N6 Kinnegad to Kilbeggan Dual Carriageway: Archaeological Resolution

FINAL REPORT
E2730

A001/045, Cornaher 5
Co. Westmeath

Site Director:	L. McKinstry
Senior Archaeologist:	R. Ó'Maoldúin
Job No.:	1112-04
Client:	Westmeath County Council
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Valerie J. Keeley Ltd

transport21
progress in motion

NDP
National Development Plan 2007 - 2013

European Union
Structural Funds

Department of Transport
An Roinn Iompair

NRA
National Roads Authority
An tÚdarás um Bóithre Náisiúnta

WESTMEATH
COUNTY COUNCIL

NATIONAL ROADS DESIGN OFFICE
Westmeath County Council

VJK
Valerie J. Keeley Ltd.
ARCHAEOLOGICAL CONSULTANCY

SUMMARY

This report comprises the final results of the archaeological excavation of site 5, Cornaher Townland, Co. Westmeath. This excavation was undertaken as part of the archaeological programme for the N6 Kilbeggan to Kinnegad road scheme. It was conducted by Liam McKinstry, for Valerie J. Keeley Ltd. on behalf of Westmeath Co. Council, in accordance with the ministerial direction A001 by the Minister for the Environment, Heritage and Local Government and in consultation with the National Museum of Ireland. For recording purposes, this excavation was allocated the number A001/045 and work number E2730. It was undertaken from January 18th to January 21st, 2005.

The site was recorded as F92, described as a ploughed out burnt mound with trough in the testing report compiled by CRDS Ltd. On excavation the site consisted of a small pit full of burnt stone and charcoal possibly dating to the Prehistoric period. The natural into which the pit had been excavated showed evidence of in situ burning with the natural brick red in places. The pit had also been truncated in places by modern agricultural activity and suffered from root damage.

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1.0 INTRODUCTION

This report presents the results of the archaeological excavation of Site 5 in the Townland of Cornaher carried out in advance of the proposed N6 Kinnegad to Kilbeggan dual carriageway between the townlands of Kilbeggan and Tyrellspass in County Westmeath and on the line of all associated link roads and country roads.

The site is located in the Townland of Cornaher, at N.G.R 239588/235027 and OD 93 m.

2.0 PROJECT BACKGROUND

Valerie J. Keeley Ltd. was appointed to undertake the resolution of 59 archaeological sites on behalf of Westmeath County Council and was funded by the National Roads authority, in advance of the new N6 Kinnegad to Kilbeggan. These sites were identified as a result of archaeological test trenching carried out by Conor McDermot of the Irish Archaeological Wetland Unit under licence (ref.: 04E 0879) on behalf of C.R.D.S. Ltd. (O'Connor *et al* 2004).

The testing report stated:-

'F92. An area of intermittent charcoal concentrations with occasional burnt mound material (2.3x1.3x0.04m). Immediately to the north there is a possible trough (2.8x2.72x0.25+) that wasn't bottomed but is filled with burnt mound material and sealed by a peaty clay which probably formed after the trough went out of use. It has a sharp break of slope on top and a vertical side. Lying 0.15m southeast of the trough there is a small pit (0.53x0.30x0.13m) of uncertain archaeological significance. The fill of the pit is a mid-brown peaty silt with frequent unburnt small stones and no charcoal inclusions. It has sharp sides with a slightly uneven base. These features are located at 60m from the start of the trench. F92 may contain the remains of a Fulacht Fiadh with a trough and associated mound that has been truncated by agricultural activity as suggested by the plough marks found within the transect.'

The scheme is part of the Dublin to Galway National Primary Route and covers the section of the improved N6 between the existing Athlone Relief Road to the proposed M4 at Kinnegad. The route is 57.7km long and will be to standard dual carriageway construction. The location of the route is predominantly to the south of the existing N6 and there will be access to the local road network through the seven grade separated junctions located at Athlone, Farnagh, Moate, Kilbeggan, Tyrrellspass, Rochfordbridge and Kinnegad. The cross-section of the mainline consists of 2m wide verges, 2.5m wide hard shoulders, 7m wide two-lane carriageways and a 3m wide central reserve. This central reserve will accommodate 1m hard strips and a safety barrier. In addition to the mainline dual carriageway there is a further 0.3km of standard dual carriageway to the south of Athlone Interchange to connect to the existing N6 and 1.2km to the south of Kilbeggan Interchange to connect to the existing N52.

3.0 METHODOLOGY

The topsoil at this site was removed from the site utilising a hydraulic excavator under the direction, supervision and monitoring of a qualified archaeologist. Once the topsoil had been removed, the entirety of the site area was cleaned back to reveal the features identified during the previous testing (see above) and to try to identify any new features which may have been exposed.

Upon location all archaeological materials were cleaned and excavated by hand using methods appropriate to their composition, nature and date. All archaeological contexts were photographed and planned (in relation to the site grid) prior to excavation. Sections were excavated through all features to obtain profiles and to expose the stratigraphic sequences and then fully excavated. Features that proved to be of modern origin tended not to be fully excavated. The composition, stratigraphic position and interpretation of all contexts were recorded on a context sheet prior to excavation. Contexts have been sampled for palaeobotanical material, radiocarbon dating, micromorphology, petrology and wood identification, where appropriate. All sections and cut features were photographed and drawn. The position of all finds and samples were recorded in three-dimensions (where practicable) in relation to the site-grid.

4.0 SITE DESCRIPTION

4.1 Geographical

The site was located within an area of relatively flat bogland around which were a number of medium to large sized steep glacial drumlins and eskers. The site itself was situated on a slightly higher piece of ground and was consequently not as boggy.

4.2 Environmental

The site is situated on the edge of a partially wetlands area. Much of the surrounding land has deep modern cut drainage ditches running throughout in an attempt to make the land agriculturally viable, but only with regards to livestock farming.

4.3 Cultural

The Townland of Cornaher was situated within the parish of Newtown and was also part of the barony of Moycashel. It is known in Irish as *Cór an Aithir* translated as ‘fathers division’ or *Cor Na hIthire* meaning ‘a division of arable land The Townland was listed in the Civil Survey of Ireland, 1654-6 (R.C. Simmington, 1953). The historical evidence seems to indicate that the Townland, or at least the name of the Townland, would date from the post medieval period at the earliest. Possibly the wetland nature of most of the county would discourage

intensive occupation on anything other than high ground until land drainage became a practicable option in the 17th or 18th centuries.

In 1837 it contained c.666 acres part of which was of bog, arable and tillage land. Cornaher demesne is located to the north with Cornaher house (O'Donovan, 1837). A battle is said to have taken place at Cornaher in 468AD between the O'Dooleys the ruling clan of Fartullagh in the fifth century, and the descendents of Niall of the Nine hostages and the ruling Kings of Leinster (Egan,Oliver, 1986).

There are no archaeological sites recorded in the Record of Monuments and Places for this townland and no archaeological finds recovered. However recent archaeological work carried out by the IAWU has uncovered a total of eight archaeological sites in part of Toar bog within this townland. They have been classified as pieces of worked or unworked wood in situ. "These site types consist of less than ten pieces of wood which show evidence of having been worked or placed in the bog but have no apparent function" (McDermott C. IAWU, 2000). They are of unknown date. Two areas of archaeological potential were identified in the line of the N6 proposed route. They include an area of forestry (field 285) and the area around Cornaher Lough (field 271). A vernacular building (CHS 94) was also identified within the roadtake and is marked on the first edition OS map, 1837.There are also five other buildings marked on the first edition map, which the road may pass over and are located in field nos. 284 and 285 at chainage 26400.000.

(Extracts of Historical Background in CRDS testing report 2004- After Orlaith Egan 2004)

The site at the time of excavation had no known culturally important features associated with it.

