Results of Archaeological Excavation

Community Archaeological Excavation at Kilmocholmóg Field, Lurgan, County Armagh

Planning Ref:	Licence Number:	Author:
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Executive Summary

County:	Armagh
Site name:	Kilmocholmóg Field, Lurgan
Sites and Monuments Record No:	ARM006:016
Licence Number:	AE/22/089
Site type:	Greenfield
ITM:	7109898, 860504
Irish Grid Reference:	E309966, N360507
Planning Reference:	N/A
Date of Excavation:	22nd- to 26th August 2022

This report is designed to present the results of a community archaeological excavation that was carried out at a site known as Kilmocholmóg field, northwest of the Kilmore Road, Lurgan, County Armagh. The excavation took place between the 22nd and 26th August 2022. Six test trenches were excavated across the site.

Archaeologists from Northern Archaeological Consultancy Ltd, working in partnership with local community volunteers though the Lurgan Township Heritage Scheme, undertook an excavation at a site believed to contain the remains of an ancient church and graveyard. The project was funded by the Armagh City, Banbridge and Craigavon Borough Council and The National Lottery Heritage Fund through the Lurgan Townscape Heritage Scheme; and the Department for Communities: Historic Environment Division.

The investigation area is named Kilmocholmóg that translates as '*my little Colmán's church'*. This place name evidence, local tradition and previous research implied that the site may contain the sub surface remains of an ecclesiastical site. There is a folk memory that a graveyard was located within the field and was in use until the 1840's when the trainline from Belfast to Armagh cut across it.

Geophysical analysis of the field was undertaken in late 2021 by academics from Queen's University Belfast, who identified a large right-angled anomaly. Archaeological investigation of this determined it to be the remains of a collapsed souterrain dating to the early medieval period. Other material uncovered included a subsoil cut feature, worked stone and rubble that may originate from a structure, and coarse pottery dated to the early medieval period. Furthermore, iron slag recovered indicates metalworking was taking place within the vicinity of the site. At this stage it is impossible to determine if the remains are ecclesiastical or secular in nature. In addition to the above, several pieces of struck flint were also recovered from the excavated trenches. The presence of these may suggest a much earlier prehistoric origin to the site. It is hoped that the results of this excavation will form part of a wider project design for a larger community archaeological project at Kilmocholmóg field.

ACKNOWLEDGEMENTS

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A special thank you is required for all the community volunteers who participated. It was due to their help, enthusiasm and hard work that the project a resounding success. Furthermore, all those who visited the site and took an interest in project. Finally funding for the project was generously provided by the Armagh City, Banbridge and Craigavon Borough Council and The National Lottery Heritage Fund through the Lurgan Townscape Heritage Scheme; and the Department for Communities: Historic Environment Division.

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1 INTRODUCTION

1.1 An Archaeological Written Scheme of Investigation was prepared in June 2022 by Northern Archaeological Consultancy Ltd, having been commissioned by Lurgan Townscape Heritage Scheme to provide onsite archaeological testing of geophysical anomalies and promising topographical locations within Kilmocholmóg field. This fieldwork was to act as both a community outreach project and be a preliminary investigation to determine the viability of a future larger community excavation at the site. This report will detail the results of the archaeological investigation that was carried out between the 22nd of August to the 26th of August 2022.

1.2 Six hand excavated test trenches were opened across the investigation area. Two of these were targeted on a large right-angled anomaly detected during a geophysical survey undertaken in late 2021, whilst four others were positioned across promising topographical locations. All six trenches were fully excavated to either the natural glacial subsoil or archaeological deposits whichever was encountered first.

1.3 Archaeological investigation of the right-angled anomaly determined it to be the remains of a collapsed souterrain dating to the early medieval period. Other material uncovered at the site included, a subsoil cut feature, worked stone and rubble that may originate from a collapsed building, and souterrain ware pottery. All of these have been dated to the early medieval period. Furthermore, iron slag recovered from the site indicates metalworking was taking place within the vicinity, likely dating to the same era. It is believed that these finds represent the remains of early medieval settlement. At this stage it is impossible to determine if the remains are ecclesiastical or secular in nature. In addition, thirteen pieces of struck flint recovered from the excavated trenches may suggest a much earlier prehistoric origin to the site.

1.4 It is hoped that the results of this excavation will form part of a wider project design for a larger community archaeological project at Kilmocholmóg field.

2 LOCATION AND PHYSICAL SETTING

LOCATION

2.1 The site lies approximately 1.5km to the northeast of Lurgan, 500m to the northwest of the Kilmore Road, on the south-eastern side of the main rail line to Portadown. The site lies in the townland of Donagreagh (*Dún na Greagha* 'fort of the stud') in the parish of Magheralin, the barony of Oneilland East, and the county of Armagh (Figure 1 and 2)

2.2 The field which is to be the main subject of the investigations is approximately 130m by 160m, and lies on bedrock of the Lower Basalt Formation, overlaid by subsoil of diamicton till with a localised northwest

to southeast area of alluvium running along the northeastern boundary. The site lies between the 30m and 40m OD contours, with a low ridge running southeast to northwest through the site, with lower waterlogged ground to the northeast.

3 GEOPHYSICAL AND DRONE SURVEY

3.1 A 2022 report on the proposed investigation site detailed the results of geophysical analysis and an accompanying drone survey. This highlighted several anomalies shown by ground-penetrating radar (Ruffell, 2021, Appendix 7). These investigated the field in general but focused in the area around the NISMR point ARM006:016. Analysis of the orthographic imagery from the drone flights indicated a potential right angled anomaly in the northwest of the area, which was then subjected to two phases of GPR survey. This survey showed that the bulk of the ground was without significant anomalies, though a significant anomaly stretching NE to SW was noted, potentially corresponding with a line of stones observed in the field. Five possibilities were laid out for this:

- An igneous dyke,
- A NE-SW oriented fault,
- A land drain,
- A remnant of railway construction (the feature is parallel to the railway),
- Another linear feature.

3.2 The right-angled arm of the anomaly to the west of the linear anomaly was confirmed by the Phase 2 survey, and considered to be potentially:

- The convergence of two land drains, although it is noted that these drains are not in the wetter areas of the site and are in a currently well-drained position.
- The footprint of a more recent building rather than any earlier structure.

3.3 The Geophysics report concludes with the recommendation that the archaeological excavation of two or three trenches intersecting these anomalies would have the advantages of establishing the makeup of these and recovering any associated artefacts and samples which may aid with further identification and dating.

3.4 The drone survey also showed apparent traces of 'lazy beds' running northeast to southwest across the site, indicating post medieval agriculture within the field.

4 AIMS AND OBJECTIVES

4.1 As per the recommendation of the geophysical survey report Lurgan Townscape Heritage Scheme appointed Northern Archaeological Consultancy Ltd to investigate the anomalies detected in Kilmocholmóg field. A Written Scheme of Investigation was produced in July 2022 and submitted to the Department for Communities: Historic Environment Division (DfC: HED) for consultation and approval. DfC: HED authorized the excavation and issued an excavation license AE/22/089.

4.2 The Written Scheme of Investigation recommended the excavation of a small number hand dug test trenches. These were to help clarify the archaeological potential of Kilmocholmóg field, the nature of any archaeological remains indicated by the geophysical survey and historical implications of the placename evidence and local tradition. Test trenches were targeted on geophysical anomalies and topographically promising locations within the field. The objectives of these trenches were to:

1) Determine the exact nature of the anomalies on the geophysics results.
2) Test the field in question for other evidence related to the history of the site.
3) Give an initial baseline of community engagement levels by allowing volunteers to assist with the limited trenching under full archaeological supervision.
4) Determine which areas may or may not prove suitable for a larger future community excavations or other community projects.

5 RESULTS OF ARCHAEOLOGICAL EXCAVATION

5.1 The excavation was led and supervised by professional archaeologists from Northern Archaeological Consultancy Ltd with most of the excavation work and recording being carried out by local volunteers. Six test trenches were excavated across the site, four on topographically promising locations (TT1, TT2, TT5, TT6) and two across geophysical anomalies (TT3 and TT4) (Figure 2 and 7).

5.2 Prior to excavation both the LIDAR and drone survey indicated the presence of 'lazy beds' crossing the site on a northwest to southeast orientation (Figure 3 – 5). These indicate post-medieval agriculture within the field. All the trenches excavated produced sherds of 17th to early 20th century glass and pottery. This included Blackware's, Ironstonewares, Glazed Red Earthenwares, Red Stonewares, Stamped Spongewares and Willow Pattern pottery (Plate 1) (Appendix 2). All these small fragments were found within the trenches topsoil horizon and are likely related to middening and fertilization of the 'lazy beds'.

5.3 Two clay pipe stems were also recovered from Trenches 1 and 5 within the topsoil horizon (Plate 2). The presence of these gives a terminus post quem of c.1580. The consumption of tobacco in Europe began in the late 16th century with shipments arriving from newly established colonies in the Americas.

During the 17th century local manufacturing of pipes began (Gojak & Stuart 1999, 38). Over time as tobacco became more readily available, and cheaper pipes changed shape and pipe bowls generally got bigger. This evolution, and the fact that clay pipes were an everyday product, easily discarded but durable enough to survive hundreds of years makes them one of the most ideal artefacts for dating and understanding archaeological sites. Based on the robustness of the two stems it seems likely these are associated with 19th to 20th century pipes.

TRENCH 1

5.4 Test Trench 1 was located at the summit of a low rise in the northwest corner of the field. The trench was 'L' shaped and was oriented northeast to southwest and measured 5 square meters (Plate 3). Excavation uncovered a simple stratigraphic sequence, the topsoil [101] a light brown silty clay loam was removed on to a firm yellowish orange stony clay [102]. No subsoil cut features were uncovered within this trench, however at the north-eastern end four pieces of Souterrain Ware pottery were recovered (Plate 4). Souterrain Ware is a locally produced, handmade, coil-built vessel type, typically used for cooking and is most frequently found in the northeast of Ireland. It has a date range of 7th to 12th century (Edwards 1996, 73–75) (Appendix 3). It was due to the presence of this pottery a 1m-by-1m extension was added at the north-eastern end, on the southern side. It was hoped that these pottery fragments might be related to a subsoil cut feature/s nearby, however this extension uncovered no such material. It may be that subsoil cut features lay just beyond the confines of the current trench, or related to a possible structure identified in Trench 6.

5.5 Three pieces of iron slag were also recovered from Trench 1, like the Souterrain Ware these were recovered from the topsoil horizon [101]. Slag is a by-product of metalworking, during the smelting process liquid metal is extracted from ores. Slag is the impure waste matter that is left behind and frequently discarded. It is unlikely that the slag is related to the fertilization of the 19th and 20th lazy beds. If the slag was related to middening it would be expected to be encountered at a similar ratio to the post-medieval pottery found across the site. Although small amounts of slag were also found within Trenches 3, 4 and 6 (Plate 5), this was also in contexts containing Souterrain Ware. As such it is plausible that the slag recovered from Kilmocholmóg field dates to the same era as the Souterrain Ware and indicates metalworking at the site during the early medieval period.

5.6 In addition to the above three flint flakes were recovered from the topsoil [101] within Trench 1, and indeed across all the other trenches excavated at the site (Plate 6) (Appendix 4). Before the introduction of metallurgy to Ireland, flint was the primary source material used for tools and fire starting. This is because when struck with a hammer stone of differing geology flint sparks and splits into thin, sharp splinters, known as blades or flakes. These can then be shaped and worked into a variety of tools such as scrapers, arrowheads, axes, knives, etc. This process is known as knapping and the discarded waste material is termed debitage. Flint tools are primarily used during the Irish Mesolithic, Neolithic, and Early Bronze Age, before being replaced by more durable Bronze and Iron implements in later eras. The finds recovered within Trench 1 are likely related to flint knapping within the vicinity, as to whether this material is related to transitory activity or a prehistoric settlement within the area is unclear.

TRENCH 2

5.7 Trench 2 was located at the southeast corner of the site in a topographically promising area. The trench measured 4m by 1m and was orientated northeast to southwest. Again, a simple stratigraphic sequence was encountered. The topsoil [201] a light brown silty clay loam was removed onto a firm yellowish orange stony clay [202] (Plate 7). No subsoil cut features were uncovered within this trench. The only finds of an archaeological nature were two flint flakes recovered from the topsoil [201].

TRENCH 3

5.8 Trench 3 was located over the north south arm of the right-angled anomaly. It was orientated east to west and measured 4m by 1m. The stratigraphic sequence consisted of topsoil [301], a light brown silty clay loam containing 17th to 20th century ceramic fragments, three flint flakes and a squared headed iron nail. Nails of this type are typical of the medieval to early post-medieval period (Plate 8) (Appendix 5). Below the topsoil a grey, brown silty loam with frequent charcoal flecking was encountered [302] (Plate 9). This layer [302] has been interpreted as a historic ground surface that predates the 'lazy bed' cultivation of the field, but postdates the earlier use of the site. Within this deposit eight fragments of Souterrain Ware pottery were uncovered (Plate 10) (Appendix 6), along with four pieces of iron slag and some small fragments of burnt bone. Deposit [302] capped a spread of sub angular stone [303]. This was concentrated within the western 3m of the trench. The final eastern 1m came down on to the firm orange subsoil [304] (Plate 11).

5.9 Several of the stones within deposit [303] appear to have been deliberately cut and shaped and as such may constitute material from a stone structure. Some of the pieces may be in-situ but others undoubtably represent rubble. One stone at the western end of the trench appeared to be deliberately shaped with straight sides and a circular notch cut into the centre (Plate 12). This notched stone may be a pivot stone associated with a door jamb. Whether it is in-situ or has been displaced from its original location is unclear.

TRENCH 4

5.10 Trench 4 was located across the east west arm of the right-angled anomaly and was positioned by Dr Alastair Ruffell on the first day of excavation over the strongest signal detected during his geophysical analysis. This signal was located centrally within the 4m by 1m trench that was orientated north to south (Plate 13). The topsoil [401] was a light brown silty clay loam. Several post medieval ceramics were recovered from this layer, along with two square headed iron nails (Plate 8) and five pieces of iron slag.

5.11 Excavation of the topsoil [401] exposed a spread of sub-rounded and sub-subangular stone across the entirety of the trench (Plate 14). Within the centre of the trench where the geophysical signal was strongest, larger and more concentrated stone was noted [402]. Within [402] large voids were noted, the slightly smaller non-voided stones to the north and south were labelled [403] and [404] respectively.

5.12 Removal of the voided stone [402] found it to be a fill sitting within a large 'U' shaped cut 1.10m deep [405] (Plate 15 and 16). This cut had a sharp break of slope at the top, with steep sloping sides, tapering

to a relatively flat base. The cut measured 1.75m wide at the top narrowing to a width of 1.22m at the base. No finds were recovered from fill [402] however, based on the geophysical survey results, the features size and makeup it has been interpreted as the remains of a collapsed souterrain. Souterrains are underground chambers constructed during the early medieval period, for the purposes of storage, defence, and refuge.

TRENCH 5

5.13 Trench 5 was a reserve trench to be placed within the site following any discoveries made within the first four trenches. Following the findings in Trenches 3 and 4, the area between seemed promising. Therefore, across a relatively flat area approximately 6m southwest of Trench 3, and 4m north Trench 4, Trench 5 was opened. The location of this trench was communicated to and agreed upon by the DfC:HED licensing inspector on the 23rd August 2022. It was orientated north to south and measured 4m by 1m.

