located just outside Drogheda town (Clarke & Murphy 2003).

Other important sites dating to the Iron Age that have been excavated in Co. Meath include the double banked earthwork at Teltown (Waddell & O'Brien 1998); which is located approximately 3km east of Nugentstown, significantly close to the Contract 4 excavations. Kells has been recognised in the Iron Age as a *dun* settlement. However it is also believed that it is more likely that a prehistoric *dun* was located on the Hill of Lloyd, immediately west of the town, where a trivallate ringfort (ME017:054) is positioned. The location of the Contract 4 M3 Road-Scheme excavations coincides with the location of an old thoroughfare in the region. Kells is located along an ancient route-way known as the Slí Assail. The Slí Assail is one of five Slíte or main highways which, according to the Annals of the Four Masters, all led to Tara (Geissel 2006, 9). This road travelled on an east–west axis from Drogheda towards Rathcroghan (Geissel 2006, 10).

Settlement and Industrial Activity

Along Contract 4 of the M3 Clonee–Kells Road Scheme Iron Age activity was identified at the multi-phase site of Kilmainham 1C (Walsh 2010) in the form of a ditch, and cereal-drying kilns. A pit also dating to the Iron Age was excavated at nearby Kilmainham 2 (Bayley 2010) (2 Sigma cal 510–387 BC) and further evidence of rural industrial activity was excavated at Grange 3 (Kelly 2010a) in the form of a furnace pit and associated pits. Similarly, extensive metalworking activity was also excavated at Grange 2 (Kelly 2010b) (possible shaft furnace: 2 Sigma cal AD 257–409 and 427–554). Pits of unknown function were excavated at Cookstown Great 1 (Lynch 2010d) and a posthole at Kilmainham 3 (Whitty 2010b) has also been dated to this period (2 Sigma cal 51 BC–AD 52). A waterhole associated with burnt mound activity was excavated at Cookstown Great 3 (McLoughlin 2010) and returned an early Iron Age date; however Bronze Age dates were also recorded at the site indicating a continuity of use of these features over a long time span. Similar to this,

a burnt mound was excavated at Colp West approximately 35km east of Kells which also returned an Iron Age date (Clarke & Murphy 2003). Additional Iron Age industrial activity was excavated along Contract 1, 2, 3 & 5 of the M3 Clonee–North of Kells Road Scheme in Co. Meath. Kilns and bowl furnaces were excavated at Dunboyne 2 (O'Hara 2009a) and a bowl hearth was uncovered at Ballinter 1 (Linnane 2008b). A middle Iron Age metal working area was recorded at Rath Hill 1 (Elder & O'Hara 2009) and iron working features were excavated at Chapelbride 1 (Danaher & Ginn 2008). Kilns, pits and hearths were excavated at Johnstown 2 (Schweitzer & Ginn 2008a), kilns dating to the late Iron Age/early medieval period were excavated at Skreen 3 (O'Neill 2009) and some activity including a kiln dating to this period, was uncovered at Pace 1 (Elliott, Clarke & Ginn 2008). A series of large enclosures and associated features dating to the Iron Age were recorded at Garretstown 2 (Rathbone 2009) and pits including ephemeral features also dating to this period were excavated at Roestown 4 (Linnane 2008a), Kennastown 2 (Martin 2009a) and Macetown 1 (Martin 2009b).

Funerary Activity

Three sites on the present section of the M3 Clonee–North of Kells Road Scheme had evidence of funerary activity. A ring-ditch (384–207 BC) was excavated at Commons of Lloyd (Whitty 2010a) close to the Iron Age ring-fort ME017:054 while cremation pits were also recorded at Grange 1 (Lynch 2010c) and Grange 2 (Kelly 2010b) (2 Sigma cal 46 BC–AD 56). A glass bead was recovered from one of the cremations excavated at Grange 2 (*ibid*.). A large ring-ditch at Cakestown Glebe 2, close to the commons of Lloyd example may also date to the Iron Age (AD 28–128). In addition to these sites funerary activity dating to this period is evident throughout the county. Two unprotected inhumations associated with grave goods including glass beads were excavated at Knowth (Eogan 1977) and at Raffin Fort a structure surrounded by circular pits has been interpreted as having a ceremonial function (Newman 1993). An Iron Age cemetery was excavated at Bettystown (Meenane 2000) and a late Bronze Age/early Iron Age ring-ditch was discovered at Ninch Laytown (Eogan & Reid 2002); the upper fills of this feature have been dated to the Iron Age indicating re-use of this monument. An Iron Age double ring-ditch was also excavated at Cookstown (Clutterbuck 2007) approximately 30km to the south-east of Kells and a small ring-barrow uncovered at Harlockstown (O'Connor 2007) located approximately 5km further to the south-east of Cookstown has also been dated to this period. A number of sites excavated as part of the Contracts 1, 2, 3 & 5 of the M3 Clonee–North of Kells Road Scheme also uncovered evidence of Iron Age funerary activity. Ring-ditches with associated pits and possible cremations were excavated at Ardsallagh 1 (Clarke & Carlin 2008) and Castlefarm 1 (O'Connell & Clarke 2009). Similar activity was excavated at Johnstown 4 (Elder & Ginn 2009), although this activity has been dated to the late Bronze Age/early Iron Age. Ring-ditches dating to the Iron Age were recorded at Lismullin 1 (O'Connell 2009) and Collierstown 1 (O'Hara 2009b), and the ring-ditches excavated at Ardsallagh 2 showed signs of re-use throughout the Iron Age (Clarke 2008). A small amount of funerary activity was dated to the Iron Age at Knockmark 1 (Schweitzer & Ginn 2008b) and a penannular gully, which has been identified as a possible ring-ditch dating to the Iron Age was excavated at Chapelbride 4 (O'Hara, Gallagher & Ginn 2009).

Excavations along Contract 4 of the M3 Clonee–North of Kells Road Scheme have mainly uncovered evidence of rural industrial activity. The small amount of funerary activity and lack of settlement evidence along the route is intriguing. It is possible that Contract 4 of the M3 Clonee–Kells Road Scheme merely by coincidence avoided settlement activity dating to the Iron Age. Much of the activity uncovered can be described as ephemeral and it is possible that other sites in the region such as

Teltown and Kells sustained at least some, if not the majority, of the population at this time.

3.3 Archaeological Landscape of Grange 5

Two phases of activity were identified at Grange 5, an early Bronze Age (2335–2148 BC) phase represented by an isolated pit and an Iron Age/early medieval phase (AD 424–541) represented by two cereal-drying pits.

Contemporary early Bronze Age activity was recorded in the immediate area of Grange 5. A component of the burnt mound site at Phoenixtown 1 *c.* 2km to the north-west was dated to the final Neolithic/early Bronze Age (2457–2205 BC) (Figure 2). This site consisted of a burnt mound, pits and possible postholes with dates ranging from the final Neolithic/earliest Bronze Age to the middle Bronze Age (Lyne 2010a). To the south-east an early Bronze Age burnt mound (2134–1963 BC) was identified at Ardbraccan 6 (Duffy 2010a). Evidence of Bronze Age settlement in the area is strong with the discovery of a major middle Bronze Age settlement which includes two middle Bronze Age houses (1499–1415 BC and 1408–1269 BC) located *c.* 400m to the north-west at Grange 3 (Kelly 2010a). Middle Bronze Age activity was recorded at the adjacent Grange 4 site, *c.* 250m to the north-west (Duffy 2010b). This site also had evidence of early Neolithic and late Neolithic features.

Evidence of Iron Age–early medieval settlement in the Grange area is also strong. Metalworking furnaces (191–5 BC, 346–60 BC), a possible enclosure ditch (617–666 AD) and cereal-drying kilns (427–570 AD) were all identified at Grange 3 (Kelly 2010a). Immediately west of this site a possible shaft furnace dating to AD 257–409, AD 427–554 was identified (Kelly 2010b). This site also had earlier Iron Age metalworking features (369–202 BC) and a late Iron Age/early medieval grave yard (AD 424–568, AD 431–571, AD 432–591).

There were a number of recorded archaeological monuments within the general vicinity of Grange 5 (Figure 2). All of these other recorded monuments date from the early medieval period or later demonstrating a continuity of settlement in the area stretching over several millennia.

3.4 Summary of the Excavation Results

The site at Grange 5 comprised one early Bronze Age pit (C27: 0.82m x 0.52m x 0.27m deep) filled with charcoal rich clay; two possible Iron Age/early medieval cereal-drying pits (C3: 1m x 0.84m x 0.12m deep and C24: 0.62m x 0.59m x 0.32m deep) both of which had scorched/burnt edges/base with charcoal rich fills and finally two undated pits, two possible postholes and two undated ditches (ditch C6: 35.5m+ x 0.7m x 0.35m deep and ditch C9: 11.75m+ x 0.9m x 0.38m deep).

3.5 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.

Lithics Analysis

Two lithic artefacts were recovered: an unworked, abraded flint lump recovered from topsoil (C1 topsoil) and a small, minimally retouched cutting tool formed on a bipolar flake from ditch C9 (Nelis, Appendix 2.1).