5.0 THE EXCAVATION

The site at Cornaher 5 consisted of a large pit, which contained burnt stone material. The pit, C3 (figure 3 & 4, plates 1 & 2), was sub-circular shaped in plan and measured 2.4m by 1.6m and was 0.35m deep. The pit contained two fills. The upper fill was dark brown silty clay, which had occasional charcoal inclusions. The bottom fill was dark brown grey silty clay with frequent inclusions of burnt stone and charcoal. Both of the fills were severely disturbed and truncated by modern agriculture and root damage.

6.0 THE ARTEFACTUAL ASSEMBLAGE

No artefacts were recovered from the site.

7.0 THE AERIAL SURVEY

No aerial survey was conducted with regards to this site.

8.0 DISCUSSION

Due to the disturbed nature of the pit it was impossible to obtain secure dating material. The site was similar to another excavated at Cornaher (Licence Number 05E2731) which also consisted of a pit containing burnt stone. This site was dated to B.P. 2763±36 (2σ calibrated to 970-843BC) placing it in the late Bronze Age. It seems probable that the pit at Cornaher 5 was of a similar date. The most likely use for the pit was as a temporary cooking site. Such isolated features containing burnt stone are often found throughout Ireland. The landscape at Cornaher was probably a wetland one. This type of landscape would have been ideal for hunting and fishing and such isolated pits may represent the remains of temporary cooking/camping sites.

Excavations and specialist analyses of the site of Cornaher 5 are complete and the archaeological investigations have reached their conclusion. The site is regarded as having been archaeologically resolved.

9.0 ACKNOWLEDGEMENTS

The following people worked helped with the excavation of this site.

On site excavation team:

Supervisor	Aaron Johnston
Site Assistants	Toril Bergsvik, Eoghan Barret, Alan Dixon, Vincent Mougin, and Bryan Crossan.
General Operatives	Nabil Mountasser, Cyril Danilenkoff, Sylvain Daubigney and Julien Charbonnier

Post excavation Phase

Supervisors	Aaron Johnston and Steve Balfe.
Site assistant	Alan Dixon.

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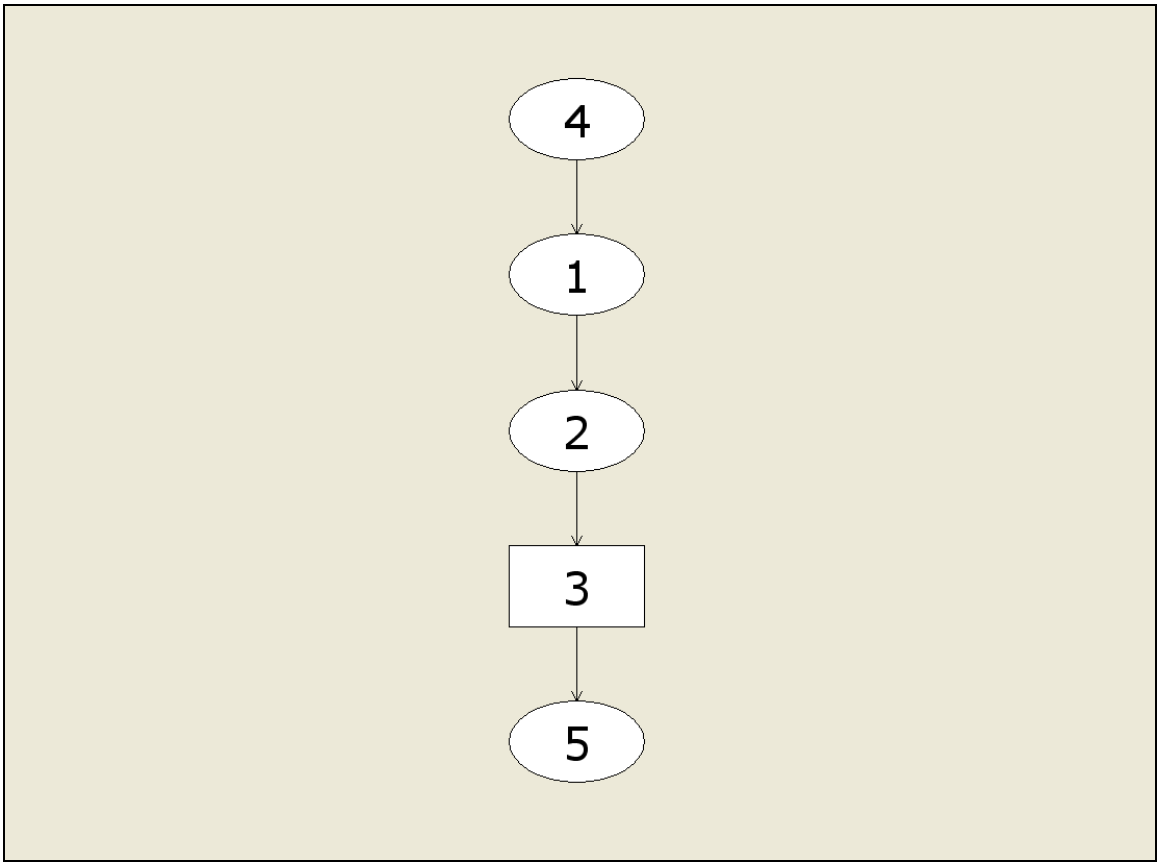
APPENDIX A:

CONTEXT REGISTER

C #	*Cutting*	*Type*	*Interpretation*	*Group*	*Description*	*Dimensions*
001		Fill	Of pit [003].		Soft dark brown silty clay with occasional charcoal flecks.	Length 1m 70 width 1m 60m depth 0.20m
002		Fill	Of pit [003].		Soft dark brownish grey silty clay with frequent angular large / medium sized stones.	Length 1m 70 width 1m 60m depth 0.25m
003		Cut	Pit		Irregular in shape with rounded corners, sharp break of slope top gradual at base, vertical sides and an uneven base.	Length 1m 70 width 1m 60m depth 0.45m
004		Deposit	Topsoil		Dark brown peat	
005		Deposit	Natural		Light grey brown clay	

APPENDIX B:

SITE MATRIX



APPENDIX C:

LIST OF SAMPLES

Sample No.	*Context No.*	*No. Bags*	*Reason for Sampling*	*Description*
1	1	1	Charcoal/ environmental	Upper fill of pit C3
2	2	1	Charcoal/ environmental	Lower fill of pit C3

NB ***The samples were sieved but produced no plant remains, only charcoal (see Appendix E). Due to the heavily disturbed nature of the fills, no dates were sought.***

APPENDIX D:

LIST OF QUANTITIES

Record type	*Number*
Drawings	2
Context sheets	3
Photographs	5
Notebooks	1
Registers	2

APPENDIX E:

ARCHAEOBOTANICAL REPORT VAUGHAN-WILLIAMS

N6 KILBEGGAN TO KINNEGAD, CO. WESTMEATH
(LICENCE NO.'S E2709, E2717, E2798, E2722, E2723, E2728, E2730, E2731, E2749, E2750, E2766): ANALYSIS OF THE ARCHAEOBOTANICAL MATERIAL

Vaughan-Williams **January 2007**

INTRODUCTION

This report presents the findings of the analysis of archaeobotanical material recovered during watching briefs undertaken during the laying of the N6, Kilbeggan to Kinnegad, Co. Westmeath (Licence no. E2709, E2717, A001/031-2, E2722, E2723, E2728, E2730, E2731, E2749, E2750, E2766). Forty-three bulk samples were sent for analysis from twelve sites, with features dating from the prehistoric to the post-medieval period. The material was preserved through becoming charred and waterlogged.