5.14 Like the previous trenches a similar stratigraphic sequence was encountered. The topsoil [501] was removed onto a spread of sub round and sub angular stones [502] (Plate 17). These ranged in size with the largest measuring 0.42m by 0.31m. Some of these stones were removed at the northern and southern end of this trench, however subsoil was not encountered. They were found to be resting on a brown silty clay [503], that has been identified as a historic ground surface. No voids were noted amongst these stones, and they were of a similar nature to stony deposit [303] within Trench 3. As such they may also represent rubble from a structure. Finds within this trench included 17th to 20th century pottery, one clay pipe stem fragment, one slate fragment, three flint flakes, small fragments of burnt bone, a cattle tooth and a pig tooth (*pers comm* Ryan Montgomery). The most significant find from this trench was a large sherd of souterrain ware pottery (Plate 18). This was recovered from topsoil packed between stony deposit [502]. This fragment originated from the upper body of a large vessel, just below the rim. There was limited decoration, in the form of a single applied strip that would have been present around the entire circumference of the vessel.

TRENCH 6

5.15 The written scheme of investigation proposed the opening of 25 square metres across the investigation area. Following the opening of the first five trenches only 21 square metres of this allocation had been utilised. Therefore, following consultation and agreement with the DfC:HED licensing inspector a sixth trench was opened. This was located approximately 15m west of Trench 5 and around 10m east of Trench 1. It was orientated east to west and measured 2m by 1m.

5.16 Around 0.22m of topsoil was removed onto a firm orange clay. This was encountered in the northern half of the trench, however when cleaning back a subsoil cut feature on a northwest to southeast alignment was uncovered (Plate 19). Due to the size of the trench only the northern edge of the feature was uncovered, however, it was filled by a dark grey silty loam [602]. During the cleaning process seven pieces of souterrain ware pottery and three pieces of iron slag were recovered from the surface of [602] (Plate 20). As the souterrain ware pottery and slag confirmed the features archaeological nature it was

left unexcavated. This feature may be the edge of a large pit, or it could be a foundation cut or a drip trench associated with a structure. Three flint flakes were also recovered from the topsoil [601] within this trench, some small burnt bone fragments, and an 18th century flat button *(pers comm* Katy McMonagle).

6 DISCUSSION

PREHISTORIC

6.1 Prehistory by its definition is a time before written records. Within Ireland this period spans from c.8000 BC with the coming of the first hunter gathers until the arrival of Christianity around AD 400. During this time span Ireland's epochs can be divided into four broad eras:

Period	Date Range	Description
Mesolithic	8000 BC – 6000 BC	The First Colonists the Hunter Gathers
Neolithic	4000 BC – 2500 BC	The Arrival and Establishment of Farming
Bronze Age	2500 BC – 700 BC	The Introduction and Working of Bronze
Iron Age	700 BC – AD 400	Iron Smelting and Smithing Appears on the Island

6.2 Before the introduction of metallurgy to Ireland, flint was the primary source material used for tools and fire starting. This is because when struck with a hammer stone of differing geology flint sparks and splits into thin, sharp splinters, known as blades or flakes. These can be shaped and worked into a variety of tools such as scrapers, arrowheads, axes, knives, etc. This process is known as knapping and the discarded waste material is termed debitage. Flint tools are primarily used during the Irish Mesolithic, Neolithic and Early Bronze Age, before falling out of common use and being replaced with more durable metallic forms during the Mid to Late Bronze Age / Early Iron Age.

PREHISTORIC ARCHAEOLOGY AT KILMOCHOLMÓG FIELD

6.3 Prehistoric activity at the site was evidenced by sixteen pieces of struck flint recovered across the investigation area. It is unclear if these finds relate to transitory activity or are associated with prehistoric settlement at the site. Nevertheless, prehistoric flint artefacts are frequently recovered from known medieval and early medieval contexts. In some cases, these finds are the result of residual prehistoric background activity however, in other instances they may have been considered 'elf shot' that were brought into early medieval and medieval settlements deliberately. It is believed that during this period flint and other stone artefacts were accidentally found during agricultural work, these prehistoric artefacts were considered magical or charmed and were brought home for luck or to ward off disaster (O'Sullivan, 2014, 100). As Kilmocholmóg contains known early medieval activity this may account for the struck flints presence on this site.

EARLY MEDIEVAL PERIOD

6.4 The early medieval period in Ireland began with the coming of Christianity in approximately AD 400 and ended with the arrival of the Anglo-Normans in the mid-12th century. During this period settlement across the island was still not nucleated in townships like in Britain. The lifestyle of the time was very much a rural agricultural one. Records indicate that wealth was determined by the amount of cattle an individual owned. It is during this period that raths, the predominant archaeological monument found on the island, appear in the Irish landscape. Raths are banked and ditched enclosures that acted as defended farmsteads. Around 40,000 have been recorded across the island (Lynn, 2005, 14). Although most recorded examples typically have a single bank and ditch (*univallate*), double (*bivallate*) and triple (*multivallate*), monuments have been documented. Several reasons for the sudden appearance of these defended farmsteads in the Irish landscape has been put forward. These range from assumptions about societal change associated with the arrival of Christianity, to the development of ideas about the need for a defined social space and the representation of status. Other theories include the sudden emergence of plague and protection from warfare and raiding (O'Sullivan *et al.* 2014, 74–77). It should, however, be noted not all people during the early medieval lived in raths, unenclosed houses have been found and dated to this time however, these remain a rarity (Dunlop 2015, 113).

6.5 The arrival of Christianity in Ireland, saw the establishment of the first monasteries on the island. In the north, notable ecclesiastical centres were founded at places such as Armagh, Bangor and Derry. Numerous less well-known monastic sites were also established throughout the island. In many instances the founders of these monastic communities became regarded as saints. The monks that lived in these places demarcated their holdings and constructed places of worship, work, and lodgings. Generally, the buildings of early Irish monasteries were constructed using timber, however in some instances stone was used for the central place of worship (Manning 1995, 6). Gradually over time these religious settlements became the focus of human activity and the areas surrounding them became more urbanised.

6.6 Kilmocholmóg field is located within the townland of Donagreagh, anglicized from the Irish Dùn na Greagha, which translates as 'fort of the stud' and likely refers to horse-rearing. As a point of fact, the current landowner Finola Mulholland rears horses across the investigation area and surrounding fields. These lands have been in her family for several generations. Place Names NI gives the following explanatory note in relation to Donagreagh and Kilmocholmóg field:

> "*Mooney thought the name (*Donagreagh) *might indicate an early church site named Domhnach Riach 'speckled church', since there was a field called Kilmocummog in Gallery's farm with 'traces of an ancient graveyard' (Mooney MS 201-2). The original name of this site might be Cill Mo-Chommóg or Mo-Cholmóg 'my little Colmán's church', rather like the townland called Kilminioge 'my little Finn's church' in Moira. The tradition of a burial ground in Donagreagh is still remembered locally. However, Donagreagh was not church land, and it seems unlikely that a church site important enough to be called a domhnach would have been forgotten"* (PlacenamesNI 2022).

6.7 Despite this assessment Kilmocholmóg field lies within a conspicuous blank area in the Northern Ireland Sites & Monument Record. No other sites lie within approximately a 1km radius of the field. Given the average density of raths across the country, and the density of raths beyond this radius, this could be taken as an indication that the land immediately around the site was church land and therefore not used for secular settlement. Furthermore, although it is stated that a church site called *domhnach* "seems unlikely to be forgotten" it is not impossible.

EARLY MEDIEVAL ARCHAEOLOGY AT KILMOCHOLMÓG FIELD

6.8 Early medieval archaeology at the site was evidenced by the remains of a collapsed souterrain, the recovery of twenty sherds of souterrain ware pottery, fifteen pieces of iron slag, possible building rubble and a subsoil cut feature.

Collapsed Souterrain

6.9 Within Trench 3 the remains of a collapsed souterrain were uncovered. Souterrains are underground chambers constructed during the early medieval period, for the purposes of storage, defence, and refuge. They are earth cut trenches that were lined and capped with wood, stone, or a combination of both. They range in both shape and size; some are simple linear compartments whilst others have several chambers interconnected by a series of 'creepways'. Some recorded examples have been known to run for upwards of 40m in one direction. Souterrains are typically linked with raths; however, they are also known to be associated with unenclosed open settlement, ecclesiastical sites, and some promontory forts (O'Sullivan & Downey 2004, 35) (Plate 22 and Figure 8).

Souterrain Ware Pottery

6.10 Twenty sherds of souterrain ware pottery were recovered across four trenches (Trenches 1, 3, 5 and 6) (Appendix 6). These originated from more than one vessel, however due to the limited nature of the assemblage it wasn't possible to establish an accurate vessel count.

6.11 Souterrain Ware is a type of coarse ware pottery that first appeared in the northeast of Ulster in the 7th – 8th centuries AD and continued in use until the 12th century AD. Vessels were predominantly bucket shaped, with slightly flared or vertical sides, flat bases and rounded rims. Decoration was applied to vessels later in the development of the ware, from around the 9th century onwards however, not all of the later vessels were decorated, and the use of plain, undecorated vessels continued. Decoration was simple and took the form of an applied strip applied just below the rim on the exterior surface. The applied strip decoration may appear as a simple strip as is the large piece recovered from Trench 5, or it may have been pinched giving the decoration a 'pie-crust' appearance (Figure 9).

6.12 Some of the sherds recovered from Kilmocholmóg field exhibited soot adherence to their exterior surface. The presence of this soot is the result of the vessel having been hung directly over an open fire probably for cooking. Furthermore, several sherds had charred residue adhering to their inner surface, particularly at the base. This residue is the burnt remains from cooking.

Iron Slag

6.13 Fifteen pieces of iron slag were recovered from four trenches (Trenches 1, 3, 4 and 6). These were all found within the topsoil horizon of the site, with the exception of three pieces that were found on the surface of a subsoil cut feature [602] within Trench 6. These three pieces were found in the same locale as seven fragments of souterrain ware pottery. It is believed that all the slag recovered from Kilmocholmóg field is representative of iron working at the site during the early medieval period.

6.14 From around 700 BC iron was being worked on the island of Ireland. Over the next thousand years this more durable metal gradually replaced everyday bronze implements (tools, utensils, weapons, etc). Its robustness meant that it continued to be used widely in its raw form until the industrial revolution when new technologies brought about the widespread production of steel. Evidence of iron working has been found at over 200 early medieval sites in Ireland, both secular and ecclesiastical in nature. It is the most frequently encountered craft found on early medieval archaeological excavations thereby reflecting a common rudimentary skill of iron smelting and smithing during this period (O'Sullivan et al 2014, 217).

Possible Collapsed Building Material

6.15 Within Trenches 3 and 5 possible collapsed building material was encountered. Several pieces within these trenches appeared to have been deliberately cut and shaped. This material was spread across the majority of both trenches. Some of this stone may be related to the souterrain uncovered in Trench 4 however, all of the material within Trench 5 is outside the line of the right-angled anomaly identified during the geophysical survey. Furthermore, material within the western three quarters of Trench 3 is also outside of its line. Additionally at the western end of Trench 3 a pivot stone was uncovered, this was likely associated with a door jamb. Pivot stones have been excavated at early medieval enclosure sites such as Whiterocks Road, Killinchy (in this instance displaced) (Alexander, forthcoming) and in-situ within plantation era buildings at Dunluce Castle (Gault & McAlister 2014, 31).

Subsoil Cut Feature

6.16 Within Trench 6 a subsoil cut feature was uncovered, this was exposed on the final day of excavation. Seven fragments of souterrain ware pottery and three pieces of iron slag were recovered from the surface of the feature. Due to time constraints this feature remained unexcavated. However, the presence of the pottery and iron slag on its surface undoubtedly dates the feature to the early medieval period.

6.17 As the feature extended beyond the limits of excavation its exact size and shape could not be accurately determined. However, intriguingly during examination of one of the aerial photographs taken during excavation, it was noted that this feature appears to align with a sub-circular crop mark approximately 12m in diameter (Figure 10 and 11). This crop mark may delineate the footprint of a structure and could be either a wall slot or a drip gully. Drip gullies are frequently found on archaeological excavations, their purpose was too direct rainwater and roof run off away from the structures they enclosed. If this feature is a drip gully it would mean that the structure enclosed would be approximately 10m in diameter. This corresponds with Lynn's observations that the typical measurement of an Irish early medieval roundhouses tended to be 4m to 10m in diameter (Lynn, 1994, 90).

6.18 During the early medieval period in Ireland structures are often found within ecclesiastical sites and raths. Throughout the Irish landscape unenclosed settlements may be as prevalent as raths, however, they are not as easily identifiable due to having no upstanding earthworks. They are often found during large scale commercial developments and as such this may be the reason for the disparity (Dunlop, 2015, 133). Examples of unenclosed early medieval settlements have been found throughout the country, such as Terryhoogan, Co Armagh (McSparron, 2007, 120-131), Armalughey, Co Tyrone (Dunlop, Barkley, 2016, 133) and Baronsgrange, Carryduff (Alexander, 2020). The reason as to why some settlements of this period did not have an enclosure is uncertain. It has been proposed that they may have been seasonal when cattle were moved into the uplands for the summer or alternatively, the inhabitants may have been too poor to construct a surrounding ditch and bank (O'Sullivan et al, 2014, 113).

Post-medieval Activity at Kilmocholmóg field

6.19 Post-medieval activity within the investigation area was evidenced by 'lazy beds' also known as 'potato rigs'. These are visible on both by the drone and LIDAR surveys of the field (Figure 3-5). This type of arable spade cultivation was common across Ireland during the post medieval period and was in widespread use up until mechanization in the late 19th century. Although no subsoil cut features from the 'beds/rigs' were uncovered it was evidenced by the recovery of 95 post-medieval ceramics (Appendix 2), two clay pipe stems, a slate fragment and glass fragments. These artefacts likely originated from midden heaps that were spread across the cultivated field to fertilize the growing crops.

7 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

7.1 The excavation at Kilmocholmóg field was a resounding success in both its archaeological research objectives and community engagement aims. As previously stated, this excavation was conducted both as a community outreach project and as a preliminary investigation to determine the viability of a future larger community excavation should archaeological material be present at the site.

7.2 The discovery of unenclosed early medieval settlement outside the confines of documented and proven ecclesiastical sites and raths is rare. To be done so within the confines of six small keyhole test trenches even rarer still. One hundred and fifty-six artefacts were recovered from the site, this included Souterrain Ware pottery, struck flint, iron slag, clay pipe stems, slate and post-medieval pottery fragments.

7.3 The community response to the project was above and beyond the expectations of the organisers. Over the five-day excavation over 80 volunteers participated in the excavation and many more visited for tours of the site, including both a local councillor and an MLA. Daily updates were posted on both the Northern Archaeological Consultancy Ltd and Lurgan Townscape Heritage Scheme Facebook pages and this garnered a lot of interest, resulting in the excavation being reported on by BBC Newsline.

7.4 Although the excavation at Kilmocholmóg field was a success in both its archaeological research objectives and community engagement aims, there is scope for further work in relation to the site. A second larger season of excavation could help resolve some uncertainties and gain more information into both the nature and function of the site. The site was highlighted for investigation as geophysical analysis, place name evidence and local research had indicated that Kilmocholmóg field may contain the subsurface remains of an early ecclesiastical site. Although archaeological remains have been found within the limited area of excavation, we are at this stage unable to determine if the site is of an ecclesiastical or secular nature.