Charcoal Identification

Charcoal was examined from three contexts at Grange 5 and four wood taxa were identified. The results are dominated by oak (*Quercus* sp.), followed by hazel (*Corylus avellana*). Ash (*Fraxinus* sp.) and pomaceous fruitwood (Maloideae) were also identified. The charcoal from the early Bronze Age pit (C27) was dominated by oak, with a small amount of ash present. The Iron Age/early medieval pit (C24) contained hazel, pomaceous fruitwood and oak. Pit C3 contained willow and hazel charcoal (O'Donnell, Appendix 2.2).

Analysis of Plant Remains

Carbonised cereal grains were recorded in low to high concentrations, with the most notable assemblages identified from C23 and C26 (the fills of possible cereal-drying pit C24). Barley (*Hordeum* sp.), wheat (*Triticum* sp.) and oat (*Avena* sp.) were all identified. Oat (*Avena* sp.) was also recorded from C17 (the *in situ* burning at the base of this pit), C23 and C26. Barley was also identified from cereal-drying pit C3. A number of vesicular and eroded grains were recorded from pits C3 and C24 (Lyons, Appendix 2.3).

Radiocarbon Dating

Two AMS dates were obtained for the site. An early Bronze Age date (2335–2148 BC) was established for a pit (pit C27) while an Iron Age date was obtained for one of the possible cereal-drying pits (pit C24: AD 424–541) (QUB, Appendix 2.4).

4 DISCUSSION AND CONCLUSIONS

4.1 Discussion

Two phases of archaeological activity were identified at Grange 5: an early Bronze Age pit and Iron Age cereal-drying pits. Two linear ditches to the east of these were undated and may be contemporary with either phases or may represent a later phase of post-medieval activity.

Phase 1: The significance of the site in the early Bronze Age landscape

The Bronze Age pit is relatively insignificant in isolation but is a small part of a much larger Bronze Age landscape which includes a potentially contemporary phase of burnt mound activity at Phoenixtown 1 *c.* 2km to the north-west and extensive Bronze Age settlement in the general area including the important middle Bronze Age settlement at Grange 3 *c.* 400m to the north-west. Grange 3 had both settlement and funerary components which included two middle Bronze Age houses, possible cremation pits and a ring-ring which was in use in the middle Bronze Age and re-used in the late Bronze Age. The evidence from this site suggests that there was an established Bronze Age population in the area from the middle Bronze Age onwards. Grange 5 was an earlier aspect, but part of, this archaeological landscape.

Phase 2: The significance of the site in the Iron Age/early medieval landscape

The possible cereal-drying pits at Grange 5 area are also a small part of a more extensive Iron Age/early medieval landscape which includes the contemporary metalworking and cereal-drying features at Grange 2 and 3. These features are likely to be peripheral components of Iron Age/early medieval settlement in the general area, small elements of which were perhaps identified at Grange 3 in the form of a possible enclosing ditch which returned a date of AD 617–666.

The cereal-drying kilns at Grange 3 were 'figure of eight' kilns one of which was dated to AD 427–570, contemporary with the date established for C24 at Grange 5. Although the cereal-drying pit at Grange 5 did not conform to the classic kiln shape of this period ('figure of eight' or 'key-hole' kilns) the archaeobotanical remains from the Grange 5 pits area consistent with cereal-drying. Circular cereal-drying pits have been discovered elsewhere including one example at Tonaphort, Co. Westmeath which was morphologically similar: circular with scorched base and charcoal-rich primary deposits (Coughlan 2009).

Cereal-drying kilns – function and form

Cereal-drying kilns were used for a variety of purposes, but were mostly related to the drying of cereals and other crops, and in Ireland the two basic purposes for which they were constructed seem to have been to dry grain and to harden it prior to grinding (O'Sullivan and Downey 2005, 32). The Irish 'corn-drying kilns' are frequently keyhole or dumb-bell shaped (*ibid. 33*). The basic kiln would comprise four main structural components: a *bowl*; *flue*; *stoke-hole*; and *drying platform* (*ibid.*). A fire would have been set at the *stoke hole* (which was either a natural depression or cut) at the mouth of the *flue*. This would be where the fire was burned to effect the drying (*ibid.*). The *flue* extends from the *bowl/drying platform*. The *drying platform* overlay the *bowl* and typically consisted of heavy timber supports overlain with wattles, carrying a layer of straw and/or straw mat, through which the heat was able to pass through from below to the grain/cereal (*ibid.*). In the case of the Grange 5 pits it is not clear how the heating/drying of the grains would have been organised, however the pits themselves may either be the truncated remains of the fire-setting associated with a 'figure of eight' kiln, or may be simple fire-pits associated with cereal-drying.

The surrounding environment in the Bronze Age and Iron Age/early medieval period

Through charcoal analysis it was possible to deduce that Grange 5 was located close to oak and hazel woodlands. O'Donnell (Appendix 2.2) notes however that it was unlikely that these woodlands were closed canopy in nature, as ash was identified within the assemblage.

4.2 Conclusions

The site at Grange 5, while small in scale, is an important part of a larger Bronze Age and Iron Age/early medieval landscape. This represents, in the Iron Age/early medieval period, small-scale peripheral industry of perhaps, as yet, unidentified contemporary settlement in the wider area.

5 BIBLIOGRAPHY

5.1 References

Bartlett, A.D.H. 2002. Report on Archaeogeophysical Survey 2002, Section 3: Navan to Kells and Kells Bypass.

Bayley, D. 2010 E3142 Kilmainham 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Clarke, L. & Murphy, D. 2003 Colp West, Co. Meath. In I. Bennett (ed.) 2003 *Excavations 2001: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Clarke, L. 2008 E3087 Ardsallagh 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Clarke, L. & Carlin, N. 2008 E3088 Ardsallagh 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Clutterbuck, R. 2007 Cookstown, Co. Meath. In I. Bennett (ed.) 2007 *Excavations 2004: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Coughlan, T. 2009 E3280 Tonaphort 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Danaher, E. & Ginn, V. 2008 E3172 Chapelbride 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Duffy, C. 2010a E3120 Ardbraccan 6 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Duffy, C. 2010b E3122 Grange 4 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Elder, S. & O'Hara, R. 2009 E3040 Rath Hill 1. Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Elder, S. & Ginn, V. 2009 E3052 Johnstown 4 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Elliott, R. Clarke, L. & Ginn, V. 2008 E3031 Pace 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Eogan, G. 1971 Knowth, Co. Meath www.excavations.ie

Eogan, G. 1995 Knowth, Co. Meath. www.excavations.ie

Eogan, J. & Reid, M. 2002 Ninch Laytown, Co. Meath In I. Bennett (ed.) 2002 *Excavations 2000: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Finch, T.F., Gardiner, M.J., Comey, A. and Radford, T. 1983 *Soils of County Meath*. Dublin, An Foras Talúntais.

Geissel, H. 2006 *A Road on the Long Ridge; in search of the Ancient Highway on the Esker Riada.* CRS Publications, 7–14.

Gleeson, C. 2010 E3149 Town Parks 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Gowen, M. 2002 *M3 Clonee–North of Kells Dunshaughlin–Navan, Environmental Impact Statement*.

Harbison, P. 1992. *Guide to the National and Historic Monuments of Ireland*. Dublin: Gill and Macmillan.

Kelly, A. 2010a Site E3123 Grange 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Kelly, A. 2010b Site E3124 Grange 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Kilfeather, A. 2002 *M3 Clonee–North of Kells Dunshaughlin–Navan, Environmental Impact Statement Vol 6C*, Appendix G.

Linnane, S. 2008a E3046 Roestown 4 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Linnane, S. 2008b E3083 Ballinter 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lynch, P. 2010a E3158 Cakestown Glebe 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lynch, P. 2010b E3136 Nugentstown 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lynch, P. 2010c E3125 Grange 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lynch, P. 2010d E3137 Cookstown Great 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lyne, E. 2010a Site E3128 Phoenixtown 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lyne, E. 2010b E3130 Phoenixtown 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Lyne, E. 2010c E3141 Kilmainham 1A Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Martin, K. 2009a E3094 Kennastown 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Martin, K. 2009b E3100 Macetown 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

McLoughlin, G. 2010 E3139 Cookstown Great 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Meehan, R *Directions of ice flow during the last glaciation in counties Meath, Westmeath and Cavan,* Teagasc, Kinsealy Research Centre, Dublin.

Meenane, R. 2000 Bettystown, Co. Meath. In I. Bennett (ed.) 2000 *Excavations 1998: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Mitchell, F. and Ryan, M. 1997 *Reading the Irish Landscape*. Dublin: Townhouse.

Moore, D. 2003 Site 2, Sheephouse, Co. Meath. In I. Bennett (ed.) 2003 *Excavations 2001: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Murphy, D. & Clarke, L. 2003 Site 17, Lagavooren, Co. Meath. In I. Bennett (ed.) 2003 *Excavations 2001: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Newman, C. 1991 Raffin Fort, Raffin, Co. Meath www.excavations.ie

Newman, C. 1993 Raffin Fort, Raffin, Co. Meath www.excavations.ie

O'Connell, A. 2009 E3074 Lismullin 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O'Connell, A. & Clarke, A. 2009 E3023 Castlefarm 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O'Connor, E. 2007 *Fulacht Fiadh*, Burnt Mounds and Hot Stone Technology on the M3. Unpublished Report. Archaeological Consultancy Services, Louth.