The aim of this analysis was (1) to determine the relationship between the archaeobotanical material and the features sampled; (2) their relationship to the economy and diet of the population; and (3) to identify the nature of the local environment.

METHODOLOGY

The flots were analysed using a low power zoom-stereo microscope. Identifications were made with reference to the author's modern seed reference collection, and Berggren (1981) and Anderberg (1994). Plant nomenclature follows Stace (1997). The results are presented in Tables 1-4.

RESULTS

ARDNAGLEW 3 (E2709)

Bronze Age

Burnt Spread

Context (001) was sampled from a burnt spread. No archaeobotanical material was present (table 1).

BALLYKILMORE 5.1+5.3 (E2717)

Bronze Age

Burnt mound

Context (025) was one of five shallow burnt spreads (Burnt Spread 5) (Ó'Maoldúin and Hardy, 2006). One waterlogged bramble seed (*Rubus* sp.) was present (table 1).

BALLYKILMORE 6 (E2798)

Early Medieval

Pits

*Four pits were sampled, of which pits [533] and [1017] were associated with metal-working. The assemblages from cut [755] and context (1321b) cut [1321] contained occasional charred grains of hulled barley (*Hordeum *sp.), including one 'straight' grain; occasional grains of oat (*Avena *sp.); and occasional wheat grains (*Triticum *sp.). One rye grain (*Secale cereale*) was present in context (538) of cut [533]. Context (1017a) from cut [1017] did not contain any archaeobotanical material (table 2).*

Layer

Layer (371) was cut by a number of inhumations and other features. The assemblage was small and dominated by grains of hulled barley, including a few identifiable as 'straight'. Wheat grains, oat grains (*Avena* sp.) and seeds from the grass family (Poaceae sp.) were occasional (table 2).

Posthole

The fill of posthole [352] presented one grass seed and a cereal grain (table 2).

Bowl Furnace

Fill (171) from cut [168] and basal fill (186) from cut [184] were both from areas associated with metal-working. The former presented a small assemblage composed of grains of barley including one hulled; large grass seeds; and one garden pea (*Pisum sativa*). The latter contained the fragmented remains of hazelnut (*Corylus avellana*) (table 2).

Medieval

Ditches

Ditch fill (609) cut [761] presented a small waterlogged assemblage of the ruderal / waste ground taxa blue woodruff (*Asperula arvensis*), woundwort (*Stachys* sp.) and bramble.

Post-medieval

Pits

Context (2034) from pit [2029] presented a moderate assemblage of wheat grains, with the rounded appearance of bread wheat (*Triticum aestivum*); garden peas; and one large grass seed.

CAPPANRUSH 1 (E2722)

Bronze Age

Fulachta Fiadh

Context (005) was the lower layer of a burnt spread. The sample contained one waterlogged seed of whitebeam (*Sorbus* sp.). Context (009) was sampled from cut [006] which lay under context (005). The context is recorded as having been peaty and organic with inclusions of reeds (*Juncus* sp.) (Ó'Maoldúin and McKinstry, 2006a). However only a bud (indet.) was present in the assemblage (table 1).

CLONFAD 3 (E2723)

Early Christian / Medieval

Area B

Ditches

Context (305) from ditch [101] in Area B presented a small assemblage of hulled barley grains, wheat grains and large grasses, plus the remains of two lentils (*Lens culinaris*) (table 3).

Area C

Wells

Context (340) from well [585] in Area C provided a small but well preserved assemblage of emmer / bread wheat (*Triticum dicoccum / aestivum*), barley grains and oat grains, plus lentils. No oat florets were present so it was not possible to determine whether these represent the wild or cultivated species.

Area D

Pits

The assemblage from basal fill (463) in pit [462] contained occasional grains of barley and grass seeds. Charcoal was radiocarbon dated to AD723-889.

Ditches

Context (571) from the base of ditch [605] in Area D contained a single large grass seed.

Wells

Two samples were taken from well [287]. Context (291) contained a single cabbage / mustard seed (*Brassica / Sinapsis* sp.). No archaeobotanical material was present in context (473).

Medieval

Area A

Kilns

Kiln [362] was unlined and oval in shape (Ò'Maoldúin and Stevens, 2005). Nearly 50% of the assemblage from backfill (361) were cereal grains, namely barley, including a number of 'straight' grains. Wheat and rye grains were occasional. Chaff was frequent with 2-row barley internodes, bread wheat glumes, and rye internodes. The remainder of the assemblage was composed primarily of large desiccated grass seeds, plus rough ground plants such as nipplewort, bristly ox-tongue (*Picris echinoides*), stinking chamomile, orache and lesser stitchwort (*Stellaria gramineae*). A moderate number of the legumes lentil, garden pea, parsnip (*Pastinaca sativa*) and wild turnip (*Brassica rapa* ssp. *campestris*) were represented along with the damp ground taxa reeds, curled dock and common hempnettle. Context (387) presented a similar assemblage to that from context (358), though in smaller quantities (table 3).

Contexts (358) and (360) presented small though well preserved assemblages comprising occasional grains of hulled barley and emmer / bread wheat, lentil and garden peas.

Area E

Kilns

The assemblages from contexts (230) and (233) from kiln [217] were rich in material, but of mixed levels of preservation. Both assemblages were dominated by hulled barley grains, with a significant number in context (233) identifiable as 'straight'. Many others retained remnants of their 'hull' or lemma and palea. Occasional internodes were identifiable as 2-row barley (*Hordeum distichon*), with some retaining the lemma and palea. A moderate number of emmer / wheat grains and grass seeds were also preserved with occasional rye and oat grains, and occasional oat florets. Those in context (230) retained the characteristics of cultivated oat (*Avena sativa*). However those in context (233) were characteristic of the wild variety (*Avena sterilis*), including one grain still retained by the floret. The broken lemma's from oat florets and grasses were frequent to abundant in both assemblages, and embryo's were frequent in context (233). Charred seeds from context (230) were radiocarbon dated to AD1211-1376.

Post-medieval

Area B

Kilns

Kiln [147] was stone lined and adjacent to a boundary ditch (Ò'Maoldúin and Stevens, 2005). Upper fill (303) presented a rich and moderately diverse assemblage with the preservation state of grain and seeds ranging from good to poor. This was mirrored by the smaller assemblage from primary fill (302). *c.*45% of context (303) was composed of barley grains, typically hulled. Grass seeds (mostly large, or cereal grain sized) contributed to a further 42%. One glume of bread wheat was preserved with occasional grains and internodes of rye. Occasional grains of oat were preserved, but no florets were present. The remainder of the assemblage consisted of arable

weed seeds including stinking chamomile (*Anthemis cotula*), redshank (*Polygonum persicaria*), common hempnettle (*Galeopsis tetrahit*) and nipplewort (*Lapsana communis*); rough grassland taxa such as narrow-fruited cornsalad (*Valerianella dentata*) and viper's bugloss (*Echium vulgare*); and damp habitat taxa including sedge (*Carex* sp.), docks (*Rumex* sp.) and marsh St. John's wort (*Hypericum* cf. *elodes*) (table3).
Context (163) over-lay context (303) and was dominated by free-threshing wheat grains. Occasional grains of barley and grass seeds were also present. Charcoal and charred seeds were radiocarbon dated to *c.*AD1660-1953.

Area C

Kilns

Four fills from kiln [411] were sampled providing mixed results. Context (420) was sampled from the raking pit, and differed through having a greater proportion of weed seeds like ribwort plantain (*Plantago lanceolata*), orache, common chickweed (*Stellaria media*), stinking chamomile and woodruff (*Asperula* sp.). Hulled barley grains were present with occasional rounded wheat, rye and oat grains. Grasses were roughly proportionate to the barley grains. Contexts (419) and (526) provided moderate assemblages dominated by grains of hulled barley, including occasional 'straight' grains in context (526). Context (419) presented a large quantity of waterlogged elder seeds. Context (597) contained a single charred grass seed. Charred seeds from contexts (420) and (526) were radiocarbon dated to AD1667/1681-1953.