7.5 The stone rubble within Trenches 3 and 5 requires more examination to clarify its extent and function. Furthermore, it would be beneficial to open an area around the pivot stone in Trench 3 to determine if it is in-situ or if it has been moved from its original location. Additionally, the souterrain within Trench 4 requires more investigation. A larger wider trench could be opened over this to record a better cross section and perhaps recover any artefacts abandoned within the structure. Furthermore, a series of smaller trail pits could be dug to track its extent across the field, thereby further ground truthing the geophysical analysis. Within Trench 6 the subsoil cut feature requires more investigation. The contents of this feature and aerial imagery suggests this may be the remains of an early medieval structure. Furthermore, to garner a more precise date for the site and its environmental setting within antiquity a programme of soil sample processing and radiocarbon dating could be undertaken following a second season of excavation. Additionally, should more Souterrain Ware be uncovered, lipid analysis could be conducted on any charred residue adhering to the inner surface of fragments to provide an insight into the diet of those who occupied the site.

7.6 As part of his own research, volunteer and QUB postgraduate archaeology student Ryan Montgomery will be conducting a drone survey of the site every month for the next year. His work aims to track plant growth, drainage and frost melt patterns thought the year looking for configurations that might be paired with the original survey date and the results of the excavation. We look forward to his updates and hope that that he may discover something that could be subject to excavation during a second season.

7.7 Following on from the success of the community engagement an aim would be to replicate the public outreach aspect during a second season of works, however on a larger scale. Local school groups this time could be involved, with both tours and hands on digging. In addition, volunteers from the local community would again take part with both new and returning excavators. With a longer, more open, upscaled excavation greater numbers of volunteers could be accommodated. The site would again be open to members of the public to visit for tours, and with new trenches opened and further research objectives, it would make a different experience to the previous season.

7.8 The results and conclusions of this excavation will be presented to the local community before the end of 2022. It is also the authors intention to prepare an article for publication in Archaeology Ireland, presenting the results to the wider public and archaeological community. Furthermore, should a second season of excavation take place and based upon available funding a small standalone publication

detailing all the geophysical, archaeological, and historical work relating to Kilmocholmóg field could be produced. This publication could also detail both visitor and volunteer experiences working on the project.

7.9 When the entire project has been completed it would be worthwhile submitting the project to the Archaeological Achievement Awards. Even nomination in the awards would heighten visibility of future projects that the community would wish to undertake.