O'Connor, J. 2007 Harlockstown, Co. Meath. In I. Bennett (ed.) 2007 *Excavations 2004: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

O'Hara, R. 2009a E3034 Dunboyne 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O'Hara, R. 2009b E3068 Collierstown 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O'Hara, R., Gallagher, D. & Ginn, V. 2009 E3169 Chapelbride 4 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O'Neill, T. 2009 E3073 Skreen 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

O Ríordáin, S. P. 1995 *Antiquities of the Irish Countryside*. London, Methuen.

O'Sullivan, M. and Downey, L. 2005 Corn Drying Kilns. *Archaeology Ireland* **19**, 32–35.

Rathbone, S. 2009 E3061 Garretstown 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Roche, H. 2002 Excavations at Ráith na Ríg, Tara, Co. Meath. *Discovery Programme Report* **5**, 19–82

Russell, I. 2003a Claristown 2, Co. Meath. In I. Bennett (ed.) 2003 *Excavations 2001: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Ronayne, J. 2005 *Report on Archaeological Assessment, Testing Area 1, M3 Clonee–North of Kells Motorway Scheme.*

Schweitzer, H. & Ginn, V. 2008a E3042 Johnstown 2 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Schweitzer, H. & Ginn, V. 2008b E3050 Knockmark 1 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Sweetman, D. (ed) 1987 *Archaeological Inventory of County Meath* Office of Public Works.

Waddell, J. 1998 *The Prehistoric Archaeology of Ireland*. Galway, Galway University Press.

Waddell, J. & O'Brien, M. 1998 The Knockans (Teltown), Oristown, Co. Meath In I. Bennett (ed.) 1998 *Excavations 1997: Summary Accounts of Archaeological Excavations in Ireland*. Bray: Wordwell.

Walsh, F. 2010 E3140 Kilmainham 1C Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Whitty, Y. 2010a E3157 Commons of Lloyd Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

Whitty, Y. 2010b E3144 Kilmainham 3 Final Report. Unpublished Final Report. National Monuments Service, Department of the Environment, Heritage and Local Government, Dublin.

5.2 Other Sources

Record of Monuments and Places (RMP), The Department of the Environment, Heritage and Local Government, 7 Ely Place Upper, Dublin 2.

Topographical Files of the National Museum of Ireland, Kildare Street, Dublin 2.

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	0.3–0.4	Topsoil.	Brown grey sandy soil.
C2	N/A	N/A	N/A	N/A	Natural geology.	Boulder clay.
C3	N/A	1	0.84	0.12	Cut of possible cereal-drying pit.	Cut of an oval pit, with gentle sloping sides and curving base.
C4	C3	1.05	0.8	0.02–0.05	*In situ* burning.	Red/yellow baked clay lining the base and sides of cut.
C5	C3	0.22	0.28	0.02–0.03	Fill of pit.	Loose brown/black charcoal-rich silty clay.
C6	N/A	35.5	0.13–0.70	0.35	Cut of linear ditch.	Cut of narrow ditch/gully curving from an east–west axis to the north. The linear ditch had a u-shaped base along its east–west axis but the sides became steeper, and the profile V-shaped, towards the north.
C7	C6	35.5	0.13–0.70	0.35	Fill of ditch.	Loose brown/grey silty clay, containing small stones and charcoal flecks, comprising the fill of a curving ditch/gully.
C8	C21	1.31	1.07	0.13	Fill of pit.	Loose grey/brown sandy silt fill of an irregular pit, containing frequent inclusions of small stones and occasional flecks of charcoal.
C9	N/A	11.75	0.80–0.90	0.38	Cut of ditch.	Linear ditch, running on a north–south axis, with a sharp break of slope at top creating steep sides, while the base is a flattened U-shape.
C10	C9	11.75	0.80–0.90	0.38	Fill of ditch.	Loose/medium grey brownish silty sandy fill, containing occasional flecks of charcoal and pebbles.
C11	N/A	0.17	0.14	0.07	Cut of posthole.	Cut of posthole with vertical sides and flat base.
C12	C11	0.17	0.14	0.07	Fill of posthole.	Loose brown/black silty clay fill, with charcoal flecks comprising >25%.
C13	C27	0.82	0.52	0.27	Fill of pit.	Loose grey sandy silt with occasional flecks of charcoal.
C14	C20	0.86	0.44	0.08	Fill of pit.	Charcoal-rich brown/black fill of an oval shallow pit.
C15	N/A	N/A	N/A	N/A	N/A	Non-archaeological
C16	N/A	1.7	~0.20	~0.05	Deposit/surface firing.	Deposit of red burnt clay. Possibly associated with nearby pit C3. No traces of charcoal associated with this deposit.
C17	C24	0.82	0.76	0.08	*In situ* burning.	Reddened burnt clay or lining of the cut of a fired pit. The context possibly represents the fired natural subsoil around the cut.
C18	C3	0.8	0.46	0.11	Fill of pit.	Dark grey silty clay, containing frequent inclusions of small heat-fractured stones. Charcoal inclusions represent 5% of the overall context.
C19	C3	0.8	0.48	0.02	Charcoal layer.	Charcoal.
C20	N/A	0.86	0.44	0.08	Cut of pit.	Cut of an oval pit (north–south axis), with a gradual break of slope at its top and bottom in the north, becoming sharp in the south where the sides are steeper.

Context	Fill of	L(m)	W(m)	D(m)	Interpretation	Description
C21	N/A	1.31	1.07	0.13	Cut of pit.	Cut of an irregular pit with a gradual break of slope at both top and bottom, with gently sloping sides and an uneven base.
C22	C25	0.2	0.16	0.08	Fill of posthole.	Loose grey/brown sandy silt with occasional small stones.
C23	C24	0.79	0.68	0.18	Fill of pit.	Loose, grey/brown silty clay (containing occasional charcoal flecks and frequent heat-fractured stone) forming the upper fill of a pit.
C24	N/A	0.82	0.76	0.32	Pit.	Cut of oval pit. Steep/vertical sides with gently curving base. Break of slope is sharp at top and gentle at base.
C25	N/A	0.2	0.16	0.08	Cut of posthole.	Cut of posthole with a sharp break of slope at top and bottom, vertical sides and a flat base.
C26	C24	0.62	0.59	0.07	Charcoal layer.	Loose blackish charcoal-rich sandy silt fill.
C27	N/A	0.82	0.52	0.27	Cut of pit.	Cut of a small sub-oval pit with a sharp break of slope at both top and bottom, with a flat base.

Appendix 1.2 Catalogue of Artefacts

Registration Number	Context	Item No.	Simple Name	Full Name	Material	No. of Parts	Description
E3121:1:1	C1	1	Flint lump.	Abraded lump.	Flint.	1	Natural abraded lump of flint.
E3121:10:1	C10	1	Worked flint.	Cutting tool: bipolar flake.	Flint.	1	Small bipolar flake which has signs of having been used as a cutting tool.

Appendix 1.3 Catalogue of Ecofacts

A total of 14 bulk soil samples were taken during the course of excavation at this site. 11 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 Charcoal

Context number	Sample number	Feature	Sample weight (g)
C5	2	Pit C3	3.3
C13	13	Pit C27	1.4
C14	4	Pit C20	0.3
C19	7	Pit C3	2.3
C23	10	Pit C24	11.2
C26	11	Pit C24	11.8

1.3.2 Carbonised Plant Remains

Context number	Sample number	Feature	Sample weight (g)
C5	2	Pit C3	0.1
C17	15	Pit C24	0.1
C18	5	Pit C3	0.1
C23	10	Pit C24	3.4
C26	11	Pit C24	10.7

Appendix 1.4 Archive Checklist

Project: M3 – Navan to Kells, Contract 4	**Irish Archaeological Consultancy Ltd**	
Site Name: Grange 5		
Excavation Registration No.: E3121		
Ministerial Direction: A029/003		
Site director: Amanda Kelly		
Date: March 2010		
Field Records	**Items (quantity)**	**Comments**
Site drawings (plans)	6	
Site sections, profiles, elevations	14 section drawings and 1 profile drawing	12 sheets altogether
Other plans, sketches, etc.	0	
Timber drawings	0	
Stone structural drawings	0	
Site diary/note books	0	
Site registers (folders)	1	
Survey/levels data (origin information)	120	
Context sheets	27	
Wood Sheets	0	
Skeleton Sheets	0	
Worked stone sheets	0	
Digital photographs	163	
Photographs (print)	0	
Photographs (slide)	0	
Finds and Environ. Archive		
Flint/chert	2	Both prehistoric
Stone artefacts	0	
Pottery (specify periods/typology)	0	
Ceramic Building Material (specify types eg daub, tile)	0	
Metal artefacts (specify types - bronze, iron)	0	
Glass	0	
Other find types or special finds (specify)	0	
Human bone (specify type eg cremated, skeleton, disarticulated)	0	
Animal bone	0	
Metallurgical waste	0	
Enviro bulk soil (specify no. of samples)	14	
Enviro monolith (specify number of samples and number of tins per sample)	0	
Security copy of archive	Yes	Digital copy

APPENDIX 2 SPECIALIST REPORTS

THE LITHICS
GRANGE 5 (E3121)
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 5 (A029/003, E3121).