CORNAHER 3.5 (E2728)

Date Unknown

Kiln flue

Context (016) was the upper fill of kiln flue [012]. A small charred assemblage was preserved consisting of the seeds of meadow grass (*Poa* sp.), coriander (*Coriandrum* sp.), plantain and whitebeam (*Sorbus* sp.) (table 1).

CORNAHER 5 (E2730)

Date Unknown

Pits

Abundant charcoal was the only content from pit fill (002) cut [003].

CORNAHER 6 (E2731)

Date Unknown

Pits

No archaeobotanical remains were present from pit fill (003) cut [001].

HALLSPARK FARM 1 (E2749)

Bronze Age

Burnt Spread

Context (001) contained a single waterlogged bramble seed (*Rubus* sp.) (table 4).

Pits

Pit [003] was situated underneath burnt spread (001). One waterlogged seed of orache was recovered from its fill (048) (table 4).

HALLSPARK FARM 2.1-2.4 (E2750)

Medieval / Post-medieval

Kilns

Context (004) was the upper fill of kiln / oven [003] (Ó'Maoldúin and McKinstry, 2006b). It produced a poorly preserved assemblage, resulting in many of the seeds only being identifiable as belonging to the grass family. Occasional grains presented characteristics of oat and rye, and there were occasional grains of wheat / barley (table 4).

Post-medieval

Pits

*Context (078) was the secondary fill of pit [051] (Ó'Maoldúin and McKinstry, 2006b). A small charred assemblage of wheat grain was preserved with one rachis of bread wheat and one seed of vetch / pea (*Vicia / Pisum *sp.) (table 4).*

HALLSPARK FARM C (W. EXT.) (E2750)

Bronze Age

Pits

Upper fill (038) from pit [044] contained occasional waterlogged seeds of bramble (table 4).

Medieval

Pits

Lower fill (077) from pit [071] contained occasional waterlogged seeds of bramble.

KILAVALLY 8 (E2766)

Bronze Age

Fulachta fiadh

A moderate charred assemblage of hulled barley grains was present in context (001). Occasional grains of wheat were also preserved. *c.*25% of the assemblage was composed of indeterminate wheat / barley grains (table 1).

NTERPRETATION

Bronze Age

The Bronze Age sites were characterised by *Fulachta Fiadh* and associated features. The absence of charred material aside from charcoal is common on contemporary sites, as seen at Causestown, Co. Meath (Vaughan-Williams, 2005a) and Curraghatoor, Co. Tipperary (Monk, 1987). In general, the troughs underneath the *Fulachta Fiadh* are thought to have held water (Edwards, 1996). This may have acted to preserve seeds blown in or deposited from firewood prior to being burnt. Waterlogging would have been particularly viable at Ballykilmore 5.1 and 5.3, Cappanrush 1and Hallspark Farm 1, which were all located within waterlogged and / or wetland landscapes (Ó'Maoldúin and Hardy, 2006; Ó'Maoldúin and McKinsky, 2006a, b). Brambles (blackberries and raspberries) would have been ubiquitous as today, and they are believed to have been an important part of the Bronze Age diet along with nuts (Harding, 2000).

Early Christian / Medieval

The monastic site of Clonfad 3 was the only site to have Early Christian features sampled. The assemblages were small, however they indicate hulled barley, wheat and lentils were cultivated. The lack of oat florets means that it is uncertain whether the oat grains were the cultivated or wild species. Documentary evidence from the *Bretha a Déin Chécht* (Judgements of Dían Décht) (Binchy, 1966) records that wheat, barley, rye and oat were all common cereals. However they were ranked via their quality to status. As such wheat was the preserve of people such as supreme kings, and barley was reserved for the strong farmer or *bocaire* (Binchy, 1966; Monk, 1991; Edwards, 1996).

The most common cereal recovered from Early Christian sites is 6-row barley *(Hordeum vulgare)* followed by rye (Monk, 1984, 1985/6; Rynne, 1993; Edwards, 1996), as found at Antrim (Vaughan-Williams, 2005b) , Lackenavorna, Co. Tipperary and Oughtymore, Co. Derry (Monk, 1984). During the Early Christian period both of these cereals would have contributed to the monastic diet in products such as the loaf *secundarius* (Dembinska, 1986; Sexton, 1988). The small sample sizes and subsequently small assemblages recovered from Clonfad 3 mean that it is not possible to determine any links to persons of high status. The retrieval of these items from ditches, pits and wells indicates that they were used for the disposal of rubbish, including domestic detritus such as hearth rakings. Domestic dwellings or activities were therefore situated in the immediate vicinity.

Medieval

Kilns

Kilns became increasingly common through the medieval period due to the benefits of parching (drying) damp harvests prior to crop-processing and storage. These benefits included ripening the grain; minimising the growth of bacteria; reducing grain germination; and hardening the grain. The last point was particularly beneficial during milling (Edwards, 1996; Hurley and Sheehan, 1997; O'Keefe, 2000; Kelly, 2000). Threshing also becomes more effective as the chaff becomes more brittle. The popularity of kilns is demonstrated through their increasing numbers recovered across Ireland such as at Waterford (Tierney and Hannon, 1987), Rathdown Upper, Co. Wicklow (Vaughan-Williams, 2005c) and at Mill Island, Co. Kilkenny (Stevens and O'Meara, n.d.)

The medieval samples taken along this section of the N6 focused on the kilns present at Clonfad 3 and Hallspark Farm 2.4. Overall the assemblages presented concurring results, with hulled barley the dominant cereal. The presence of 2-row barley internodes and a number of 'straight' grains suggests the cultivation of this species as opposed to 6-row barley, which ideally produces 'straight' and 'twisted' grains at a ratio of 2:1 in the field. Although present in low quantities, bread wheat, rye, oat, lentils, the garden pea and parsnip were all cultivated. The florets of wild and cultivated oat at Clonfad 3 suggest it was present as an arable weed as well as potentially cultivated.

The samples from kilns [147] and [217] at Clonfad 3 presented assemblages with a mixture of well-preserved and badly damaged items. Studies on the effect of charring on different cereal grains, chaff, and weed seeds have shown that unprocessed hulled barley and glume wheats are damaged less than their cleaned or naked / free-threshing counterparts. This is due to the 'hull' or glume protecting the grain. Similarly larger items like the seeds of grasses and brambles tend to survive the intensity of a fire more complete than the smaller weed seeds and chaff (Boardman and Jones, 1990; Gustaffson, 2000). The studies have also shown that the more intense a fire, the more damaged the items become. Subsequently there is an inverse relationship between the number of fires and the preservation of material.

These kiln assemblages contained the lightest fractions, i.e. lemma and palea, with barley grains still held by the hull; oat grains still attached to their glumes; and chains of barley internodes. This is strong evidence for their being dried prior to processing, i.e. before the stages of threshing, winnowing or sieving (*see* Hillman, 1981, 1984; Jones, 1984). The fact that the most delicate items were preserved alongside damaged, unprocessed grain means that the latter must have been subject to more than one firing event, and also that waste was thrown on the dying embers. It also indicates the hearth was not raked out after every drying event. A similar situation was found at Waterford (Tierney and Hannon, 1987, 884).