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9 FIGURES

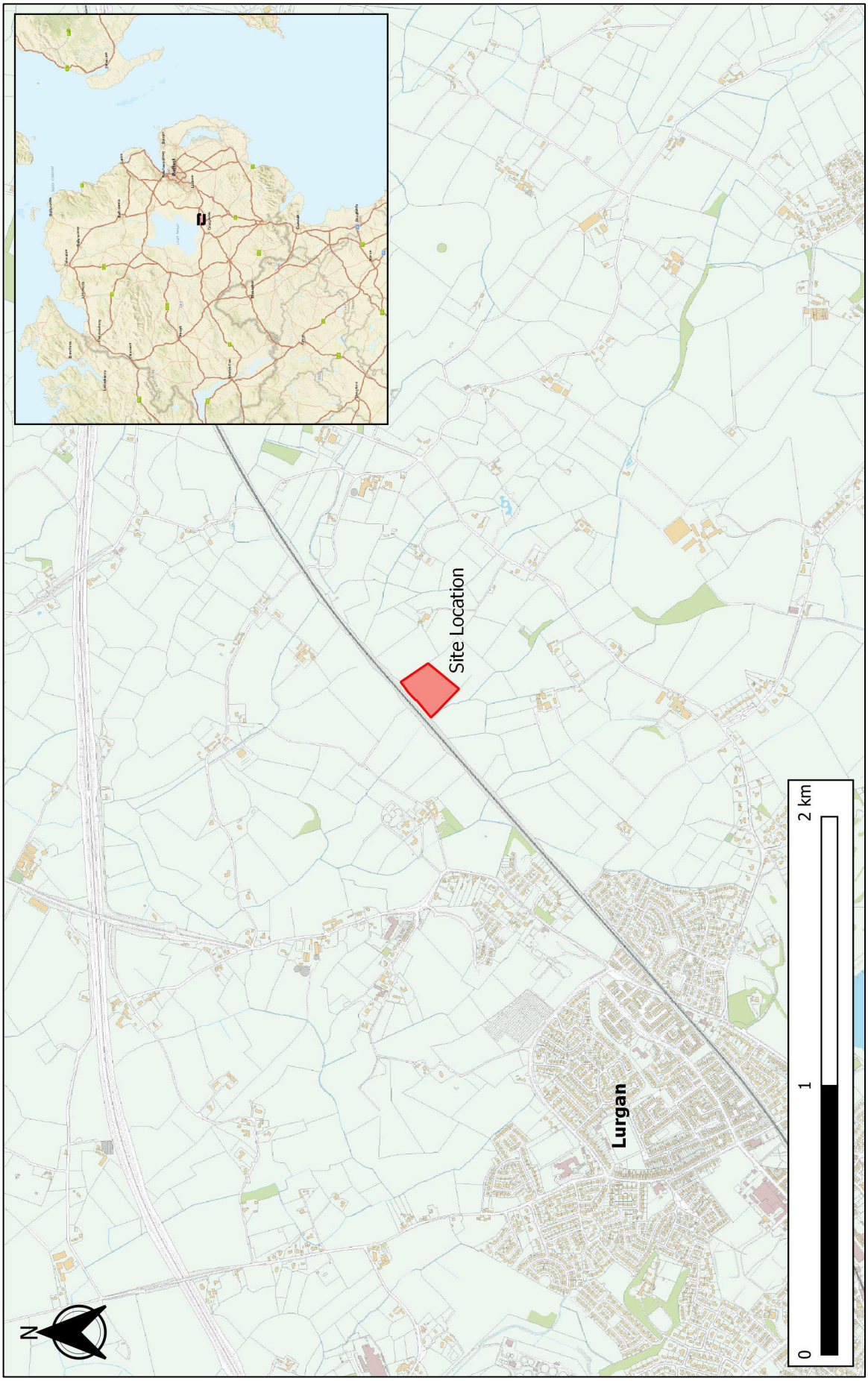

Figure 1: General Location Map

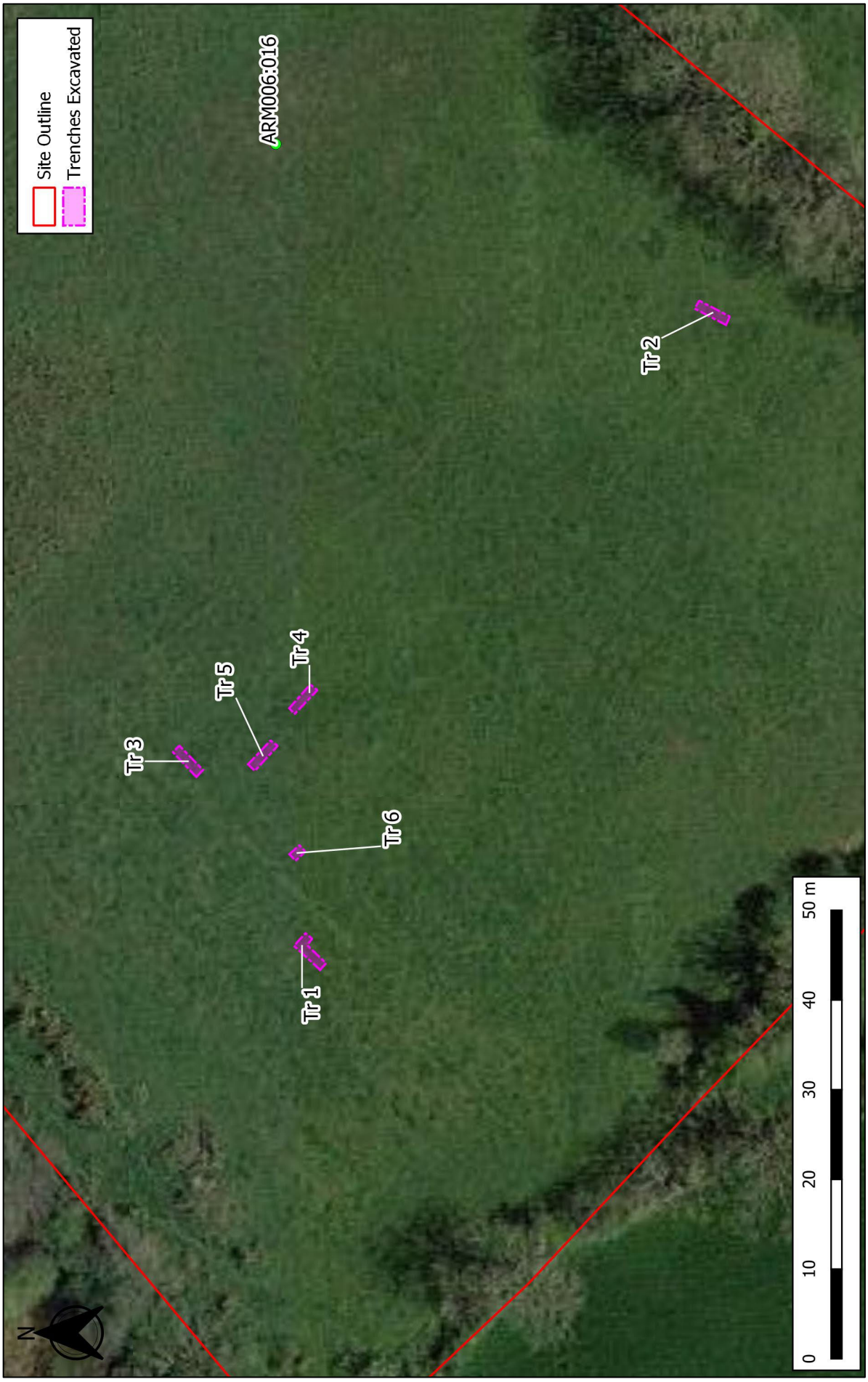

Figure 2: Location of excavated trenches

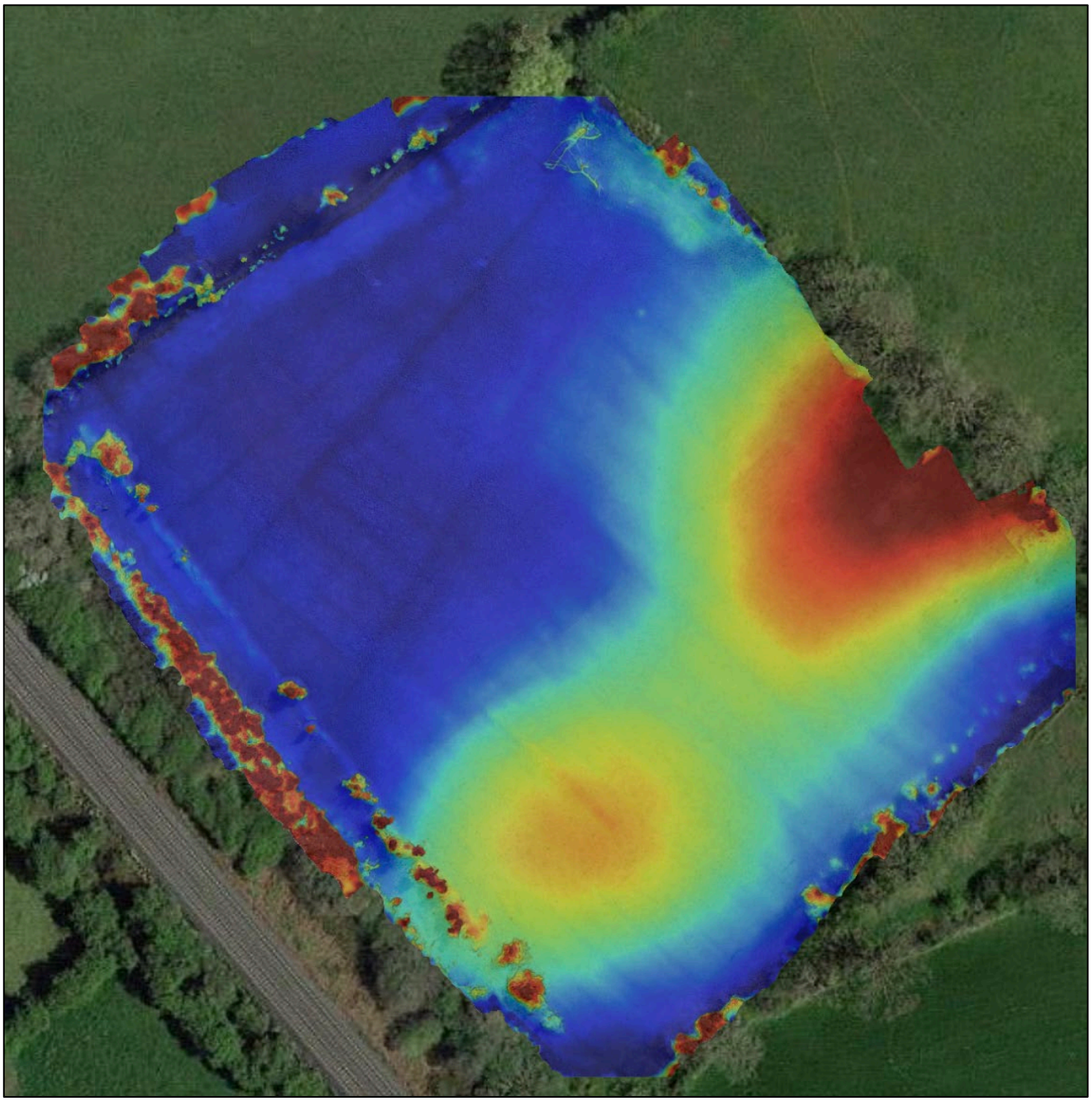

Figure 3: Topographical imagery from drone survey

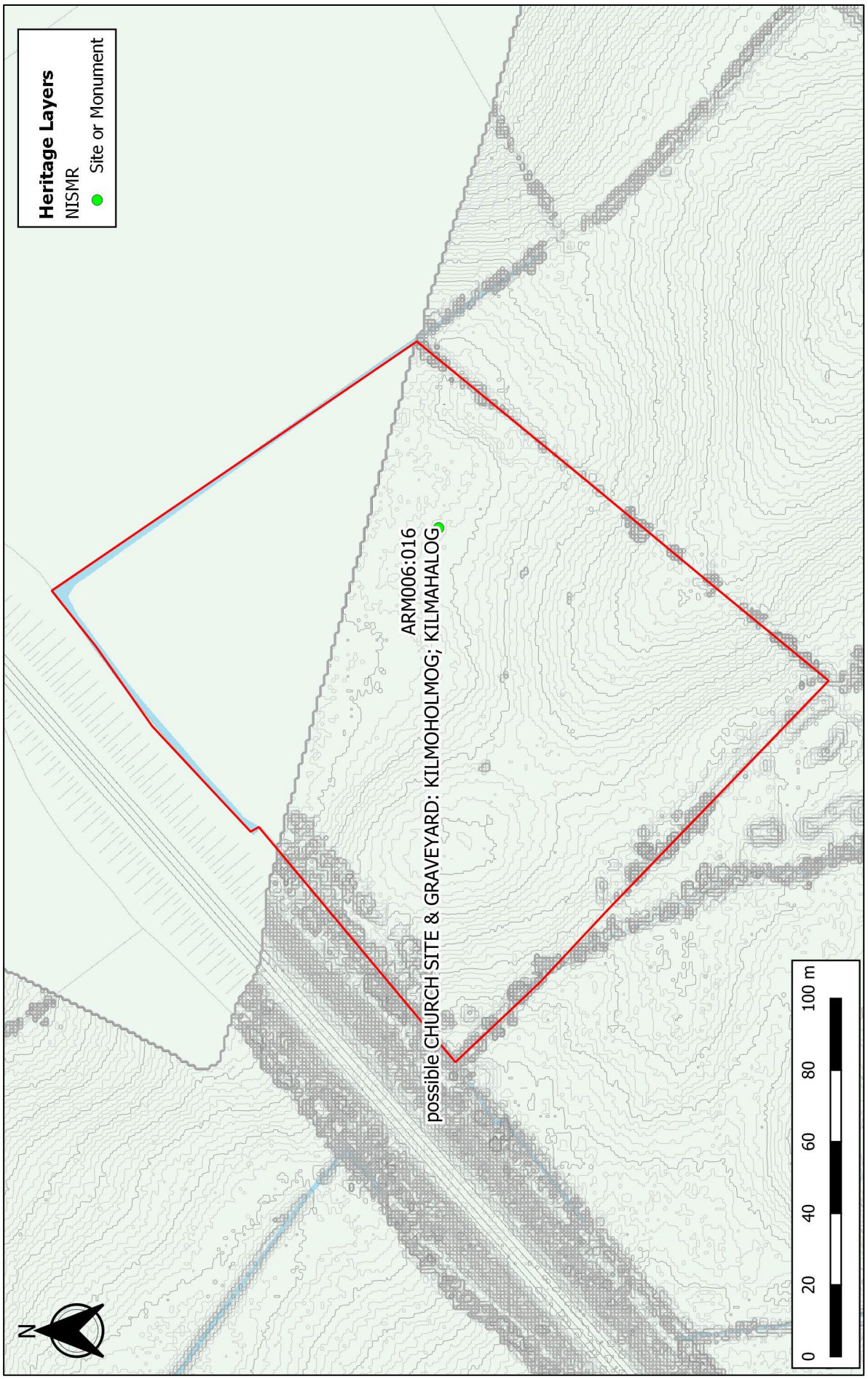

Figure 4: Site on LIDAR derived contour data

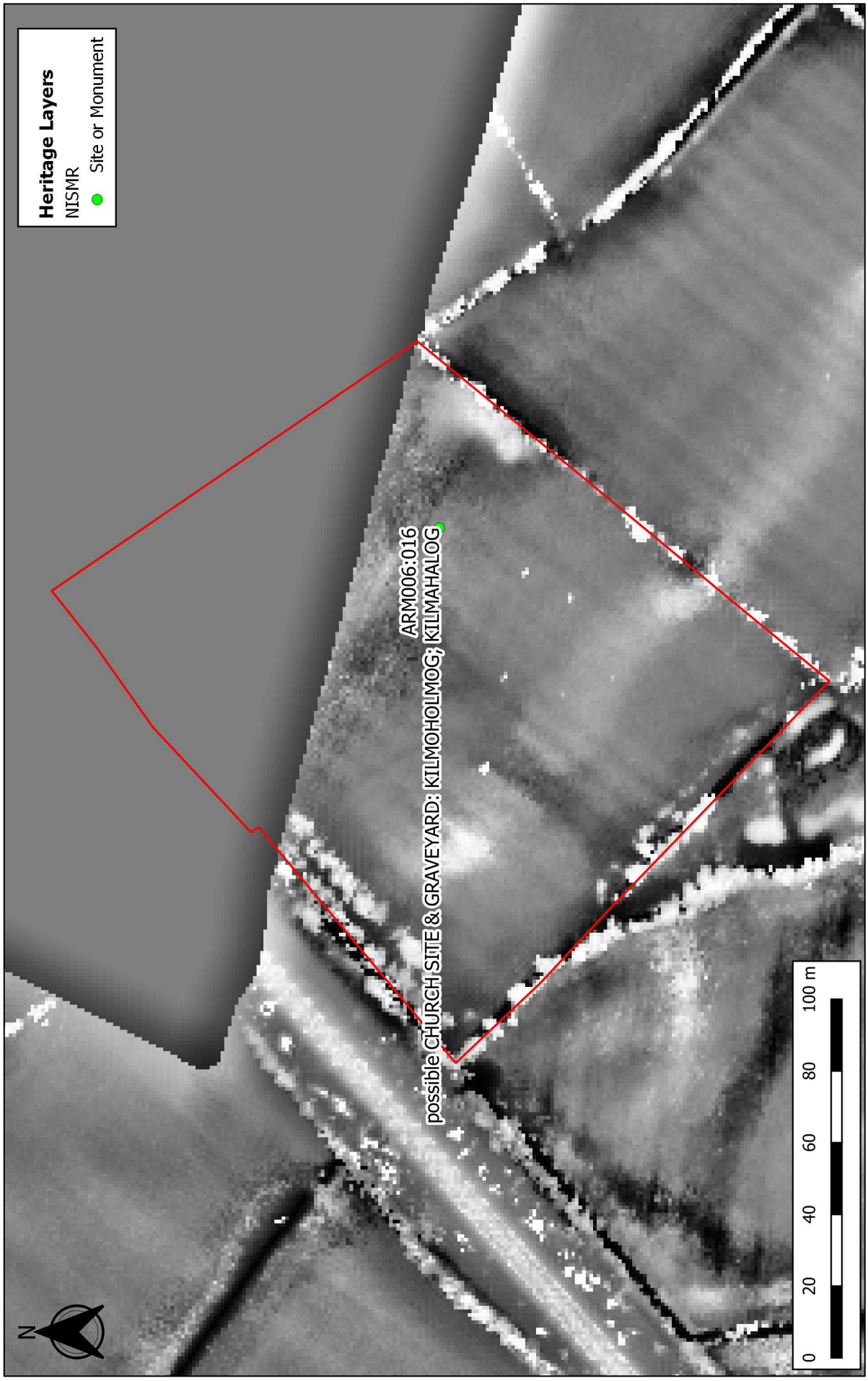

Figure 5: Site on LIDAR Data (local dominance filtered) showing 'lazy beds'.

Figure 6: GPR Survey data showing 'Right angled anomaly'

Figure 7: GPR Survey data showing 'Right angled anomaly' in relation to Trenches

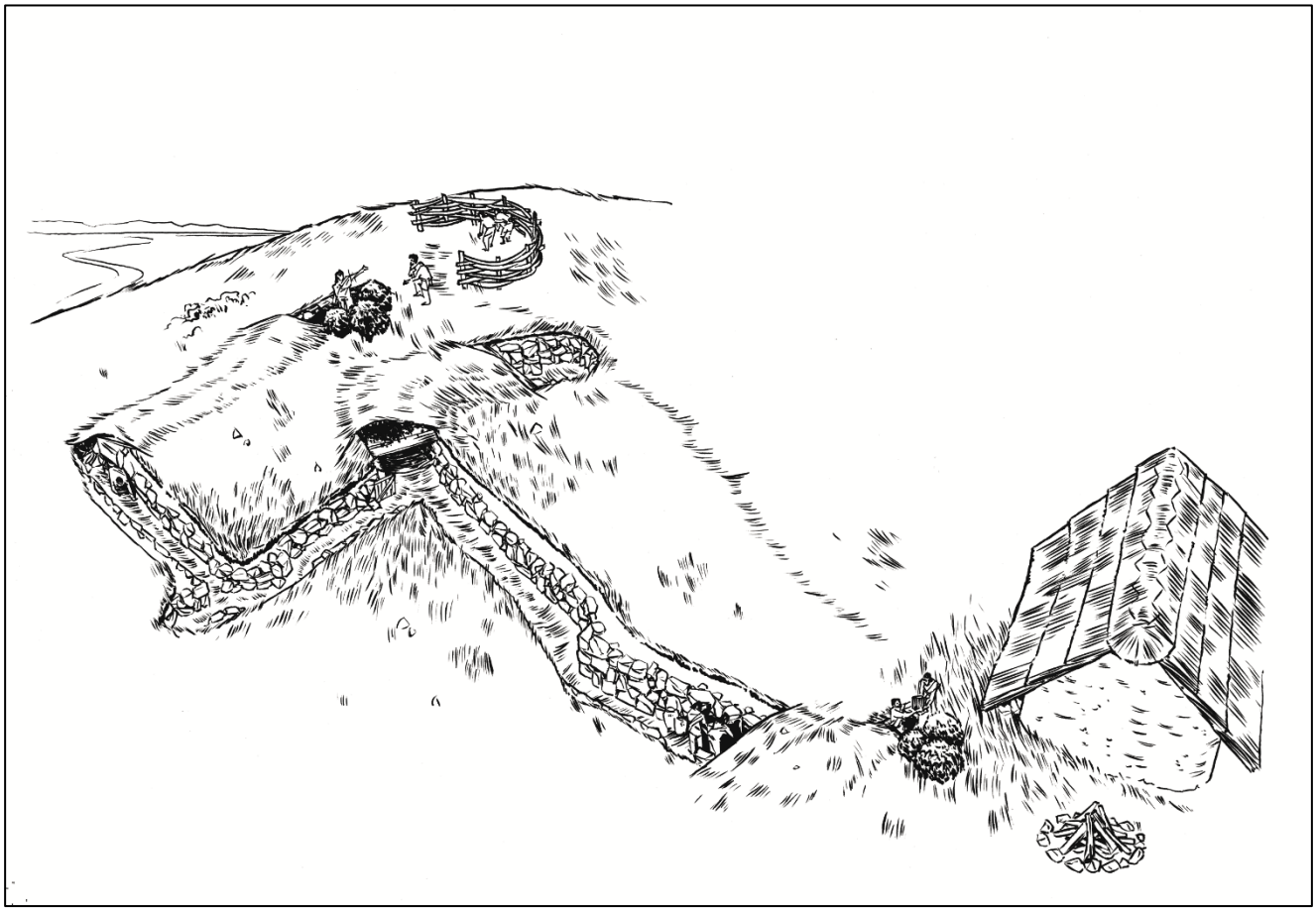

Figure 8: Reconstruction of an unenclosed early medieval house and souterrain, excavated at Drumadoon, County Antrim during the A26 Glarryford to Drones Road Scheme © NAC Ltd

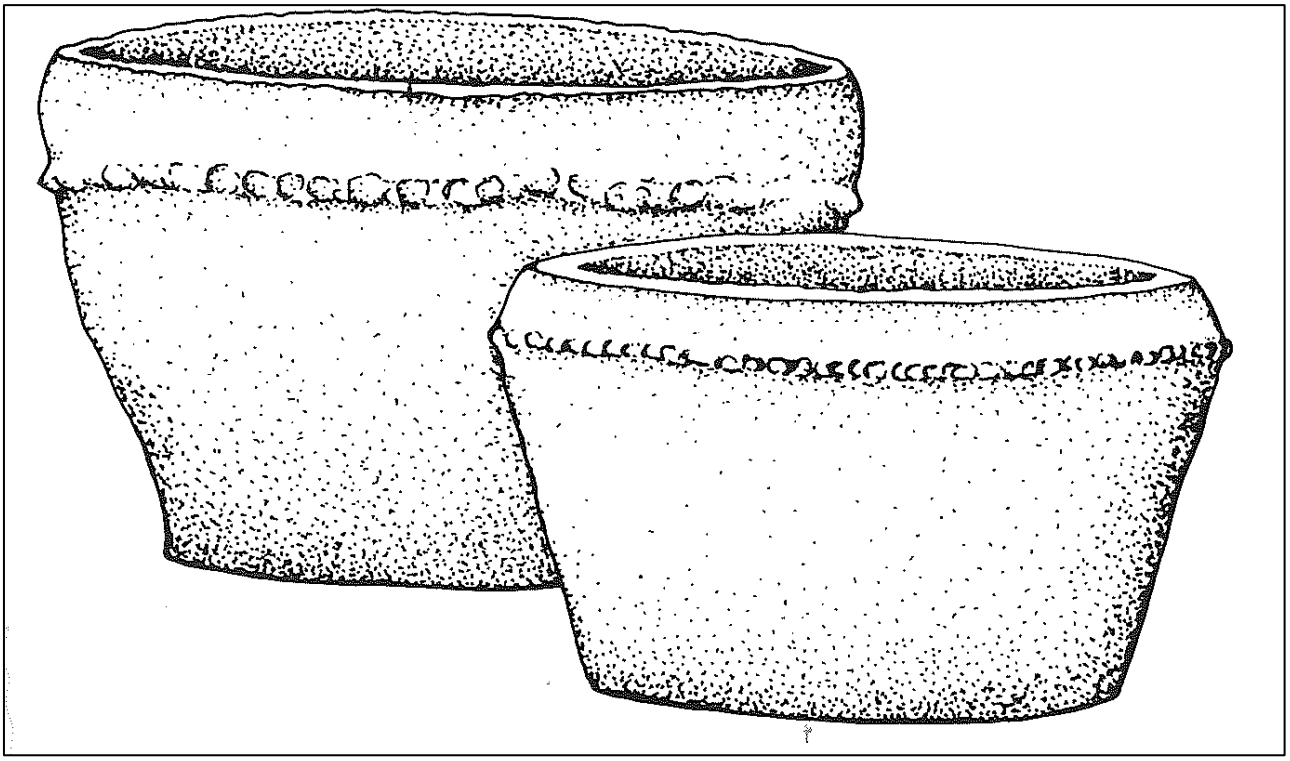

Figure 9: Example of early medieval souterrain ware vessels (Mallory & McNeill 1991, 201)

Figure 10: Annotated Aerial image showing Trenches 1, 3, 4, 5 and 6 in relation to each other, note sub circular crop mark extending from feature in Trench 6, west to top

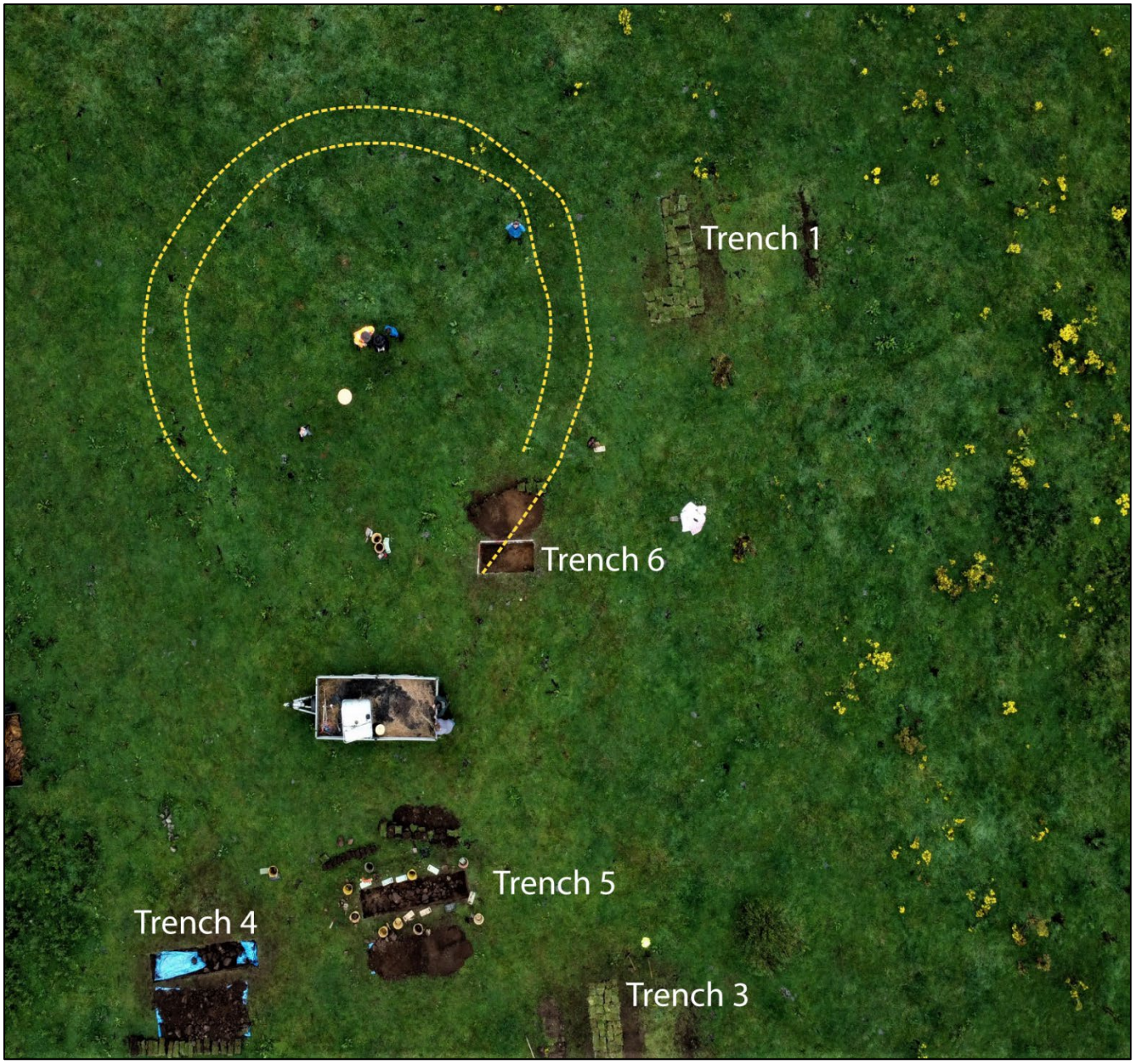

Figure 11: Annotated Aerial image showing sub circular crop mark associated with feature uncovered in Trench 6, west to top