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 5
During excavations at Grange 5, the truncated remains of hearths, and a series of ditch features, were found (A029/003, E3121) (Kelly 2008). An assemblage of two lithic artefacts was recovered (Table 1). They are comprised of an unworked, abraded flint lump recovered from topsoil (C1 topsoil) and a small, minimally retouched cutting tool formed on a bipolar flake (C10: fill of linear ditch C9).

Unique No	Context	Basic Character	Classification	Condition	Cortex	Fragment size (mm)	Length (mm)	Breadth (mm)	Thickness (mm)	Mass (g)
E3121:1:1	1	Unworked	Abraded lump	Abraded	Secondary	0	29	22	17	12.6
E3121:10:1	10	Modified	Cutting tool: bipolar flake	Fresh	Tertiary	0	17	29	6	2.6

Table 1: M3 Clonee–North of Kells: Contract 4: Grange 5 (A029/003, E3121): showing basic composition of the flint assemblage.

Artefacts such as the abraded lump found in topsoil occur naturally in soil deposits across Ireland, particularly those overlying limestone, as is the case at Grange 5 (ibid., 1). Such material is sometimes exploited for use in areas where raw material availability was limited, but this piece exhibits no sign of working and is not of archaeological significance.

The artefact found in the fill of ditch C9 (E3121:10:1; Plate 1) is a small bipolar flake which has signs of having been used as a cutting tool. Bipolar working is a common feature of low-productivity lithic industries where small-scale raw material is utilised, but is not necessarily indicative of low-level knapping skills. It is a technique found across Ireland from the Neolithic period onwards, but the majority of material resulting from this technique is not datable; such is the case at Grange 5, with this type of minimally worked cutting tool being found from the Neolithic period through to the historic period. Therefore, it does not offer any help in dating the ditch feature C9.

Plate 1: Grange 5 (E3121:1:11): Cutting tool: bipolar flake.

References

Kelly, A. 2008 *M3 Clonee–North of Kells: Contract 4: Navan–Kells and Kells Bypass: Interim report of archaeological excavation at Grange 5, A029/003, E3121.* Dublin: IAC Ltd.

Nelis, E. 2003 *Lithics of the Northern Irish Neolithic*. Unpublished PhD thesis. Belfast: Queen's University, Belfast.

THE CHARCOAL REMAINS
GRANGE 5 E3121
LORNA O'DONNELL

FEBRUARY 2010

1 Introduction

At Grange 5, a localised area of surface burning associated with five small burnt pits and two postholes was excavated. A narrow linear feature curved around the area of the burnt features (Kelly 2008).This site was excavated as part of Contract 4 of the M3 Navan–Kells bypass. Radiocarbon dates and finds indicate the site was in use during the early Bronze Age and the Iron Age/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 5. This report is summary in nature only, further analysis, discussions and comparisons of results will be incorporated into a final integrated charcoal and wood report for all sites excavated on Contract 4 of the M3 (Lyons and O'Donnell forthcoming).

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.

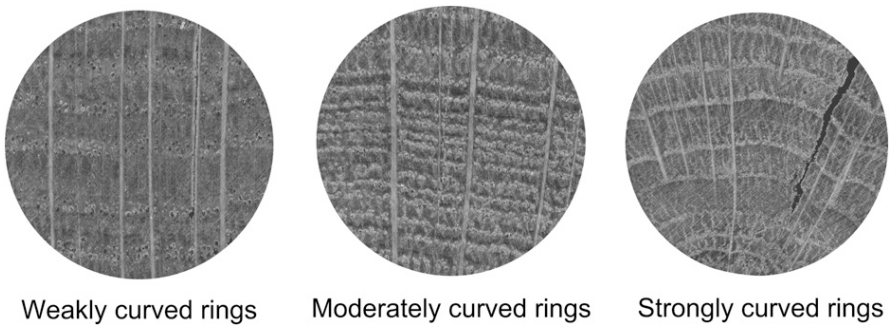


Fig. 1 Ring curvature. Weakly curved rings indicate the use of trunks or large branches (After Marguerie and Hunot 2007 1421, Fig. 3).

3 Results

Charcoal was examined from three contexts at Grange 5. Four wood taxa were identified. The results are dominated by oak (*Quercus* sp.), followed by hazel (*Corylus avellana*) (Fig. 2). Ash (*Fraxinus* sp.) and pomaceous fruitwood (Maloideae) were also identified.

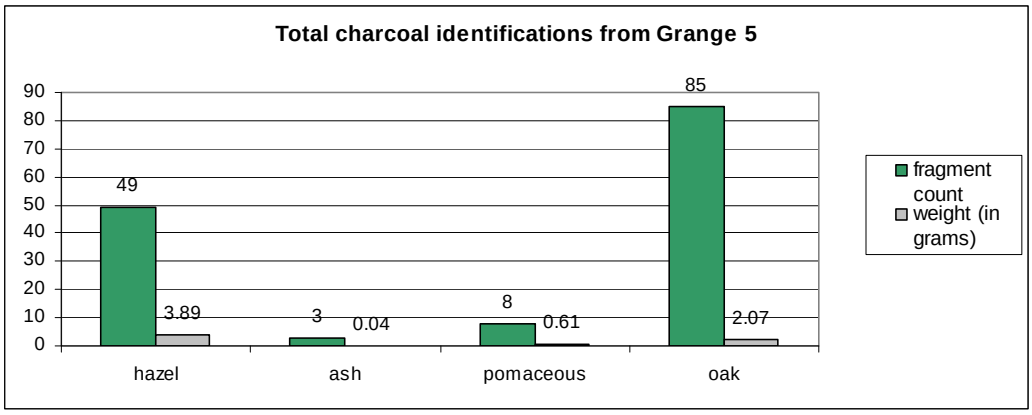


Fig. 2 Charcoal identifications from Grange 5

An early Bronze Age date has been received from the pit **C27** (fill **C13**). This is dominated by oak, with a small amount of ash present. A hearth **C24** (fill **C26**) dating to the Iron Age/early medieval period contained hazel, pomaceous fruitwood and oak. A further undated hearth **C3** (fill **C5**) contained willow and hazel.

4 Local environment

The charcoal results from Grange 5 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 ash was identified within the assemblage. 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.

5 Summary

Charcoal was examined from three contexts at Grange 5, two hearths and a pit. The charcoal identifications indicate that the site was located near to oak woodlands. The results are similar to the nearby site of Grange 4, which was also dominated by oak (O'Donnell 2010).

References

Gale, R. 2003 Wood based industrial fuels and their environmental impact in lowland Britain. In P. Murphy and P.E.J. Wiltshire (eds), *The Environmental Archaeology of Industry,* 30–47. Oxford.

Gale, R. and Cutler, D., 2000 *Plants in Archaeology. Identification of vegetative plant materials used in Europe and the southern Mediterranean to c. 1500*. West Yorkshire.

Hather, J.G., 2000 *The Identification of the Northern European Woods. A guide for archaeologists and conservators*. Archetype. London.

Kelly, A. 2008 *Interim Report on Archaeological Excavation of Grange 5, A029/003, E3121 County Meath.* Unpublished report prepared by Irish Archaeological Consultancy Ltd for Meath County Council.

Lipscombe, M. and Stokes, J. 2008. *Trees and how to grow them. London:* Think books.

Marguerie, D. and Hunot, J.Y. 2007 Charcoal analysis and dendrology: data from archaeological sites in north-western France. *Journal of Archaeological Science* **34**, 1417–1433.

O'Donnell, L. 2010 *Analysis of the charcoal from Grange 4, Co Meath (A029/004, E3122).* Unpublished specialist report prepared for Irish Archaeological Consultancy Ltd on behalf of Meath County Council.

Orme, B.J. and Coles, J.M., 1985 Prehistoric woodworking from the Somerset levels: 2. Species selection and prehistoric woodlands. *Somerset Levels papers* **11**, 7–24

Schweingruber, F.H., 1978 *Microscopic wood anatomy*. Birmensdorf: Swiss Federal Institute for Forest, Snow and Landscape Research.

Stuijts, I. 2005 Wood and charcoal identification. In M. Gowen, J. Ó Neill and M. Philips (eds) *The Lisheen Mine Archaeological Project 1996–8*, 137–186. Dublin.

Wheeler, E.A, Bass, P. & Gasson, P.E. 1989 *IAWA list of microscopic features for hardwood identification*. IAWA Bulletin nos. **10** (3): 219–332.