The kiln assemblages at Clonfad 3 and Hallspark Farm 2.4 provided mixed assemblages of grain, pulses, chaff and arable weed seeds. The seeds represented characteristic arable weeds. It is probable that they became charred either through dropping into the hearth during parching; or following separation of the grain from the chaff prior to storage and / or use, the chaff may have been used as kindling (Hillman, 1981, 1984; Jones, 1984; Kelly, 2000). However the likelihood of the latter surviving is low, and the mixed nature of the assemblage is indicative of the assemblage having caught fire during the process of drying. A few of the assemblages appear to be 'clean',

i.e. there were no or few seeds or chaff. However these assemblages contained low quantities of material, and probably reflect biased preservation.

Whilst barley dominated the assemblages, the significant presence of bread wheat is worth noting as it is believed to have increased in popularity throughout this period. The presence of pulses is also evidence for these features being post-Early Christian in date, as they were introduced by the Normans, along with rotation agriculture (Kelly, 2000; Spencer, 2004). Overall, the assemblages indicate that at Clonfad 3 and Hallspark Farm 2.4 practised a rotation-system of farming, with 2-row barley one of the main crops cultivated. Although barley was commonly used to brew beer (Kelly, 2000), no sprouted grains were present.

Metal working

Several pits and two bowl furnaces associated with metal-working were sampled from the site of Ballykilmore 6. The assemblages were small and did not differ from contemporary features on the site.

Post-medieval

Ballykilmore 6 and Clonfad presented post-medieval samples from pits and kilns. The trend of both hulled barley and bread wheat being cultivated is continued with barley dominating the assemblages overall. The presence of garden peas, lentils and seeds from the cabbage family indicates pulses were still cultivated. Although grain-drying kilns are typically associated with the Early Christian and medieval period, they continued to be used through the post-medieval period. For example, air-drying bricks were recovered from the old water-mill at Mill Island, Kilkenny (01E0608) (Stevens and O'Meara, n.d.); and possible grain-drying kilns were identified at Charlotte's Quay (R581573) (Tarbett and Wiggins, n.d.) and at Dean's Court (02E1370) (Stevens and Slater, n.d.), Irishtown, Limerick. There is also documentary evidence such as the 'corn kiln' recorded on an 1839-42 map of the River Breagagh, Gardens, Kilkenny (00E0406 ext.) (Stevens, n.d.).

Date unknown

Kiln [012] from the site of Cornaher 3.5 was capped by burnt limestone, quicklime and charcoal (Ó'Maoldúin and McKinstry, 2006c), suggesting it functioned as a lime kiln rather than as a grain-drying kiln. The occasional seeds recovered from fill (016) colonise both wild and arable habitats, and whitebeam would have been found in both woodland and hedgerows. Therefore the assemblage could represent grassland and / or an arable environment. The sample did not contain any evidence for the activity of grain drying. The assemblage may be the remains of material used as fuel, possibly from the peat itself.

DISCUSSION AND CONCLUSIONS

Fulachta fiadh are common features from the Bronze Age, but typically provide minimal evidence relating to their function, let alone economic or dietary evidence, as here. They suggest only the gathering and consumption of wild berries. The assemblages from Clonfad 3 indicate that rotation agriculture was being practised through alternating cereals, pulses and fallow. Barley appears to remain the favoured cereal from the late Early Christian / medieval period through to the post-medieval period. The evidence from both periods also indicates that the kilns were used to dry cereals as well as pulses. They also concur with contemporary evidence that the harvests were not cleaned prior to drying.

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Table 1: Species list for N6, Kilbeggan to Kinnegad, Co. Westmeath

			E#	E2709	E2717	E2722	E2722	E2728	E2730	E2731	E2766
			Sample	1	9	7+8	2	3	2	1	16
			Context	001	025	005	009	016	002	003	001
			Cut	-	-	-	006	012	003	001	-
			Feature	Spread	Spread	Layer	Trough	Kiln flue	Pit	Pit	*Fulachta fiadh*
			Period	Bronze Age	Bronze Age	Bronze Age	Bronze Age	UD	UD	UD	Bronze Age
Taxa	Item	Common name									
Atriplex sp.	seed	Orache									
Rubus sp.	seed	Bramble			1						
Sorbus sp.	seed	Whitebeam				1		2			
Vicia / Pisum sp.	seed	Vetch / pea									
Coriandrum sativum	seed	Coriander						1			
Plantago lanceolata	seed	Ribwort plantain						1			
Poa sp.	seed	Meadow grass						7			
cf. *Avena* sp.	grain	Oat									
cf. *Secale cereale*	grain	Rye									
Hordeum sp.	grain	Hulled barley									116
Triticum sp.	grain	Wheat									7
Triticum aestivum	glume base	Bread wheat									
Triticum / Hordeum sp.	grain	Wheat / barley									33
Poaceae indet.	seed	Grasses						2			
Indet.	bud						1				

Key:

Preservation:
1 charred
1 waterlogged

Period:
UD undated
? unknown

Table 2: Species list for N6, Kilbeggan to Kinnegad, Co. Westmeath

			E#	E2798	E2798	E2798	E2798	E2798	E2798	E2798	E2798	E2798	E2798
			Sample	212	211	62	94	116	807	186	129	122	806
			Context	171	186	-	538	-	1321b	1017a	371	609	2034
			Cut	168	184	352	533	755	1321	1017	-	761	2029
			Feature	Bowl furnace	Bowl furnace	Posthole	Pit	Pit	Pit	Pit	Layer	Ditch	Pit
			Period	Med	Med	Med	Med	Med	Med	Med	Med	Med	Post-med
Taxa	Item	Common name	Area	A	A	A	A	A	A	A	A	A	A
Corylus avellana	seed	Hazelnut			1		1						
Polygonum avicularia	seed	Knotgrasses							1				
Rubus sp.	seed	Bramble										1	
Pisum sativum	seed	Garden pea		1									37
Stachys sp.	seed	Woundwort										2	
Asperula arvensis	seed	Blue woodruff										5	
Poaceae indet.	seed	Grasses		4		1					4		1
Avena sp.	grain	Oat						11			2		
cf. *Secale cereale*	seed	Rye					1						
Hordeum sp.	grain	Straight hulled barley							1		7		
Hordeum sp.	grain	Hulled barley		1				23	1		42		
Hordeum sp.	grain	Barley		7									
Triticum cf. *aestivum*	grain	Bread wheat											42
Triticum cf. *dioccum*	grain	Emmer wheat									4		
Triticum dicoccum / aestivum	grain	Emmer / bread wheat						2					
Triticum sp.	grain	Wheat		1									
Hordeum / Triticum sp.	grain	Barley/ wheat		7		1							

Key:

Preservation:
1 charred
1 waterlogged

Period:
UD undated
? unknown
Med medieval

Table 3: Species list for N6, Kilbeggan to Kinnegad, Co. Westmeath

		E#	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723
		Sample	60	61,102, 146, 149	104,147,150	207	120	138	122	270	277	279	280	318	218	219	208	206	296	264	297
		Context	163	230	233	291	302	303	305	340	358	360	361	387	419	420	463	473	526	571	597
		Cut	147	217	217	287	147	147	101	585	362	362	362	362	411	411	462	287	411	605	411
		Feature	Kiln	Kiln	Kiln	Well	Kiln	Kiln	Ditch	Well	Kiln	Kiln	Kiln	Kiln	Kiln	Kiln	Pit	Well	Kiln	Ditch	Kiln
		Period	Post-medieval	Medieval	Medieval	Early Christian	Post-medieval	Post-medieval	Early Christian	Early Christian	Medieval	Medieval	Medieval	Medieval	Post-medieval	Post-medieval	Early Christian	Early Christian	Post-medieval	Early Christian	Post-medieval
		Rc date	AD1660-1953	AD1211-1376												AD1681-1953	AD723-889		AD1667-1953		
Taxa	Item	Common name	Area	B	E	E	D	B	B	B	C	A	A	A	A	C	C	D	D	C	D	C
cf. *Pinus* sp.	seed	Pine								1											
Ranunculus cf. *repens*	seed	Creeping buttercup							1												
Papaver cf. *dubium*	seed	Long-headed poppy							1												
Papaver sp.	seed	Poppy							1												
Atriplex sp.	seed	Orache			48	25			20	1				130			7				
Atriplex / Chenopodium sp.	seed	Orache / goosefoot						3													
Chenopodiaceae indet.	seed	Goosefoot family						2		1											
Stellaria media	seed	Common chickweed														3					
Stellaria gramineae	seed	Lesser stitchwort				1			1					208		1					
Carex sp.	seed	Sedges														2					
Polygonum persicaria	seed	Redshank				2			6					156	4						
Polygonum cf. *hydropiper*	seed	Waterpepper			4																
Polygonum minus	seed	Small waterpepper			6					1											
Polygonum aviculare	seed	Knotgrasses				1															
Fallopia convolvulus	seed	Black bindweed			1	3															
Polygonum sp.	seed	Knotweeds			3																
Rumex acetosella	seed	Sheep's Sorrel			5	2				1				117	1						
Rumex crispus	perianth + seed	Curled dock				1															
Rumex cf. *crispus*	seed	Curled dock			7	9								1781	25	3					
Rumex cf. *palustris*	seed	Marsh dock				1															
Rumex sp.	seed	Dock					1	4													
Hypericum cf. *elodes*	seed	Marsh St. John's wort						3													
Malva sp.	seed	Mallow												39							
Helianthemum sp.	seed	Rock rose				2									3						
cf. *Viola* sp.	seed	Violet					1														
Brassica rapa ssp. *campestris*	seed	Wild turnip			2								1937	115		9					
Brassica / Sinapsis sp.	seed	Cabbage / mustard					1		6				676								
Brassicaceae indet.	seed	Cabbage family		1				2													
Rorippa microphylla	seed	Narrow-fruited water-cress												1							
Cochlearia sp.	seed	Scurvygrass												1							
Salix sp.	seed	Willow												1							
Vicia / Lathyrus sp.	seed	Vetch / pea				26							20	1							
Lens culinaris	seed	Lentil				1		1		2	2		28			3					
Pisum sativum	seed	Garden pea			2	1		2					528			5					
cf. *Pisum* sp.	seed	Pea				1						3									
Fabaceae indet.	segment	Pea family		1					1							5					
Pastinaca sativa	seed	Parsnip											130								
Convolvulus tricolour	seed	Field bindweed											39								
Echium vulgare	seed	Viper's bugloss						1													
Stachys sylvatica	seed	Hedge woundwort				1															
Galeopsis tetrahit	seed	Common hempnettle				3		2					676	19							
Galeopsis sp.	seed	Hempnettle			2	1															
Plantago lanceolata	seed	Ribwort plantain						1								14					
cf. *Campanula* sp.	seed	Bellflower			1																
Asperula arvensis	seed	Blue woodruff				2															
Asperula sp.	seed	Woodruff			6											4			1		
Asperula / Galium sp.	seed	Woodruff / Bedstraw		1																	
Sambucus nigra	seed	Elder													103						
Valerianella dentata	seed	Narrow fruited cornsalad						63													
Cirsium sp.	seed	Thistles					1														
Lapsana communis	seed	Nipplewort				3		5					1443	9							
Picris echinoides	seed	Bristly ox-tongue											26								
cf. *Crepis* sp.	seed	Hawk's beards														1					
Anthemis cotula	seed	Stinking chamomile			35	16		10	9	2			754	4		10					
Chrysanthemum segetum	seed	Corn marigold			2	2															
Juncus sp.	seed	Reed						2					6630			2					
Poaceae indet.	seed	Grasses		6	238	4		72	479	29		3		10547	21	3	85	2			1	1
Avena sativa	floret base	Cultivated oat			8																
Avena sterilis	seed and floret	Wild oat				1															
Avena sterilis	floret	Wild oat				6								39							
Avena sp.	grain	Oat				2				12				28			1				
cf. *Avena* sp.	grain	Oat			9	14			12		1										
Avena sp.	lemma	Oat			A	F															
Avena / Secale sp.	grain	Oat / rye				13															
cf. *Bromus* sp.	seed	Brome																	5		
Hordeum sp.	grain	Straight hulled barley				128						5		180	34				12		
Hordeum sp.	grain	cf. straight hulled barley			7																
Hordeum sp.	grain	Twisted hulled barley			1										2						
Hordeum sp.	grain	Hulled barley		2	1121	661		40	64	44	1		46	6894	233	3	66	4		54		
Hordeum sp.	grain	cf. hulled barley							455												
Hordeum sp.	grain	Barley		5	60			5				1		5796	730	7					

Table 3: Species list for N6, Kilbeggan to Kinnegad, Co. Westmeath

			E#	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723	E2723
			Sample	60	61,102, 146, 149	104,147,150	207	120	138	122	270	277	279	280	318	218	219	208	206	296	264	297
			Context	163	230	233	291	302	303	305	340	358	360	361	387	419	420	463	473	526	571	597
			Cut	147	217	217	287	147	147	101	585	362	362	362	362	411	411	462	287	411	605	411
			Feature	Kiln	Kiln	Kiln	Well	Kiln	Kiln	Ditch	Well	Kiln	Kiln	Kiln	Kiln	Kiln	Kiln	Pit	Well	Kiln	Ditch	Kiln
			Period	Post-medieval	Medieval	Medieval	Early Christian	Post-medieval	Post-medieval	Early Christian	Early Christian	Medieval	Medieval	Medieval	Medieval	Post-medieval	Post-medieval	Early Christian	Early Christian	Post-medieval	Early Christian	Post-medieval
			Rc date	AD1660-1953	AD1211-1376												AD1681-1953	AD723-889		AD1667-1953		
Taxa	Item	Common name	Area	B	E	E	D	B	B	B	C	A	A	A	A	C	C	D	D	C	D	C
cf. *Hordeum* sp.	grain	cf. barley								22												
Hordeum / Triticum sp.	grain	Barley / wheat				29				30	2			10734	280			4				
Hordeum distichon	internode	2-row barley			1	16								65								
Hordeum distichon	internode	cf. 2-row barley			2				1					156	1							
Hordeum sp.	internode	Barley			1	12																
Secale cereale	grain	Rye				5																
cf. *Secale cereale*	grain	Rye			26				8	2				360								
Secale cereale	internode	Rye							3					114			2					
Triticum aestivum	glume	Bread wheat				2								559								
Triticum cf. *aestivum*	glume	Bread wheat							1													
Triticum dicoccum / aestivum	grain	Emmer / bread wheat				172					17		4	39								
Triticum sp.	grain	Free threshing wheat		230				20									4					
Triticum sp.	grain	Wheat			13					22		7				1						
Cereale indet.	embryo				2	F																
Cereale indet.	culm node											1										
Cereale indet.	lemma					2																

Key:
Preservation:
1 charred
1 waterlogged

Table 4: Species list for N6, Kilbeggan to Kinnegad, Co. Westmeath

			E#	E2749	E2749	E2750	E2750	E2750	E2750
			Sample	6	1	56	2	2	1
			Context	001	048	078	004	038	077
			Cut	-	003	051	003	044	071
			Feature	Spread	Pit	Pit	Kiln / oven	Pit	Pit
Taxa	Item	Common name	Period	Bronze Age	Bronze Age	Post-med	Med / Post-med	Bronze Age	Med
Atriplex sp.	seed	Orache			1				
Rubus sp.	seed	Bramble		1				1	11
Sorbus sp.	seed	Whitebeam							
Vicia / Pisum sp.	seed	Vetch / pea				1			
Coriandrum sativum	seed	Coriander							
Plantago lanceolata	seed	Ribwort plantain							
Poa sp.	seed	Meadow grass							
cf. *Avena* sp.	grain	Oat					3		
cf. *Secale cereale*	grain	Rye					3		
Hordeum sp.	grain	Hulled barley							
Triticum sp.	grain	Wheat				10			
Triticum aestivum	glume base	Bread wheat				1			
Triticum / Hordeum sp.	grain	Wheat / barley					4		
Poaceae indet.	seed	Grasses					15		
Indet.	bud								