10 PLATES

Plate 1: Sample of post-medieval ceramics recovered across all the trenches with investigation area

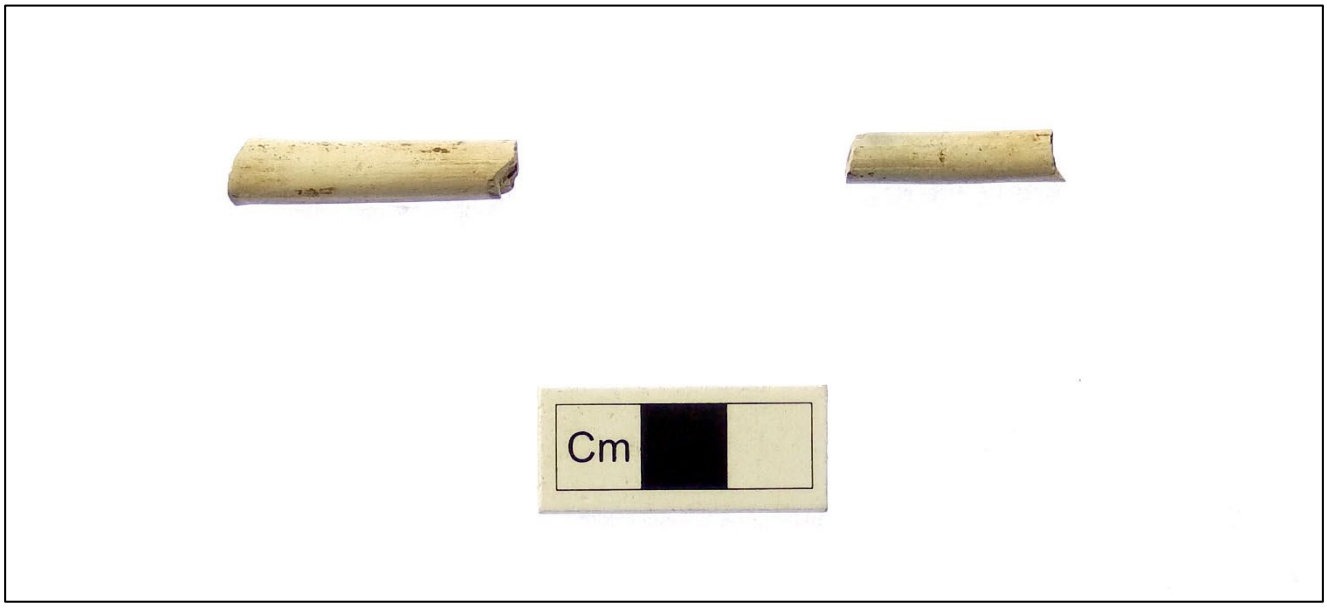

Plate 2: Clay Pipe Stems recovered from Trenches 1 (right) and 5 (left)

Plate 3: Trench 1, post-excavation, with northwest at top

Plate 4: Souterrain ware recovered from Trench 1

Plate 5: Sample of slag recovered from Trenches 1, 3, 4 and 6

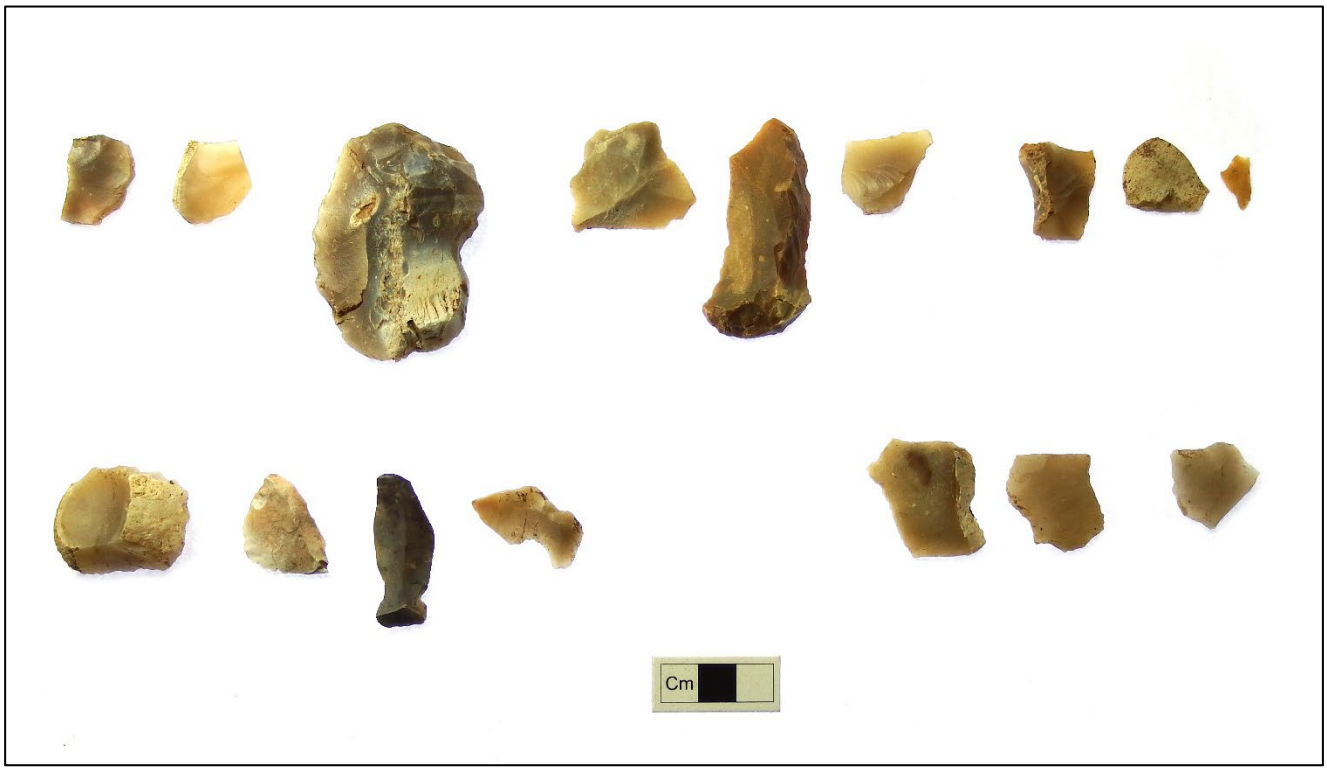

Plate 6: Flint flakes and debitage recovered from across the investigation area

Plate 7: Trench 2, post-excavation, with south at top

Plate 8: Iron Nails recovered from Trenches 3 and 4

Plate 9: South facing section of Trench 3, note historic soil horizon [302] above stone deposit [303], looking northeast

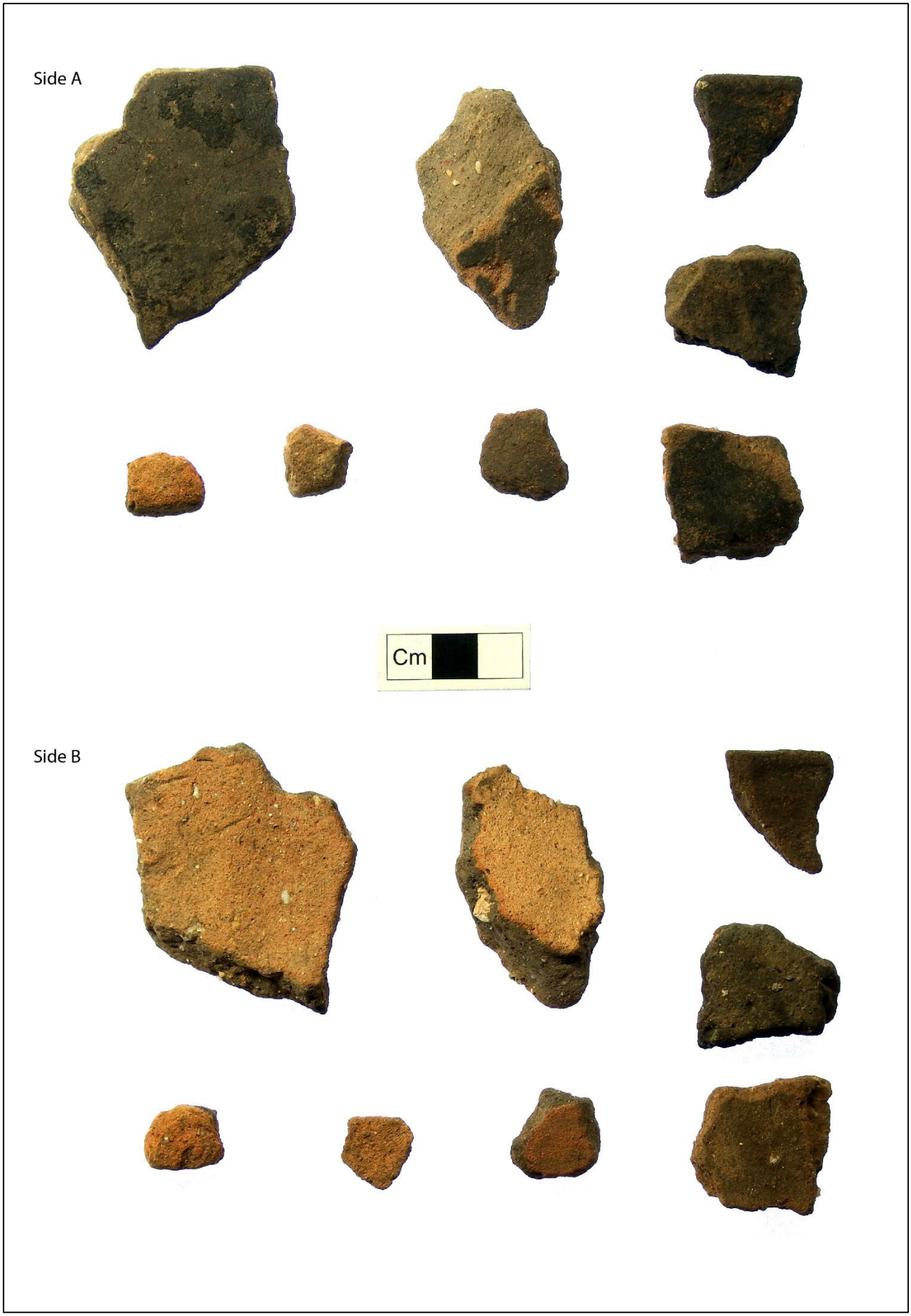

Plate 10: Souterrain Ware pottery recovered from historic soil horizon [302] within Trench 3

Plate 11: Trench 3, post-excavation, with north at top

Plate 12: Possible pivot stone within Trench 3, looking north

Plate 13: Pre-excavation shot of Trench 4, orange flags in the middle mark the strongest signal detected during the geophysical analysis, looking south

Plate 14: Trench 4 following the removal of topsoil [301], showing stony deposits [302], [303] and [304], east to top

Plate 15: Trench 4, following the removal of void stone fill [402], east to top

Plate 16: Trench 4 east facing section following the removal of voided stone fill [402], showing it sitting within 'U' shaped cut feature [405], looking west

Plate 17: Trench 5, post-excavation, with east at top

Plate 18: Large fragment of Souterrain Ware pottery recovered from Test Trench 5, note implied strip decoration

Plate 19: Trench 6, post-excavation, note subsoil cut feature [602], west to top

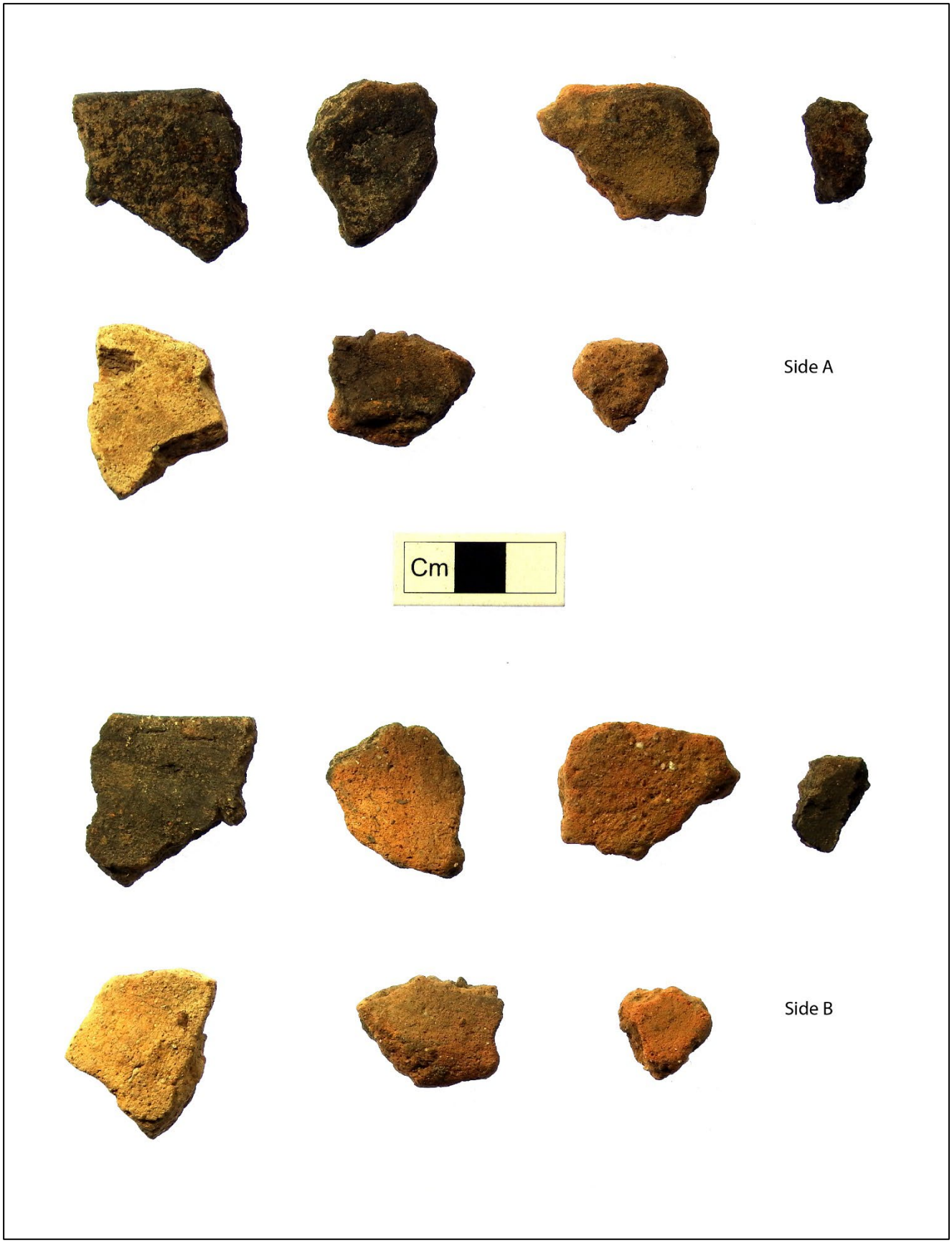

Plate 20: Souterrain Ware pottery recovered from surface of feature [602]

Plate 21: 18th century flat button recovered from topsoil [601] within Trench 6

Plate 22: Souterrain fully excavated at Drumadoon, County Antrim during the A26 Glarryford Junction to Drones Road Scheme, this feature was found in association with an early medieval unenclosed house see Figure 7, ©NAC Ltd

APPENDIX 1: COPY OF ARCHAEOLOGICAL LICENCE

DfC
Department for Communities
www.communities-ni.gov.uk

Licence for Archaeological Excavation

Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995

The Department for Communities Northern Ireland (hereinafter referred to as "the Department"), in exercise of its power under Article 41 of the above-mentioned Order (hereinafter referred to as "the Order"), hereby licenses

Stuart Alexander & Katy McMonagle

.....

and

Northern Archaeology Consultancy Ltd

.....