Table 1 Charcoal identifications from Grange 5

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
2	C5	Pit (C3)	*Corylus avellana* (hazel)	3.3	16	0.15	4–5	2–3	medium	strongly curved			
2	C5	Pit (C3)	*Salix* sp. (willow)	3.3	34	1.23	4–5	2–3	fast	strongly curved			
11	C26	Pit (C24) E med date	*Corylus avellana* (hazel)	11.8	33	3.74	5–7	2–8	medium	strongly curved	present		
11	C26	Pit (C24) E med date	Maloideae spp. (pomaceous)	11.8	8	0.61	5–6	2–4	medium	strongly curved			
11	C26	Pit (C24) E med date	*Quercus* sp. (oak)	11.8	4	0.28	4–5	2–3	medium				
13	C13	Fill of pit (C27) EBA date	*Fraxinus* sp. (ash)	1.4	3	0.04	2–4	1–2					
13	C13	Fill of pit (C27) EBA date	*Quercus* sp. (oak)	1.4	47	0.56	2–4	2–3	medium	weakly curved		present	

THE PLANT REMAINS
GRANGE 5 (E3121)

SUSAN LYONS MSC MIAI

JOB CODE: PR/088.03

OCTOBER 2009

1 Introduction

Five flot samples was analysed from excavations associated with burnt mound/*fulacht fiadh* activity recorded at Grange 5, Co. Meath. Grange 5 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 two hearths (C3 and C24), a series of pits, postholes and ditches (Kelly, 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 just two features were submitted for archaeobotanical analysis; C5 and C18 (fill of C3) and C17, C23, and C26 (fill of C24).

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

Wood charcoal – Charcoal was recorded from the majority of the features selected for archaeobotanical analysis, with the highest concentrations recorded from C23 and C26 (fill of C24). The material was very fragmented and in minute fibres in many cases with average fragment size of <5mm diameter

Carbonized cereal grain - Carbonised cereal grains were recorded in low to high concentrations, with the most notable assemblages identified from C23 and C26 (fill of C24). Barley (*Hordeum* sp.), wheat (*Triticum* sp.) and oat (*Avena* sp.) were all identified. Barley was the dominant species recorded, especially from C23 and C26 (fill of C24). Despite the abraded nature of many of the grains, the wheat species recorded were tentatively identified as bread/club wheat (*Triticum aestivum/compactum)* in most cases. Oat (*Avena* sp.) was also recorded from C17, C23 and C26 (fill of C24). 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. The majority of the grains were free of the chaff components [spikelets, glume bases and palea/lemma (hulls)], which are required in identifying between species and therefore definitive identifications were difficult to undertake.

A number of vesicular and eroded grains were also recorded from C3 and C24 and these vappear 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.

Carbonized wild taxa – Carbonised seeds (nutlets) knotgrass (*Polygonum* sp.) and dock (*Rumex* sp.) were recorded from C17, C24 and C26 (fill of C24). All species are common weeds of disturbance and waste ground.

4 Discussion

4.1 Carbonization 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 Carbonized plant remains from Grange 5

Charcoal, which was recorded from all samples, is related to the burning activities associated with domestic, funerary or industrial use of fires and hearths on archaeological sites. This charred debris is likely to be related to the activities surrounding the pits/hearths C3 and C24. Such charred material can become re-distributed across a site and enter open features or become mixed with sealing deposits.

The carbonised cereal assemblage, which was identified from deposits associated with C3 and C24 was made up of predominantly barley followed by oat and with much lesser rye. While barley has been cultivated from the prehistoric period to the present day, the cultivation of oat is primarily dated from the early medieval period in Ireland (Monk, 1986). The earliest evidence for rye in Ireland has been dated to the late Bronze Age/early Iron Age at Carrowmore, Co. Sligo (Helmquist, 1980). Rye is traditionally one of the cultivated medieval crops (Monk, 1986), however its occurrence from medieval deposits is generally quite low. These cereals would have been cultivated and consumed by all social classes during the medieval period. While oat and rye were processed for human consumption they would also have been used for animal fodder (oat) and possibly thatch (rye).

The large cache of cereal grain recorded from C24, coupled with the evidence for *in situ* burning (Kelly, 2008, 9) suggests that this feature was in some way used to facilitate the drying of crops. The occurrence of barley, oat and rye collectively indicates a medieval assemblage and this is supported by a radiocarbon date of AD 424 – 541 which was returned from a barley grain from C26 (fill of C24). The fact that the grain was left *in situ* implies that C24 was not cleaned out and possibly even abandoned after a fire or conflagration event. Based on the high barley 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 oat and rye may represent residual material from earlier kilning activities.

While the cereal assemblage from hearth C3 was also made up of a medieval cereal assemblage (barley and oat), the quantities of grain were much lower. Whether this feature also functioned as a corn-drying facility is difficult to ascertain in the absence of a higher cache of grain. 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. It must also be noted that a successful crop drying episode would also result in little or no charred remains to analyse

An interesting observation is the absence of chaff and low occurrence of weed seeds from the assemblage, which 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 (van der Veen, 1989, 304). It is important to note however that a mixture of cereal chaff, straw and weed seeds together with wood forms a very suitable fuel for parching grain (Hillman, 1981). The weed seeds recovered from C24 may also have been brought to the site with the gathered crop and charred inadvertently with the crops themselves.

5 Summary

Five samples associated with the deposits from pits C3 and C24 were selected for archaeobotanical analysis. The carbonised plant remains assemblage contained predominantly barley, followed by much lesser oat and rye. Collectively these crops are typical of a medieval cereal assemblage, which suggests that medieval crop drying activities were being undertaken at the site.

6 Recommendations

1 There is no further identification work required on the sample submitted for Grange 5. 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.

7 References

Beijerinck, W. 1976 *Zadenatlas der Nederlandsche Flora*. Amsterdam: Backhuys & Meesters.

Boardman, S. and G. Jones 1990 Experiments of the effects of charring on cereal plant components. In *Journal of Archaeological Science* **12**, 1–11.

Cappers, R.T.J., R.M. Bekker & J.E.A. Jans 2006 *Digital Seed Atlas of the Netherlands*, Groningen, Netherlands: Barkhuis Publishing & Groningen University Library.

Clapham, A. R., Tutin, T. G. Warburg, E. F. 1957 *Flora of the British Isles* Cambridge University Press.

Helmquist, H 1980 Appendix II: An Irish cereal find from the transition between Bronze Age and Iron Age. In G. Burenhult *The Archaeological Excavations at Carrowmore, Co. Sligo, Ireland. Excavation Seasons 1977–79,* Institute of Archaeological University of Stockholm. Theses and papers in N. European Archaeology 9.

Hillman, G. 1981 Reconstructing crop husbandry practices from charred remains of crops. In R. Mercer (ed.) *Farming practices in British prehistory – 2nd edition,* Edinburgh, 123–162. Edinburgh University Press.

Kelly, A. 2008 *M3 Clonee – North of Kells Motorway Scheme, Contract 4: Grange 5 E3121*. Unpublished report prepared by IAC Ltd for Meath County Council.

Lyons, S. forthcoming Plant Macrofossil Analysis from the M3 - overall integrated report. Unpublished specialist report prepared for IAC Ltd on behalf of Meath County Council.

Monk, M. A. 1986 Evidence from macroscopic plant remains for crop husbandry in prehistoric and early historic Ireland: A review. *The Journal of Irish Archaeology* **III 1985/6**, 31–36.

O'Neill, J 2000 Just another *fulacht fiadh* story. *Archaeology Ireland* **14**, No. 2.

Pearsall, D. 2000 *Palaeoethnobotany: Handbook of Procedures*. 2nd edition, San Diego: Academic Press.

Stace, C. 1997 *New Flora of the British Isles* (2nd edition) Cambridge: Cambridge University Press.

Stanton, T. R. 1955 *Oat Identification and Classification,* US Dept. of Agriculture Technical Bulletin No. 1100, Washington DC.

Van der Veen, M. 1989 Charred grain assemblages from Roman- period corn dryers in Britain. *Archaeological Journal* **146** (1989), 302–319.

Table 1. Composition of plant remains from Grange 5 (E3121)
Key: + = rare (1–10), ++ = occasional (11–50), +++ = common (51–100) and ++++ = abundant (>100)

Feature	Context number	Sample Number	Flot volume (grams)	Context description	Carbonised cereal grains	Carbonised wild taxa	Comments
Pits	5	2	0.1	Fill of burnt pit/possible hearth C3	+		Barley (x4)
	17	15	0.1	Fill of burnt pit/possible hearth C24	+	+	Oat (x2) Barley (x1) Cereal indet (x7) *Polgonum* sp. (x1)
	18	5	0.1	Fill of burnt pit/possible hearth C3	+		Barley (x4) Cereal indet +
	23	10	3.4	Fill of burnt pit/possible hearth C24	++++	+	Barley (x310) Oat (x12) Rye (x1) *Polygonum* sp. +
	26	11	10.7	Fill of burnt pit/possible hearth C24	++++	+	Barley (x863) Cultivated oat (x61) *Polygonum* sp. + *Rumex* sp. +

Appendix 2.4 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 ‰
C26 Fill of pit/hearth	11	Charred Cereal	*Hordeum Sp.* Barley (<0.1g)	QUB	UBA11099	AMS(Std)	AD 433–534 (1 sigma), AD 424–541 (2 sigma)	1578+/-23	-24.9
C13 Small pit	13	Charcoal	*Fraxinus excelsior* Ash (0.05g)	QUB	UBA11100	AMS(Std)	2286–2205 BC (1 sigma), 2335–2148 BC (2 sigma)	3810+/-21	-26.1