Key:

Preservation:
1 charred
1 waterlogged

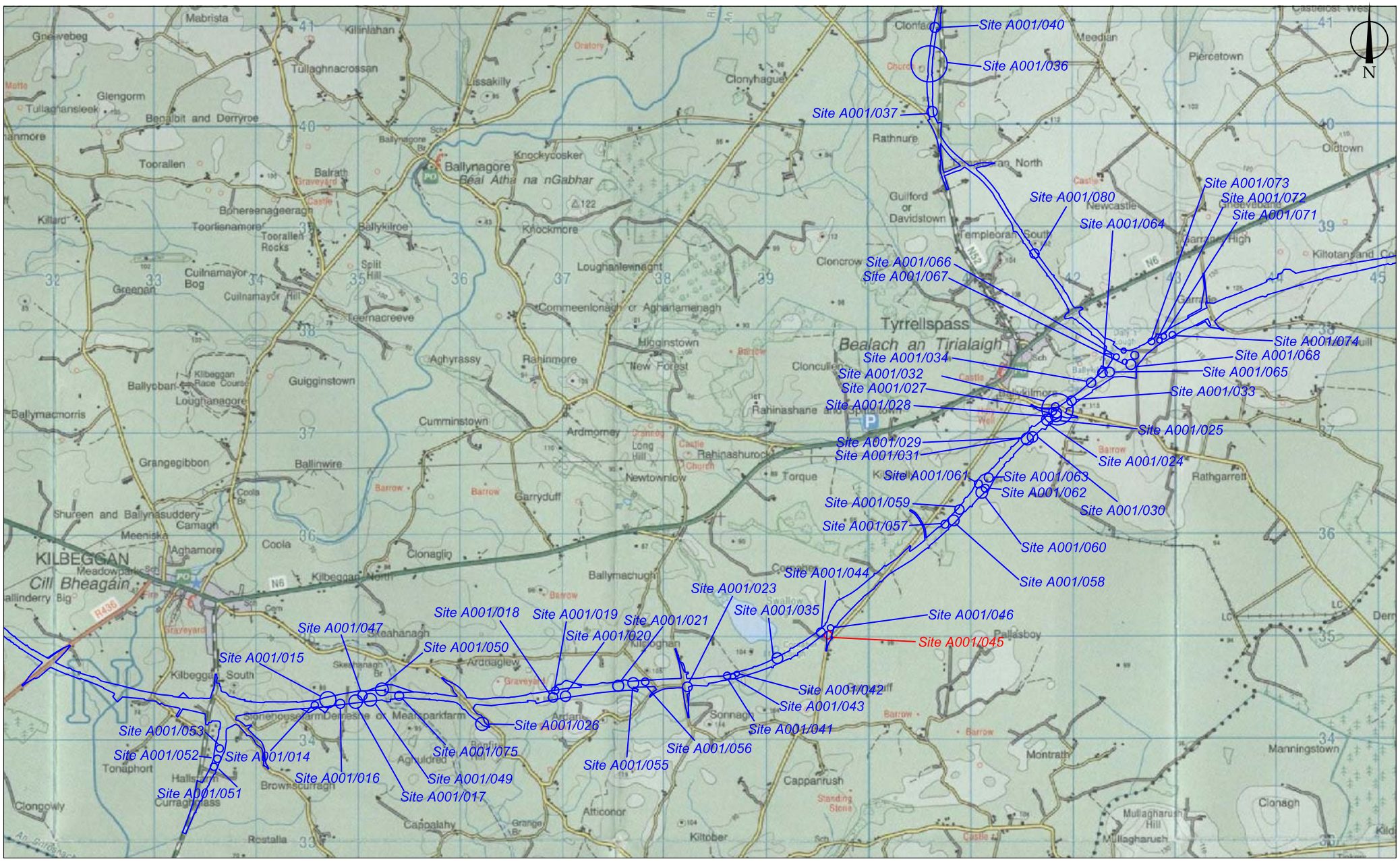
Other:
UD undated
? unknown
Med medieval

PLATES

PLATE 1: A pre excavation shot of the site.

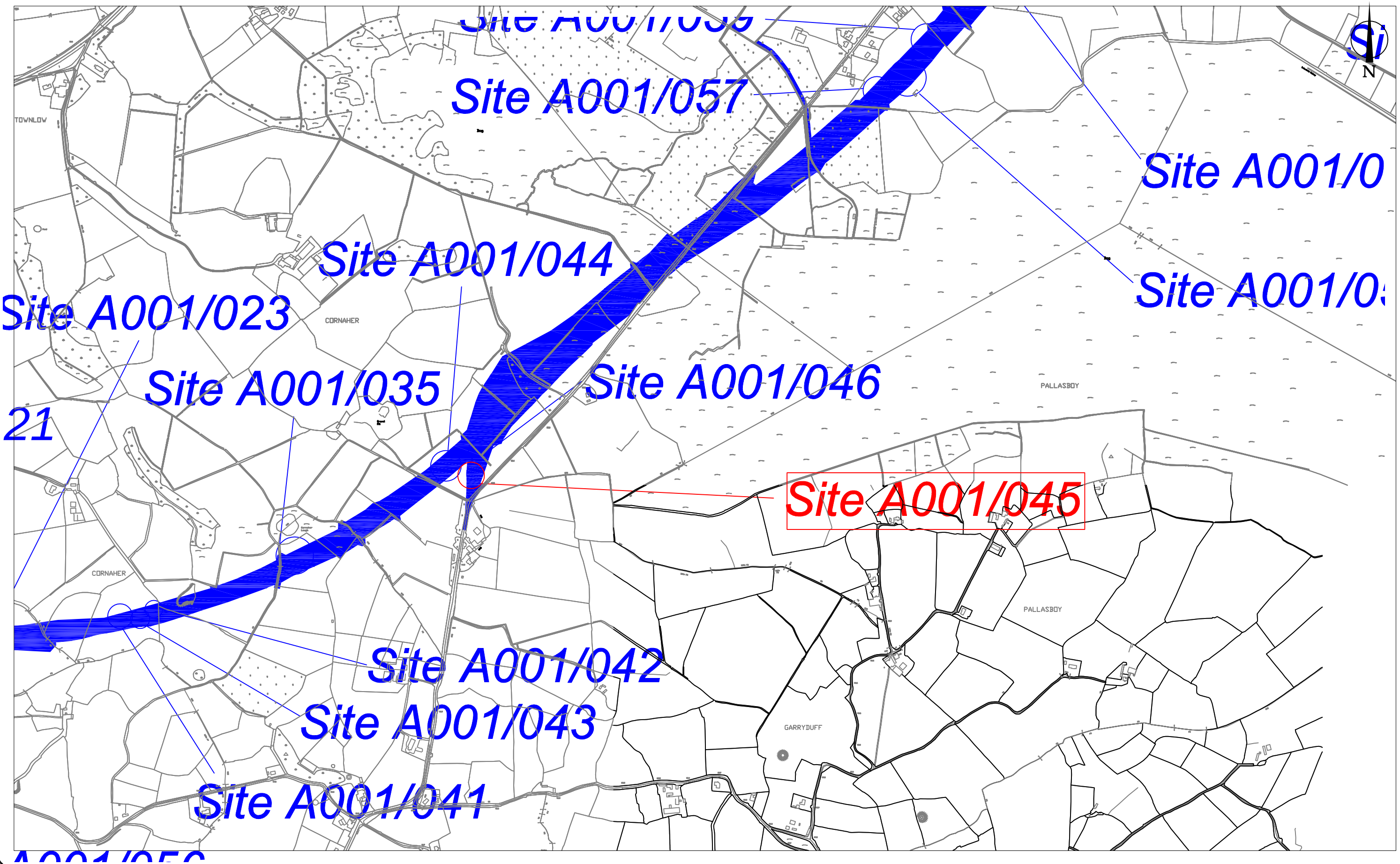
PLATE 2: A shot of C3 mid excavation.