(hereinafter [jointly] referred to as "the Licensee[s]") to excavate for purposes of archaeological investigation in or under part of the Townlands (towns) of

Donagreagh

.....

in the County of Armagh (being the archaeological site or reputed site known as))

Kilmonholmog Field, Lurgan

.....

(hereinafter referred to as "the lands") during the period of six months, commencing on 20 July 2022 and ceasing 19 Jan 2023 , subject to the following conditions:

1. This Licence is granted on condition that, except in the case of an excavation referred to in Article 32 (1) (b) of the Order, the Licensees have obtained from the owner and occupier of the lands their consent to the excavation on, in or under the said lands, and the Department, if the Licensees are not Officials of the Department, shall not be under any responsibility for the consequences of any failure on the part of the Licensees to obtain such consent.

2. Should any part of the excavation involve disturbance of an area designated as a Scheduled Monument under Article 3 of the Order, the Licensees must ensure that Scheduled Monument Consent has been obtained from the Department before any such disturbance is undertaken. It is an offence to disturb a scheduled monument without prior Scheduled Monument Consent. The Licensees shall, on request, produce this Licence to the owner and occupier of the lands.

2

3. In advance of commencement of the excavation, the Licensees must inform the Department of the start date of the excavation and likely duration. If the anticipated completion date changes during the course of the excavation, the Licensees must inform the Department of the revised completion date as soon as possible.

4. The Licensees shall ensure that adequate resources are in place to carry out all excavation, post-excavation analysis, reporting, archiving and publication requirements that arise from the excavation carried out under this licence.

5. The Licensees shall carry out all excavation and associated works under this licence pursuant to the Programme of Works submitted to Heritage Advice and Regulation Branch on (Date: 30 / 06 / 2022 HED REf Number CO1 - 22 - 464768). Should circumstances arise during the excavation which necessitate an amendment to the Programme of Works, the Licensees must inform the Department immediately and any amendment must be agreed in writing in advance of further works being carried out. Such agreed amendments shall be deemed to be incorporated into the Programme of Works. All works carried out on foot of this licence shall comply in all respects with recognised archaeological standards.

6. The Licensees shall inform the Department of the first discovery of archaeological remains, objects or material under this licence as soon as practicable after such discovery.

7. The Licensees shall report the finding of any treasure or potential treasure items to the Coroner. This must be done within 14 days from the day following the finding of the item(s) or 14 days after the realisation that the item(s) might be treasure.
8. The Department may, at its discretion, choose to inspect the excavation and the Licensees shall permit any person or persons nominated by the Department to be present on the lands at any stage during the course of the excavation.

9. The Licensees shall, during the progress of the excavation, take adequate steps to safeguard any monuments or other structures upon or adjoining the lands.

10. The Licensees shall, immediately on completion of the excavation, restore the lands and their surroundings as far as possible to their original condition unless otherwise agreed with the landowner and occupier.

Licence to Excavate for Archaeological Purposes

11. The Licensees shall furnish to the Department:
    (a) A summary report on the excavation within four weeks of the end of the excavation or its temporary cessation, unless an alternative date for the summary report has been agreed in writing with the Department

    (b) A comprehensive report on the excavation and its significance within six months of the end of the excavation unless an alternative date for the comprehensive report has been agreed in writing with the Department. The final comprehensive report will be made available to the public through the National Monuments and Buildings Record and to facilitate this, the Licensees will supply the following:
        - Final comprehensive report in digital and hardcopy forms. Acceptable digital formats include Microsoft Word (.doc/.docx), OpenDocument Text (.odt) or PDF/A (.pdf)
        - The excavation reporting form, and any associated site reporting forms, as prescribed by the Department at **www.communities-ni.gov.uk/archaeological-excavation-licence**
        - A GIS dataset showing the extent of the investigation, supplied in an open or industry standard georeferenced vector format (e.g. ESRI shapefile or CAD DXF), including all appropriate metadata
        - Confirmation that all necessary copyrights and permissions for the public dissemination of both the comprehensive report, including all of its contents, and the GIS data have been obtained

12. The Department may review the duration of the licence, and grant such extensions that it deems appropriate, where the Licensees apply, in writing, for such a review prior to the date of cessation shown on the face of the licence.

13. The Department reserves the right to suspend or revoke this Licence in the event of failure by the Licensees to comply with these conditions or any part thereof.

Authorised Officer:	Dated this:
[redacted]	20/07/2022
Serial number of excavation:	AE/ AE/22/089

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APPENDIX 2: ANALYSIS OF POST-MEDIEVAL CERAMICS

INTRODUCTION

2.1 A total of 95 individual sherds of pottery, representing seven different wares, were recovered during the excavation at Kilmocholmóg Field, Lurgan, Co. Armagh. The ceramic assemblage can be dated to the post-medieval period (17th to 20th centuries AD), with the focus of the assemblage being the 19th to 20th centuries (Table 1).

TYPOLOGY AND QUANTIFICATION

2.2 In the case of post-medieval ceramics it should be noted that the dates noted in Table 1 below are indicative of the main period of production, and subsequently of use. Indeed, many of the wares from this period can still be found as intact pieces in many households and some, for example Transfer Printed wares and Willow Pattern, have seen a revival and designs are currently being reproduced.

	Type	Date	Quantity
1	Blackware	17th – 19th century	22
2	Ironstoneware	19th – 20th century	39
3	Ironstoneware – Transfer Printed	19th – 20th century	12
4	Red Earthenware – Glazed	17th – 19th century	9
5	Stamped Spongeware	Mid-19th century	8
6	Stoneware – Red	18th – 19th century	1
7	Willow Pattern	Late 18th century - Modern	4
		Total	**95**

Table 1: Summary of Wares, Quantities and Dates

BLACKWARE (17TH – 19TH CENTURY - 22 SHERDS)

2.3 This pottery has a relatively hard orange red fabric, without obvious inclusions. Sherds are usually relatively thick walled and are glazed internally and externally with a thick black glaze. A variety of forms are recorded; while teapots & mugs are known the most common forms are large vessels such as milk pans, crocks, pitchers and storage jars. *(See also Red Earthenware - Glazed)*

IRONSTONEWARE (19TH – 20TH CENTURY – 39 SHERDS)

2.4 White bodied semi-vitrified earthenware, whose texture falls between that of cream or pearlware and porcelain. As with the earlier cream and pearlwares it is found transfer printed, hand painted and with gilded decoration. *(See also Ironstone Ware – Transfer Printed)*

IRONSTONEWARE – TRANSFER PRINTED (19TH – 20TH CENTURY – 12 SHERDS)

2.5 The development of tissue paper transfers allowed more complex patterns to be applied to vessels. The transfers were applied to fired and glazed vessels, which were then, fired again burning off the transfer in the kiln and leaving the ink pattern behind. Often a blue pattern was used but green, brown, black, purple and red are not uncommon. *(See also Ironstone Ware)*

RED EARTHENWARE – GLAZED (17TH – 19TH CENTURY – 9 SHERDS)

2.6 This pottery generally has a soft orange red fabric, without obvious inclusions. Due to uneven firing some of the fabrics may be found with a grey core. Some of the pottery had slip applied, followed by a clear glaze, giving the surface of the vessel a yellow green colour. In other cases, coloured glazes, usually brown or green, were applied to decorate the vessels. *(See also Blackware)*

STAMPED SPONGEWARE (MID-19TH CENTURY – 8 SHERDS)

2.7 Soft, cream coloured earthenware (usually Pearlware or Ironstoneware) usually covered in a clear glaze; the colour coming from the white ball clays that were used. As the name suggest the pattern was applied using a sponge and, in the case of stamped spongeware, a cut stamp or a stencil was used to allow more intricate designs to be applied. (*See also Ironstoneware, Ironstoneware – Transfer Printed*)

STONEWARE RED (18TH – 19TH CENTURY – 1 SHERD)

2.8 A hard, red coloured fabric, primarily used for tea-sets and table wares. A variant of the grey and white stonewares the red colour was produced in order to mimic 17th and early 18th century teapots imported by the East India Company from India and China. Earlier examples were frequently coated with a clear glaze to allow the fabric of the vessel to be visible, later examples were most commonly coated with a dark brown to black lead glaze, though thick coloured glazes are also recorded.

WILLOW PATTERN (LATE 18TH CENTURY – MODERN – 4 SHERDS)

2.9 A sub-set of the transfer printed earthenwares. The classic Willow pattern usually combines a central scene comprising a willow tree, boat, bridge, figures, two birds and a pagoda with a geometric border, generally all printed in blue. Designed to mimic the design on imported Chinese Porcelain of the 18th century, Willow pattern was very popular and remains so to this day. Usually found on plates, but also on larger platters, bowls and tureens. *(See also Ironstoneware – Transfer Printed).*

DISCUSSION AND CONCLUSIONS

2.10 The assemblage can be described as typical for a 19th century rural farm setting. The wares show variety, in that both table and utilitarian wares are present within the mix; again, this would have been typical for a farm of the period.

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APPENDIX 3: ANALYSIS OF EARLY MEDIEVAL POTTERY

INTRODUCTION

3.1 A total of 20 sherds of early medieval coarseware pottery were recovered from four trenches during excavations at Kilmocholmóg Field, Lurgan, Co. Armagh (Table 1). As is common with assemblages of coarseware pottery, the sherds were fragmented and with the edges worn and abraded.

Trench	Context No.	Sherds
1	101	4
3	302	8
5	501	1
6	602	7
Total		20

Table 1: Trenches containing early medieval pottery

EARLY MEDIEVAL SOUTERRAIN WARE

3.2 All of the early medieval pottery originated from Souterrain Ware vessels. From the limited number of sherds present, they originated from hard bodied, well fired vessels. Small pieces of grit had been added as inclusions within the clay, and the fabrics were coloured orange brown through to black, with all of the sherds being variegated, and displaying a variety of colours.

3.3 A number of the sherds displayed sooting and charring on their external surfaces, an indication that the vessels had been suspended over or placed in fires, and had probably been used for cooking.

3.4 Although no base sherds were present within the assemblage, the fact that the sherds originated from Souterrain Ware vessels would indicate that the vessels were flat based.

3.5 A single sherd with pointed rim was present within the assemblage, unfortunately the sherd was too small to illicit an accurate rim diameter. One large sherd (F#151) from Trench 5 originated from the upper body of the vessel, just below the rim. Limited decoration, in the form of a single applied strip, was present on the sherd. Typically this form of decoration would have been present around the entire circumference of the vessel. In later forms this band would be pinched, giving a 'pie-crust' style decoration.

3.6 Given the very limited nature of the excavation and the small assemblage of pottery it wasn't possible, nor would it have been prudent, to try and establish a vessel count.

DISCUSSION AND CONCLUSIONS

3.7 Souterrain Ware is a type of coarse ware pottery that appeared in the northeast of Ulster in the 7th – 8th centuries AD and continued in use until the 12th century AD. Vessels were predominantly bucket shaped, with slightly flared or vertical sides, flat bases and rounded rims. Decoration was applied to vessels later in the development of the ware, from around the 9th century onwards. Not all of the later vessels were

decorated and the use of plain, undecorated vessels continued. Decoration was simple and took the form of an applied strip applied just below the rim on the exterior surface. The applied strip decoration may appear as a simple strip, with no further adornment, or is frequently found with pinch markings, giving the decoration what has been described as a 'pie-crust' appearance.

3.8 Some of the sherds exhibited soot adherence to their exterior surface. Where sherds are merely blackened this can be seen as the result of being fired within a clamp kiln and the vessel having been exposed directly to the fire and the fuel material. The presence of soot on the sherds differs from this and is the result of having been hung directly over an open fire, probably for cooking. In addition to this there was evidence of charred residue adhering to their inner surface, particularly at the base. This residue is the burnt remnants from cooking.

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APPENDIX 4: LITHIC ANALYSIS

INTRODUCTION

4.1 The purpose of this report is to analyse the lithics recovered from the community excavation undertaken at Kilmocholmóg Field under archaeological licence AE/22/089. The site at Kilmocholmóg produced a lithic assemblage of 54 lithic elements.

THE ASSEMBLAGE

4.2 This rather small assemblage recovered from Kilmocholmóg consisted of 54 pieces of flint.

Type	Worked	Unworked	Total
Flint	16	41	54

Table 1: Breakdown of worked and unworked flint

RAW MATERIALS

4.3 Given the location of the site, it is not surprising that there is natural flint/unworked flint within this assemblage. The underlying geology is predominantly basalt lava and sediments. The location of the site is within close proximity to areas of Ulster White Limestone Formation, which provides a good primary source of flint (Woodman *et al,* 2006, 8).

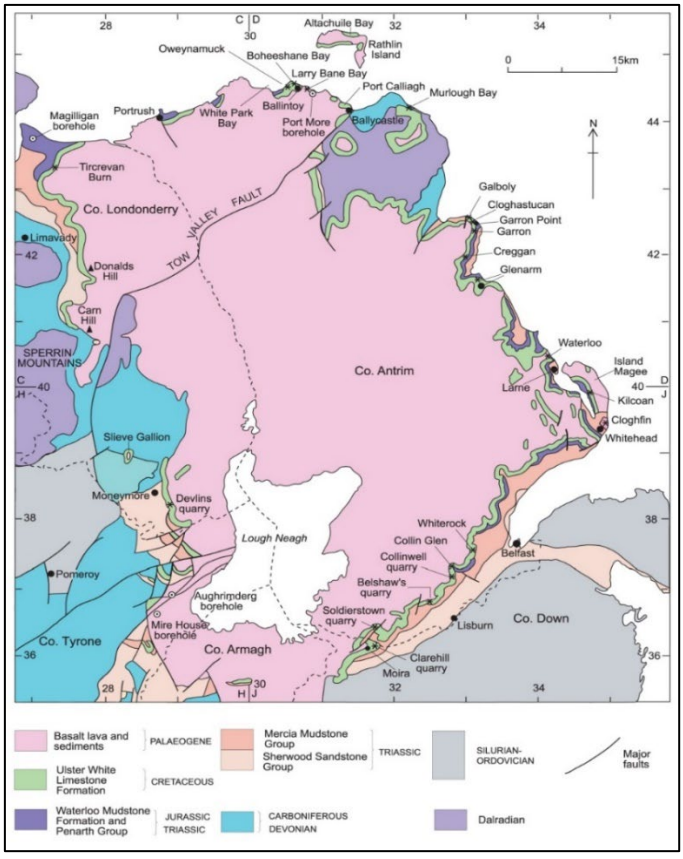

Figure 1: Geology Map of Northern Ireland

UNDIAGNOSTIC FLAKES

4.4 There was a small number (13) pieces of flint within this assemblage that are knapped. Although they are knapped they cannot be assigned to a specific tool form or period, therefore can only be assigned to the generalised date of prehistoric.