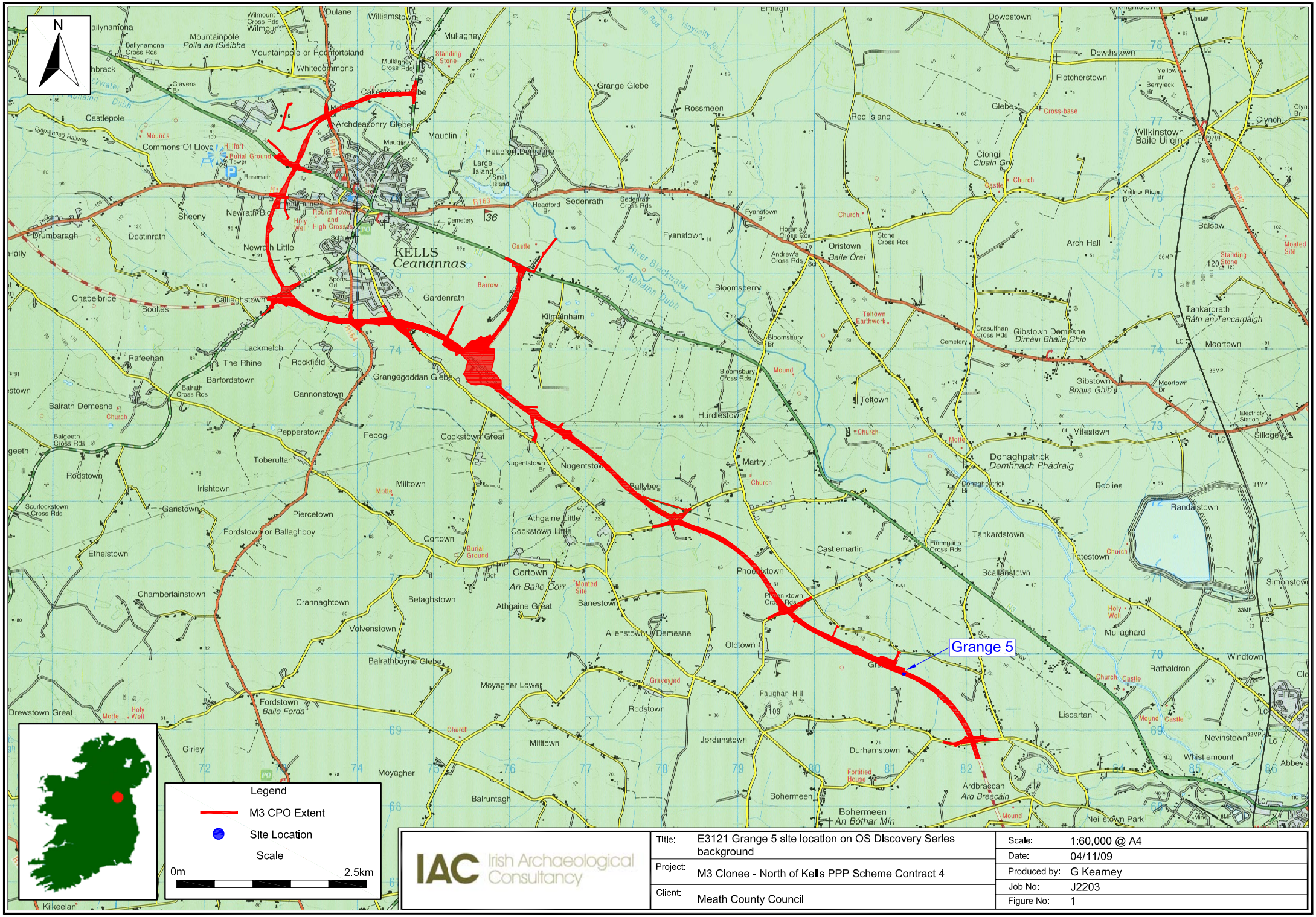
APPENDIX 3 LIST OF RMP SITES IN AREA

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

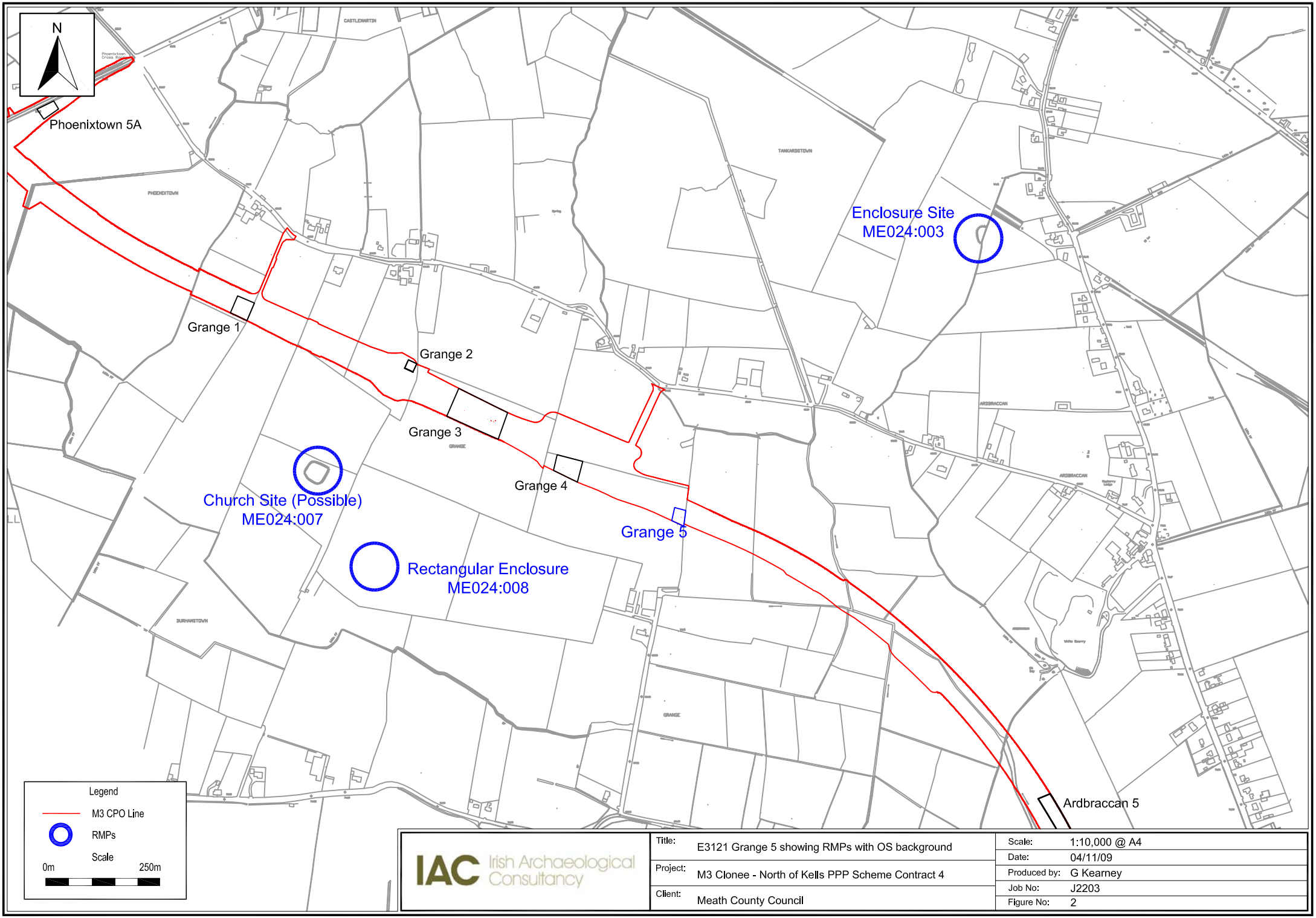
Site Name	Director	Contract site reference no.	Excavation Registration No.
Ardbraccan 5	Carmel Duffy	A029-001	E3119
Ardbraccan 6	Ciara MacManus	A029-002	E3120
Grange 5	Amanda Kelly	A029-003	E3121
Grange 4	Carmel Duffy	A029-004	E3122
Grange 3	Amanda Kelly	A029-005	E3123
Grange 2	Amanda Kelly	A029-006	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



IAC Irish Archaeological Consultancy

Title:	E3121 Grange 5 site location on OS Discovery Series background
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