FIGURES



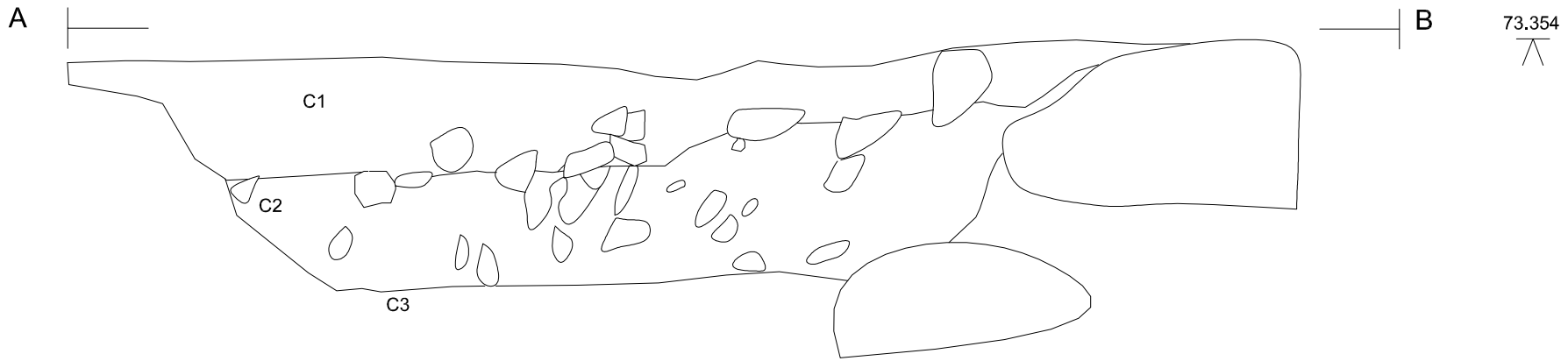
Title	Notes	Job/Exc No.	Compiled by	CAD reference	Client
E2730 A001/045 Location map		1112-04-400	A.Burke	A001/045 Figure 1	Westmeath County Council
		Date: 23 July 07	Scale: 1:50000	Drawing No.: Figure 1	Project: N6 Kinnegad-Kilbeggan

Valerie J. Keeley Ltd.
Archaeological Consultancy
Brehon House
Castlecomer
Co. Kilkenny.
Tel: (+353) 056 4440236
Fax: (+353) 056 4440237
email: vjk@vjk.ie



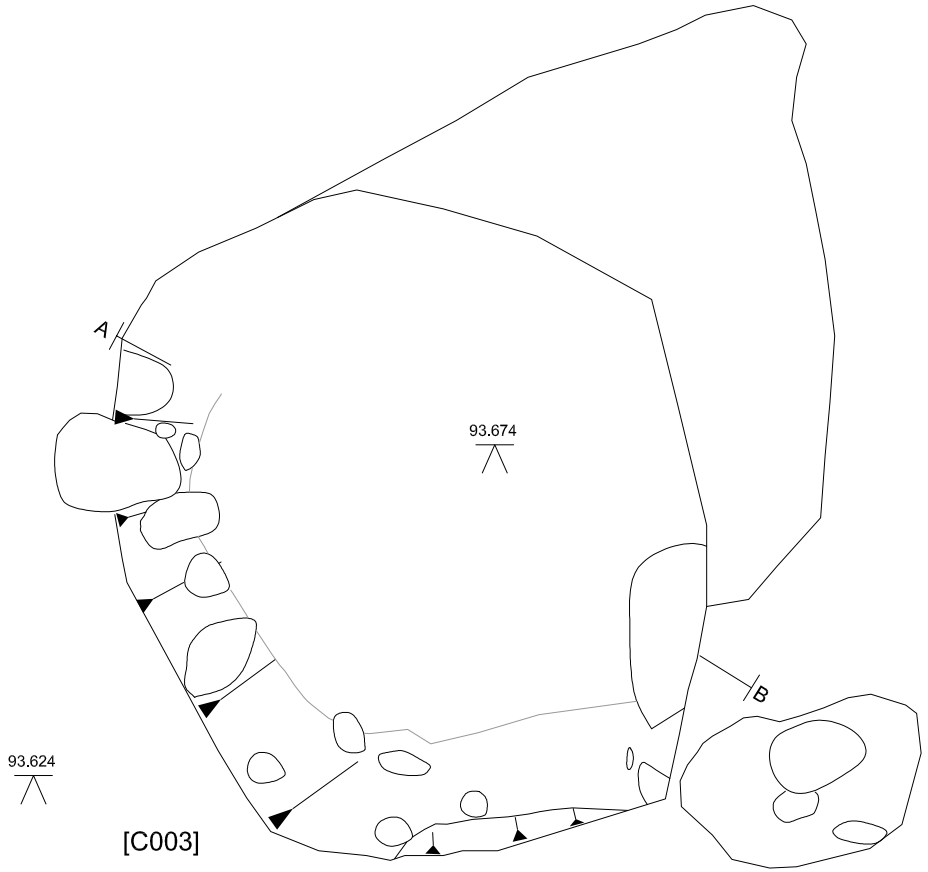
Title	Notes	Job/Exc No.	Compiled by	CAD reference	Client
E2730 A001/045 OS base map showing site and route location		1112-04-400	A.Burke	A001/045 Figure 2	Westmeath County Council
		Date 25 July 07	**Scale** 1:10000	**Drawing No.** Figure 2	**Project** N6 Kinnegad-Kilbeggan

Valerie J. Keeley Ltd.
Archaeological Consultancy
Brehon House
Castlecomer
Co. Kilkenny.
Tel: (+353) 056 4440236
Fax: (+353) 056 4440237
email: vjk@vjk.ie



Title	Notes	Job/Exc No.	Compiled by	CAD reference	Client
E2730 A001/045 West facing section of pit [c3]		1112-04-400	CMcN	A001/045 Figure 3	Westmeath County Council
		Date 23/08/07	**Scale** 1:5	**Drawing No.** Figure 4	**Project** N6 Kinnegad- Kilbeggan

Valerie J. Keeley Ltd.
Archaeological Consultancy
Brehon House
Castlecomer
Co. Kilkenny.
Tel: (+353) 056 4440236
Fax: (+353) 056 4440237
email: vjk@vjk.ie



Title	Notes	Job/Exc No.	Compiled by	Cad Reference	Client
E2730 A001/045 Mid-excavation plan of [c3]		1112-04-400	CMcN	A001/045 Figure 4	Westmeath County Council
		Date 23/08/07	**Scale** 1:20	**Drawing No.** Figure.4	**Project** N6 Kinnegad - Kilbeggan

Valerie J. Keeley Ltd.
Archaeological Consultancy
Brehon House
Castlecomer
Co. Kilkenny.
Tel: (+353) 056 4440236
Fax: (+353) 056 4440237
email: vjk@vjk.ie