4.5 The flakes although undiagnostic, have defining characteristics that aid in the understanding of the knapping techniques. These characteristics include; a recognisable ventral and dorsal face, a bulbar area and ripple marks/radial lines (Ballin, 2021, 7).

BURNT FLINT

4.6 Within this assemblage three pieces of flint show evidence of being burnt. Burnt flint shows a number of characteristics, these include discolouration, cracking/crazing, brittleness, sugary texture and a lustrous surface (Woodman *et al,* 2006, 98). The presence of burnt flint can often indicate where hearths might be located, in addition the deliberate and controlled heat treatment of lithics can also enhance the fracture properties of the flint itself (Woodman *et al,* 2006, 98). Due to the small quantity of burnt flint within this assemblage it is difficult to understand if this is evidence of deliberate/controlled heat treatment or if there was a hearth within the vicinity.

BREAKAGES

4.7 There are a number of lithics within this assemblage that show evidence of breakages, although they are broken it is not evident that it is deliberate. The presence of natural breakages throughout the assemblage is related to the condition itself (Woodman *et al,* 2006, 98). Generally, the assemblage shows a range of patination throughout and this may have affected the condition of the assemblage. Subsequently, the range of patination throughout the assemblage may have led to the amount of breakages throughout the assemblage.

DISCUSSION

4.8 This small assemblage recovered from Kilmocholmóg shows that there was knapping taking place within the prehistoric period within the vicinity. Due to the generic nature of the flakes, no specific time period can be assigned. The small assemblage can only be assigned to generally prehistoric.

CONCLUSION

4.9 The assemblage recovered from Kilmocholmóg has elements within that show that knapping was taking place within the prehistoric period within the vicinity. The generic nature of the flakes recovered can only be assigned to the prehistoric. It is the opinion of the lithic specialist that no further work is required to be undertaken concerning this assemblage.

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Find Number	Trench	Fill	Material	Description	Portion	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
37	1	101	Flint	Flake	Proximal	12.9	10.9	1.9	0.41
38	1	101	Flint	Flake	Proximal	23	16.2	5.1	2.67
39	1	101	Flint	Natural	-	-	-	-	-
40	1	101	Flint	Natural	-	-	-	-	-
41	1	101	Flint	Natural	-	-	-	-	-
53	2	201	Flint	Flake	Proximal	22.6	20.4	10.7	4.77
54	2	201	Flint	Natural	-	-	-	-	-
55	2	201	Flint	Natural	-	-	-	-	-
56	2	201	Flint	Flake	Proximal	63.1	40.6	13.5	50.63
57	2	201	Flint	Natural	-	-	-	-	-
58	2	201	Flint	Natural	-	-	-	-	-
79	3	301	Flint	Natural	-	-	-	-	-
80	3	301	Flint	Flake	Proximal	33.1	25.3	5.8	6.5
81	3	301	Flint	Flake	Proximal	30.6	21.8	5.8	3.8
82	3	301	Flint	Natural	-	-	-	-	-
83	3	301	Flint	Natural	-	-	-	-	-
84	3	301	Flint	Flake	Proximal	60.4	26.5	8.8	18.33
115	4	401	Flint	Natural	-	-	-	-	-
116	4	401	Flint	Natural	-	-	-	-	-
117	4	401	Flint	Natural	-	-	-	-	-
118	4	401	Flint	Natural	-	-	-	-	-
119	4	401	Flint	Natural	-	-	-	-	-
120	4	401	Flint	Natural	-	-	-	-	-
153	5	501	Flint	Natural	-	-	-	-	-
154	5	501	Flint	Natural	-	-	-	-	-
155	5	501	Flint	Natural	-	-	-	-	-
156	5	501	Flint	Natural	-	-	-	-	-
157	5	501	Flint	Natural	-	-	-	-	-
158	5	501	Flint	Natural	-	-	-	-	-
159	5	501	Flint	Flake	Proximal	28.6	19.4	3.1	2.04
160	5	501	Flint	Natural	-	-	-	-	-
161	5	501	Flint	Natural	-	-	-	-	-
162	5	501	Flint	Natural	-	-	-	-	-
163	5	501	Flint	Natural	-	-	-	-	-
164	5	501	Flint	Natural	-	-	-	-	-
165	5	501	Flint	Natural	-	-	-	-	-
166	5	501	Flint	Flake	Proximal	34.2	26.6	12.9	13.19
167	5	501	Flint	Flake	Proximal	30.7	15.5	4	2.43
168	5	501	Flint	Natural	-	-	-	-	-
169	5	501	Flint	Natural	-	-	-	-	-
184	6	601	Flint	Flake	Proximal	27.6	21.9	4.7	5.14
185	6	601	Flint	Natural	-	-	-	-	-
186	6	601	Flint	Natural	-	-	-	-	-
187	6	601	Flint	Natural	-	-	-	-	-
188	6	601	Flint	Flake	Proximal	21.6	23	4.5	2.79
189	6	601	Flint	Natural	-	-	-	-	-
190	6	601	Flint	Flake	Proximal	33.5	23.2	7.1	4.54

Find Number	Trench	Fill	Material	Description	Portion	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
191	6	601	Flint	Natural	-	-	-	-	-
192	6	601	Flint	Natural	-	-	-	-	-
193	6	601	Flint	Natural	-	-	-	-	-
194	6	601	Flint	Natural	-	-	-	-	-
195	6	601	Flint	Natural	-	-	-	-	-
196	6	601	Flint	Natural	-	-	-	-	-
197	6	601	Flint	Natural	-	-	-	-	-

APPENDIX 5: ANALYSIS OF IRON NAILS

5.1 Three ferrous (iron) nails (F#'s 77, 121 & 122) were recovered from the topsoil in two different trenches during the excavation at Kilmocholmóg Field, Lurgan, County Armagh.

5.2 The three nails were square in profile and hand-wrought. There was some variety in the size (see Table 1), though it was observed that in all cases the tip, and probably part of the shank, were missing. In this case the length measurements presented in Table 1 are the minimum surviving length.

Find#	Trench	Context	Length	Head width	Shank width
77	3	301	27.6mm	9mm	3.2mm - 3.7mm
121	4	401	27.6mm	8.5mm-11.3mm	3.7mm – 4.4mm
122	4	401	35mm	9.3mm – 16.5mm	6.4mm – 7.3mm

Table 1: Dimensions of the nails

5.3 These form of nails are typical of the medieval to early post-medieval period. The lack of a tip to any of the nails would indicate that they had been used, with the tip being left in the piece of wood into which they had been hammered.

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APPENDIX 6: ARCHAEOLOGICAL CONTEXT OF THE INVESTIGATION AREA

ARCHAEOLOGICAL MONUMENTS WITHIN THE INVESTIGATION SITE

6.1 The proposed investigations site in the general area of ARM006:016 which is described in the NISMR as follows:

> A low-lying field in the NW of the townland is remembered as an old grave yard. Locally, there is a tradition that the graveyard went out of use when the railway embankment NW of the site was built in 1841. There are no surface features, but the townland name, including the element `domnach` points to the former existance of a church in the area. Traditionally, `domnach' churches were claimed for Armagh, but the local name Kilmoholmóg suggests a link with Dromore, whose patron was Colman.
>
> *NISMR*

6.2 The accompanying SM7 file notes that the local name with cill points to a church site, and suggests that the name may indicate a link with Dromore, whose patron was Colmán, Donagreagh falling within that diocese. As noted in the SM7 file, additional historical information has suggested that the townland name may derive from 'domnach' suggesting an ecclesiastic site, as opposed to 'dun na' suggesting a rath. The local name of Kilmocholmóg was addressed in the research of the late Mr. Joseph McConville. No surface-visible indications of either exist within the investigation site, although topographically a small knoll on the southwestern side of the site close to the stream would be the most likely location for either.

6.3 Neither high resolution drone survey, the GPR geophysical survey, nor available LIDAR data for the area showed definite signs of potential burials or early enclosures, although the LIDAR and drone survey did appear to show signs of northeast to southwest running 'lazy beds' indicating historical cultivation of the field. This is perhaps unexpected for an area believed to contain burials, and would tend to indicate that the cultivation either significantly post-dates the burials, but this is more usual where no local tradition of the burials remains, or that the cultivation pre-dates the burials, which would then carry its own implications for the early ecclesiastic origin of the site.

6.4 As many aspects of the discussion on this site rely on varying translations of placenames and potential links with other historic sites, rather than physical evidence, the purpose of the proposed investigation is to try and give clarity regarding the historical land-use on the site and 'ground-truth' both the geophysical survey, but also the historical placename research and its implications for wider early ecclesiastical connections for the site.

ARCHAEOLOGICAL MONUMENTS IN THE SURROUNDING AREA

6.5 The proposed development and NISMR site ARM006:016. lies within a conspicuous blank area in the Northern Ireland Sites & Monument Record. No other sites lie within approximately a 1km radius of the field. Given the average density of raths across the country, and the density of raths beyond this radius, this could be taken as an indication that the land immediately around the site was church land and therefore not used for secular settlement.

CARTOGRAPHIC EVIDENCE

6.6 The Down Survey maps show the barony of 'Onealan', but the area of the proposed investigation is blank, and can only be discerned by the relative locations of the Barony boundaries and the parish boundaries of Shankill, Seagoe, Drumcree, Kilmore, and other landmarks.

6.7 Early land surveys of 1751 and 1863 show the land in the lands of Thomas Uprichard and Charles Uprichard respectively. No detail is given in terms of specific land use.

6.8 Other pre-Ordnance Survey historic mapping consulted did not give any detail of pertinence to the archaeological potential of the proposed development site.

6.9 The earliest reliably accurate mapping of the proposed investigation site is the Ordnance Survey mapping. On the 1st edition Ordnance Survey map of 1834 (Figure 1), the proposed development site is shown as a mostly unbounded area immediately to the north of a small cluster of buildings and yard, which correspond to that shown on the 1860 land survey. A portion of the site boundary in the north, and one on the west, corresponded to the original townland boundary between Donagreagh and Cornakinnegar, following a small watercourse. Note that by convention the 1st edition OS maps do not mark field boundaries, and the appearance of the site on this edition cannot be taken as indication that the site was unbounded.

6.10 By the time of the 2nd edition OS mapping of 1859 (Figure 2), the GNR rail line has been driven through the landscape and forms the new northern boundary to the site. All other field boundaries are also in place by this edition, including one northwest to southeast boundary which bisects the proposed investigation site into approximately 2/3 (southwestern portion) and 1/3 (northeastern portion). By the time of the 3rd edition mapping of 1905 (Figure 3), this subdivision has been removed, the 1st edition building that lies just outside the southern limit is no longer extant, and the site shows its modern boundaries. There is no change within the site for the 4th edition mapping of 1938.

LATER HERITAGE

6.11 The proposed investigation site is relatively removed from most individual sites of later heritage, although the line of the GNR Main Line from Belfast through Portadown to the border forms the northern boundary to the site. The associated viaduct on the line, approximately 550m to the northeast, is the closest specifically mapped item of Industrial Heritage. The Listed Buildings of Kilmore House (HB14/08/002) and Cherrymount (HB14/08/005) lie to the northeast and west respectively, Cherrymount being the closest at only 350m away on the opposite side of the Donagreagh/Cornakinnegar townland boundary.