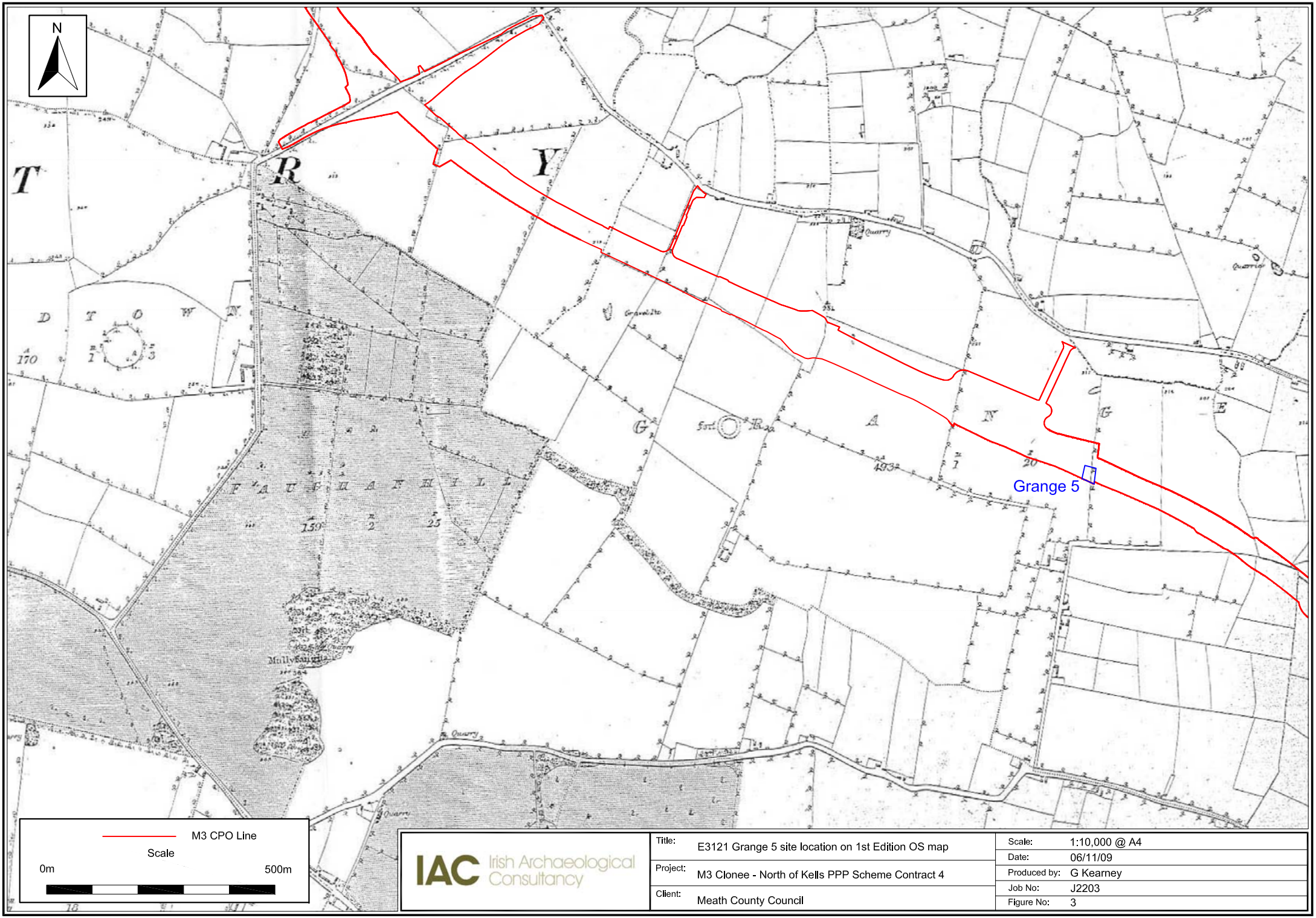
Scale:	1:60,000 @ A4
Date:	04/11/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	1



IAC Irish Archaeological Consultancy

Title:	E3121 Grange 5 showing RMPs with OS background
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

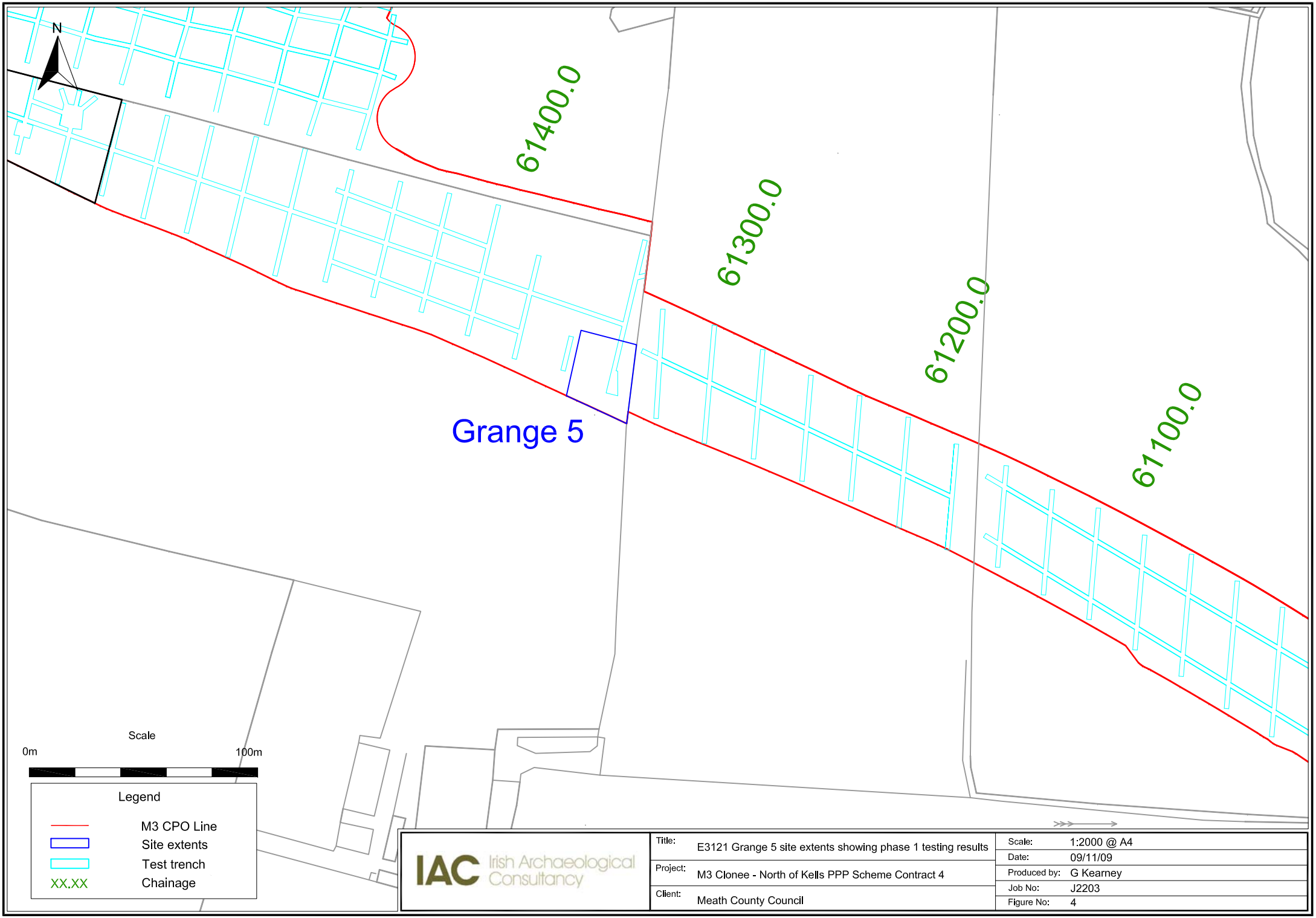
Scale:	1:10,000 @ A4
Date:	04/11/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	2



IAC Irish Archaeological Consultancy

Title:	E3121 Grange 5 site location on 1st Edition OS map
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

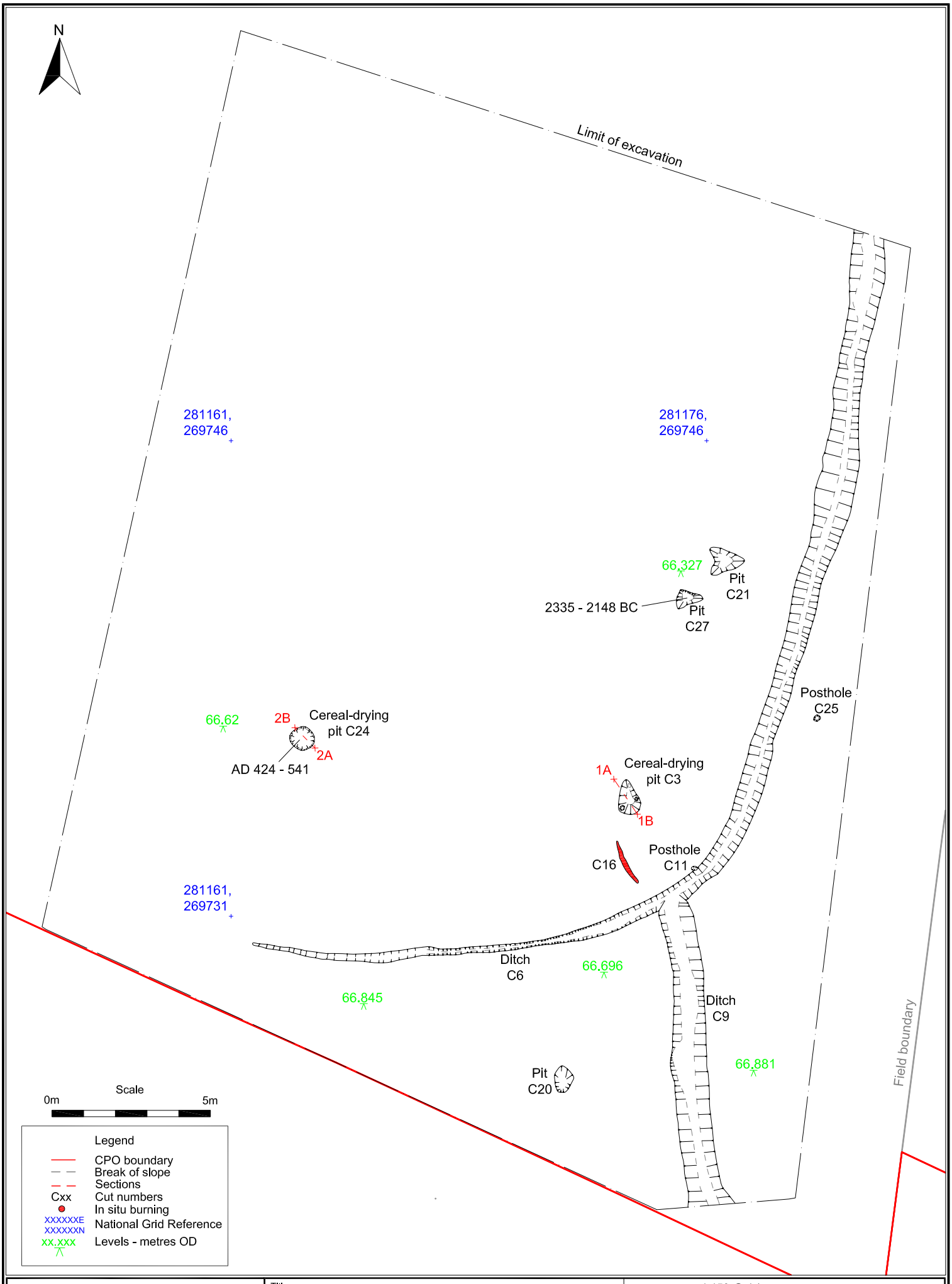
Scale:	1:10,000 @ A4
Date:	06/11/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	3



IAC Irish Archaeological Consultancy

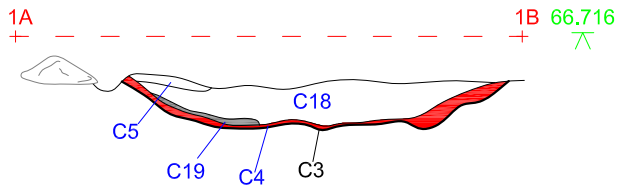
Title:	E3121 Grange 5 site extents showing phase 1 testing results
Project:	M3 Clonee - North of Kells PPP Scheme Contract 4
Client:	Meath County Council

Scale:	1:2000 @ A4
Date:	09/11/09
Produced by:	G Kearney
Job No:	J2203
Figure No:	4

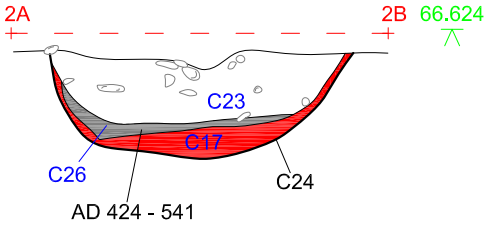


IAC Irish Archaeological Consultancy	Title: E3121 Grange 5 plan of site	Scale:	1:150 @ A4
	Project: M3 Clonee - North of Kells PPP Scheme Contract 4	Date:	07/12/09
		Produced by:	G Kearney
	Client: Meath County Council	Job No:	J2203
		Figure No:	5

Southwest facing section of C3



Northeast facing section of C24



Charcoal layer
Burnt clay

Scale

0m 1m

Legend

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

IAC Irish Archaeological Consultancy

Title:	E3121 Grange 5 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:	6

Plate 1: E3121 Grange 5 site post-excavation, facing north.

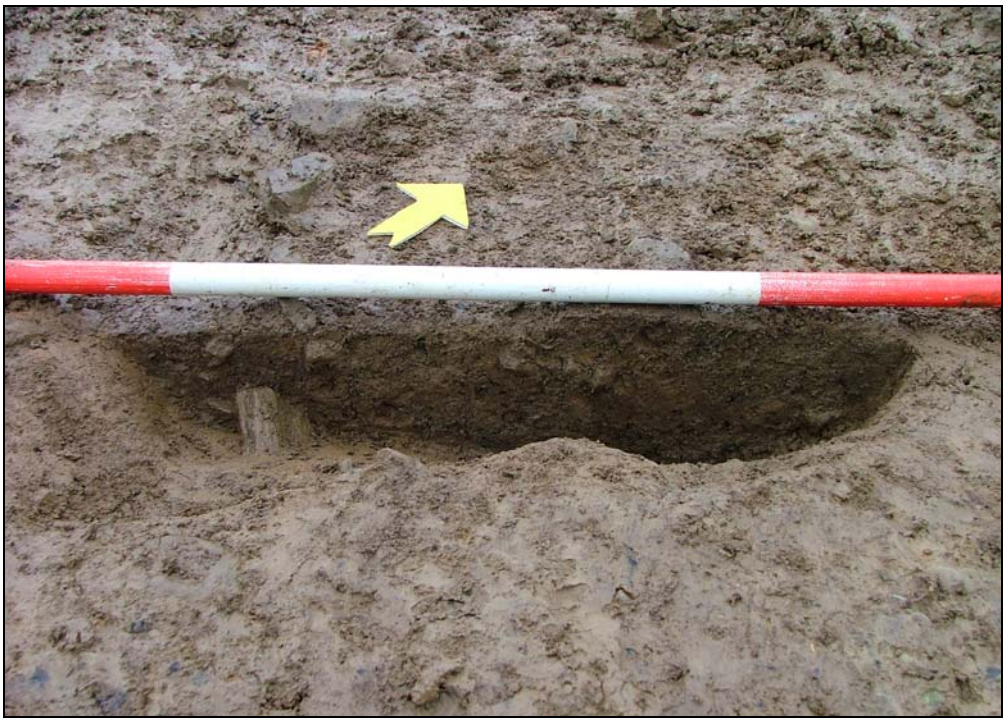


Plate 2: E3121 Grange 5 pit C27, mid-excavation, facing north-west.

Plate 3: E3121 Grange 5 hearth cut C3, mid-excavation, facing east.

Plate 4: E3121 Grange 5 hearth/pit C24, mid-excavation, facing south-west.

Plate 5: E3121 Grange 5 hearth/pit C24, mid-excavation, facing south-west, showing charcoal layer C26 *in situ.*

Plate 6: E3121 Grange 5 pit C21, mid-excavation, facing north-west.

Plate 7: E3121 Grange 5 ditch C6, mid-excavation, facing north-east.

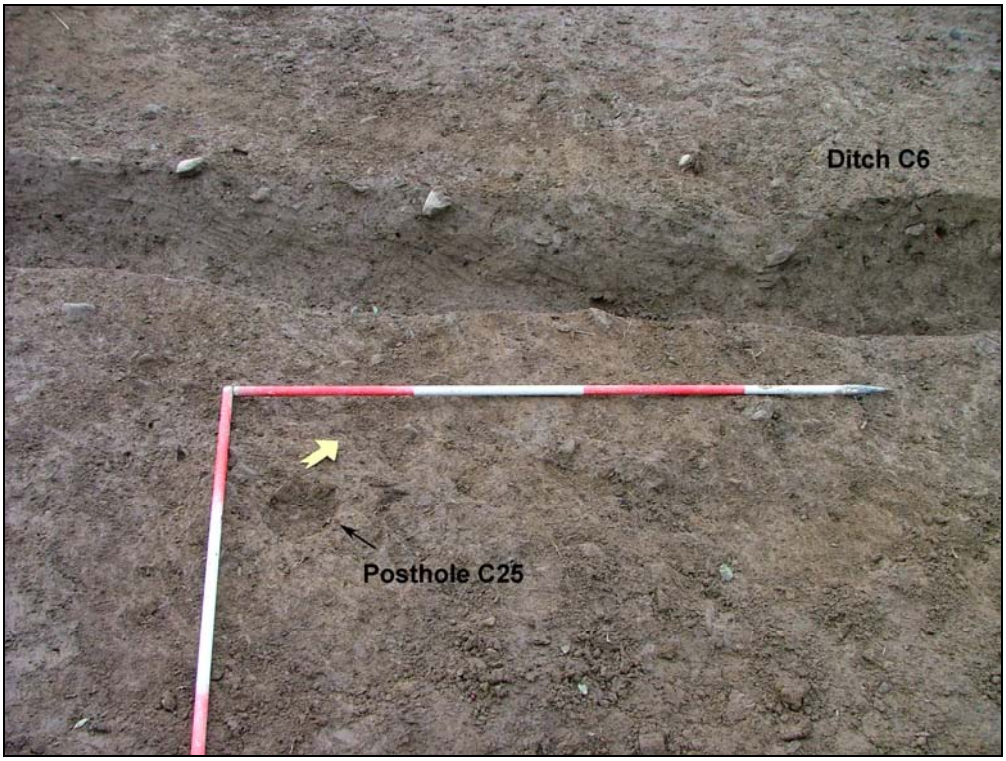


Plate 8: E3121 Grange 5 posthole C25 and ditch C6, post-excavation, facing north-west.