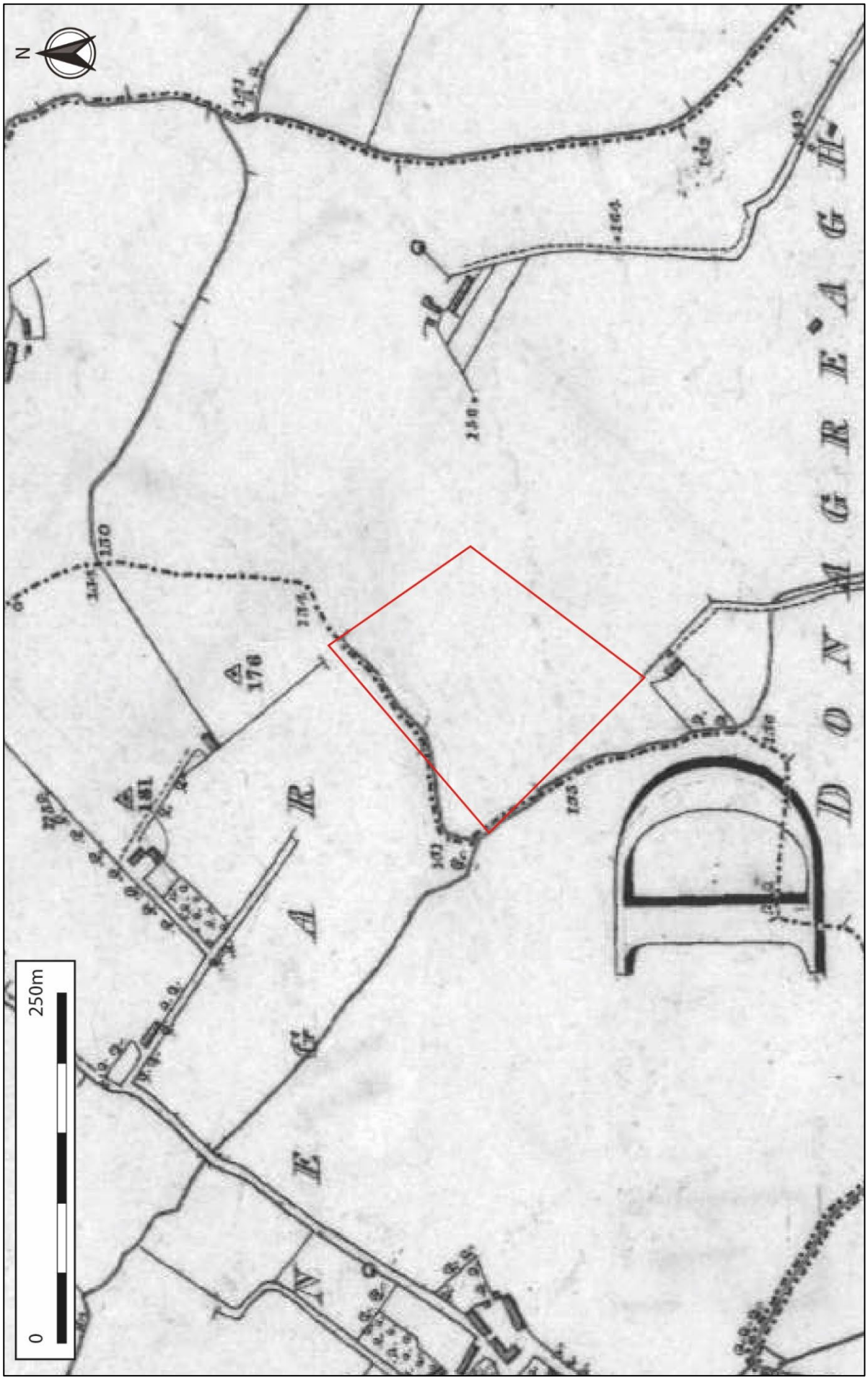

Figure 1: Proposed investigation site on OS 1st ed. mapping

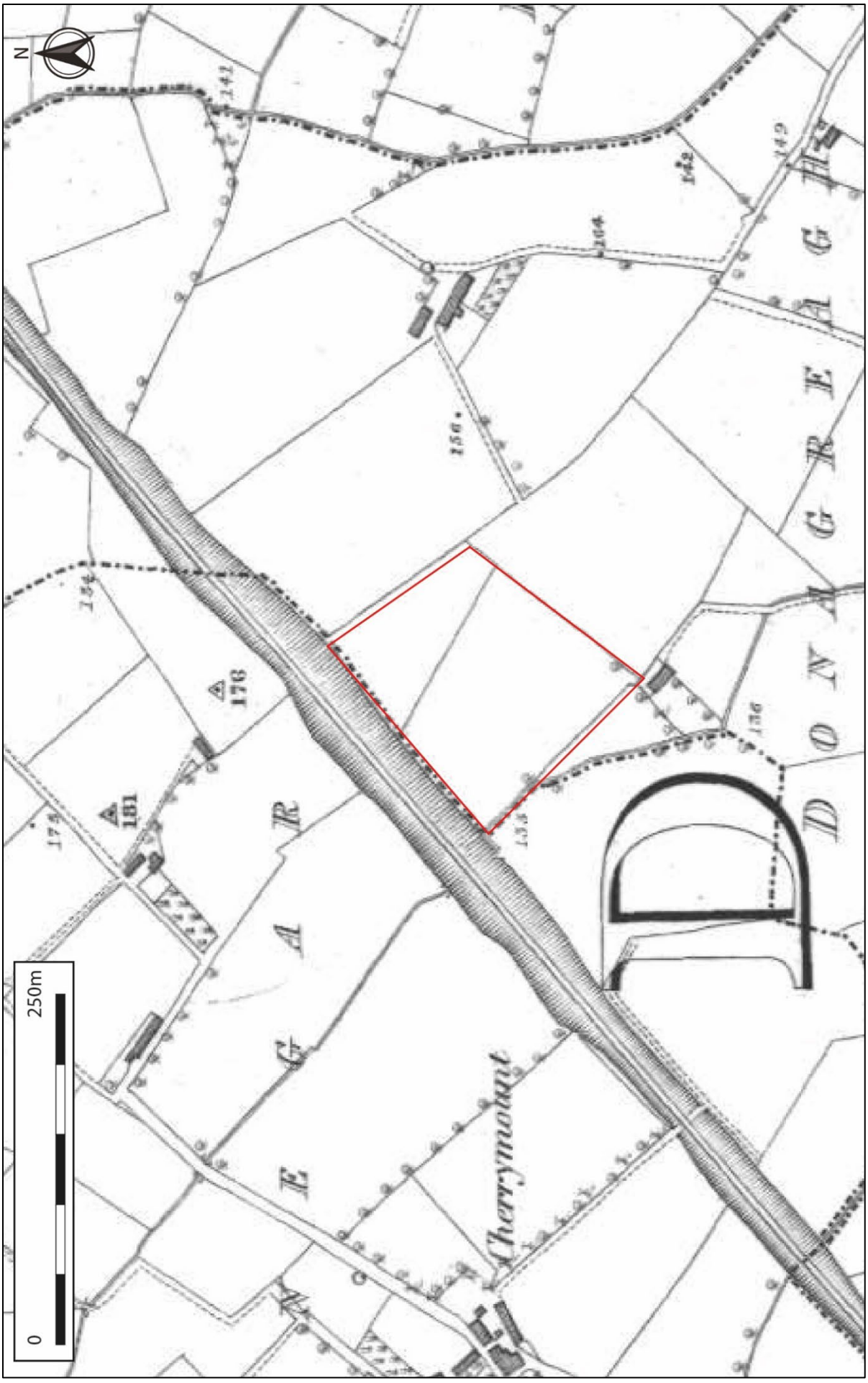

Figure 2: Proposed investigation site on OS 2nd ed. mapping

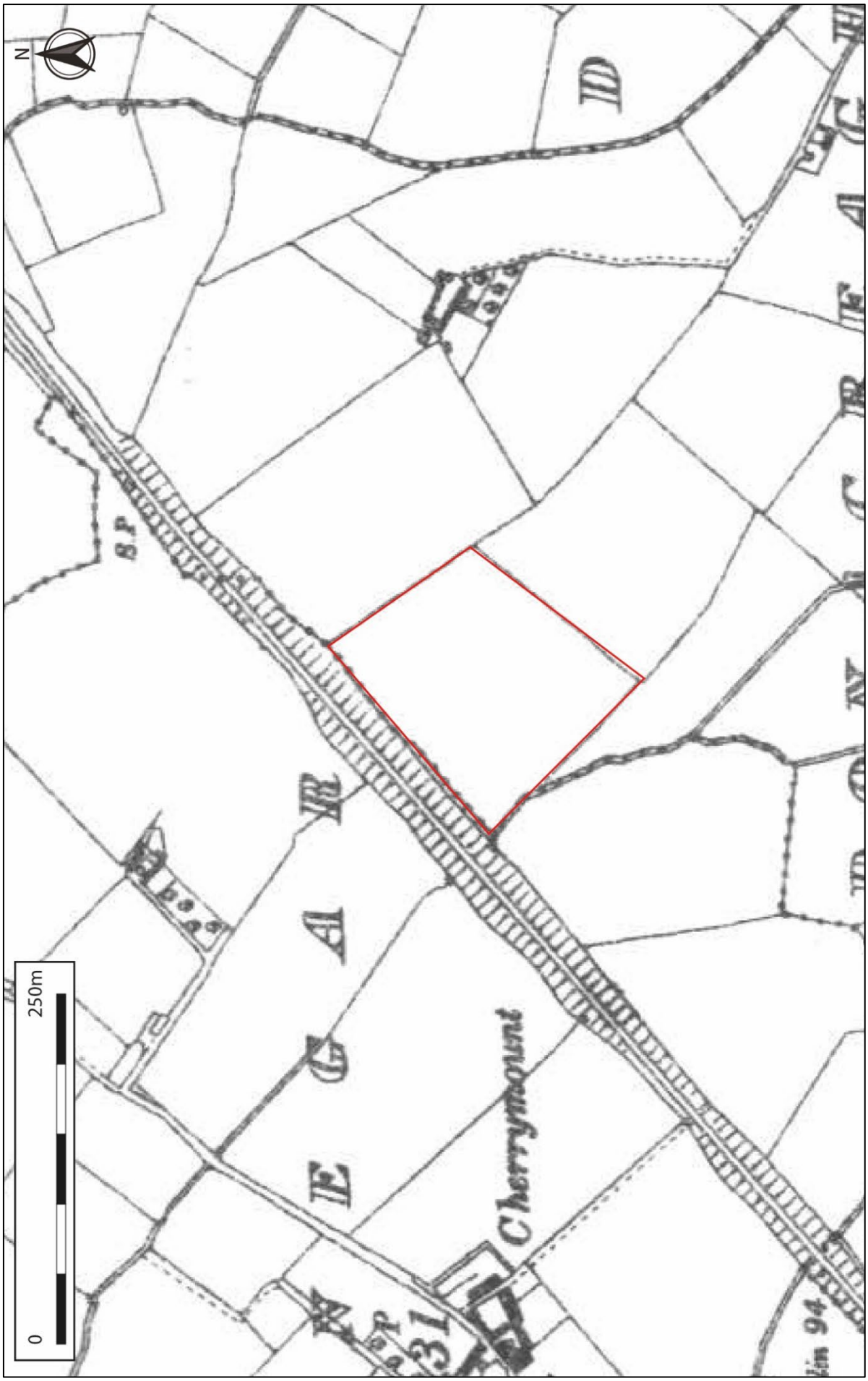

Figure 3: Proposed investigation site on OS 3rd ed. mapping

APPENDIX 7: GEOPHYSICAL SURVEY REPORT

Ground Penetrating Radar Survey: Kilmocholmóg (Lurgan)

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Ground Penetrating Radar Survey: Kilmocholmóg (Lurgan)

Contents[1]

1. Objective

To determine the presence of buried structures and unmarked burials at SMR Site ARM006:016 (Kilmocholmóg, Lurgan, listed as graveyard and church [possible]).

2. Ground Penetrating Radar

Ground penetrating radar (GPR)[2] has become a popular geophysical method in the assessment of possible underground structures and burials (Appendix 1), being more rapid than other methods (electrical resistance; seismic), less prone to magnetic interference (e.g. on basaltic bedrock) such as magnetometry [sometimes, gradiometry) and sensitive to the detection of building foundations, organic remains and ground disturbance. Major disadvantages of GPR are: it is time-consuming compared to resistivity/magnetometry and has poor results on clay-rich/conductive soils.

3. Methods

The GPR deployed comprises a GuidelineGeo 450 MHz High Dynamic Range system. This Swedish-made (Mala Geoscience) machine is a current, state of the art device.
All profile locations were recorded using a Garmin E90 global navigation system (GPS) with barometer; cross-compared to the two in-built GPS receivers in the GPR antenna and control unit (provides a differential correction), further positioned using temporary ground markers imaged by orthogonal MavicPro drone[2] (also with GPS). Data was viewed on site, in order to assess increasing survey limits or conducting more detailed work.

4. Areas Surveyed

The site lies 4-5 km north-east of Lurgan, on the Kilmore Road between Lurgan and Moira. The position of the SMR site was used as a reference point, but was found to be cut by NW-SE land drains through the wet ground with *Juncus effusus* (Irish Bog Rush) to the north-east of the surveyed field (Figs. 1, 2). Nonetheless, the area around the SMR position was surveyed. Analysis of orthoimagery indicates a right-angle (?one edge of a rectangular structure) in the north-west of the area, which was also surveyed (Fig. 3). Two phases of

[1] Fonts: main text: 12; figure captions: 10.5; Appendix: 9. [2]GPR – also 'radar'; orthoimagery – also aerial photographs

work were conducted: Phase One (23rd February, 2022) and Phase Two (1st March, 2022), with intervening review of Phase One results. Both phases concentrated on the north-western area of elevated ground in the Kilmocholmóg field (Figs 1, 2).

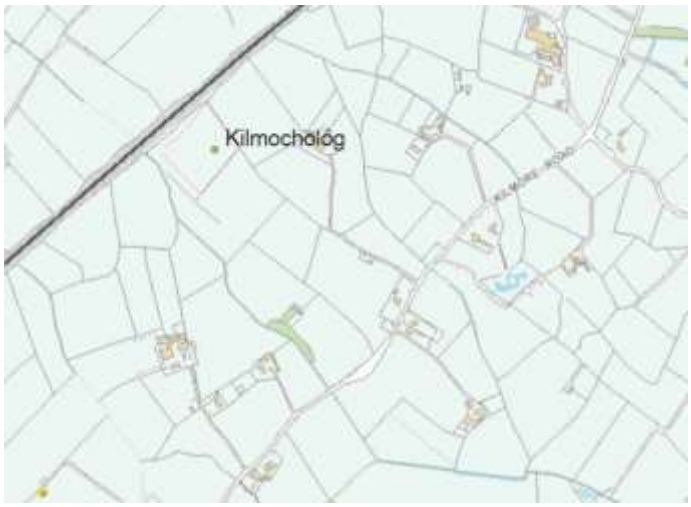

Figure 1. Site location and area surveyed (red dashed box).

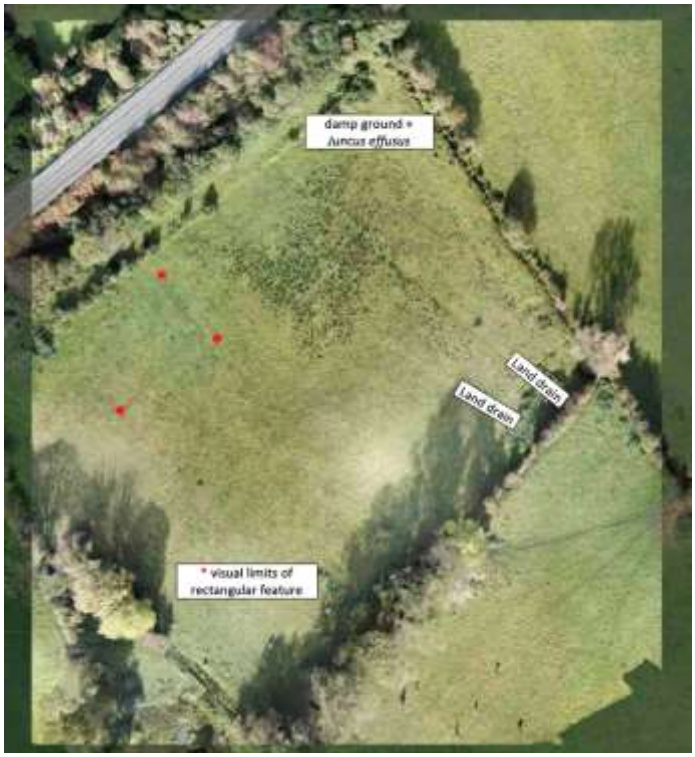

Figure 2 . Drone imagery montage (October, 2021 – c/o Ben Rocke, QUB PhD student) positioned on GoogleEarth©. Abundant *Juncus effusus* (reeds) can be observed, crossed by NW-SE land drains in the NE quarter of the field: the NW corner has a right-angled, possible corner of rectangular feature.

Figure 3. October 2021 drone image, enhanced relief using Q-GIS© remote sensing plugin.

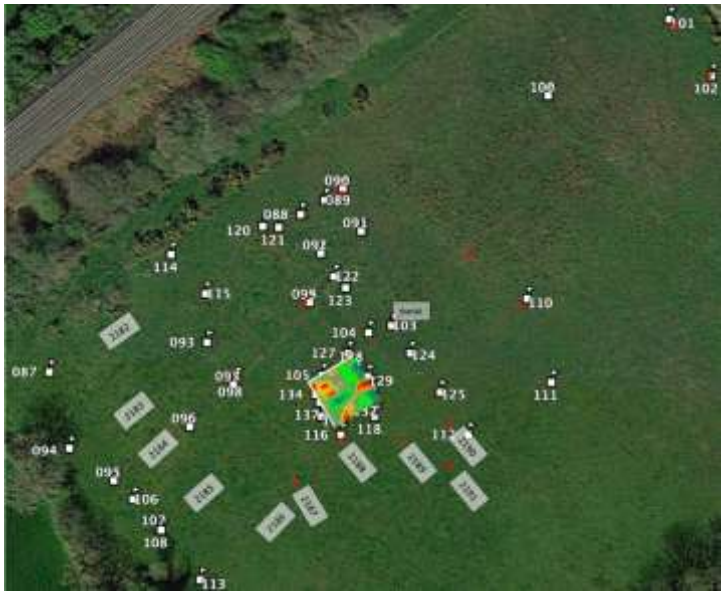

Figure 4. Reconnaissance GPR lines (red dashes), with Phase One 3D grid (coloured box). Numbers are GPS waypoints of 2D start and end points, plus anomalies noted in real-time. On GoogleEarth© aerial view.

5. Results – Phase One

Ten 2D lines were gathered on 23rd February, 2022 (Fig.4), followed by a 10 m x 10 m 3D grid, also on 23rd February.

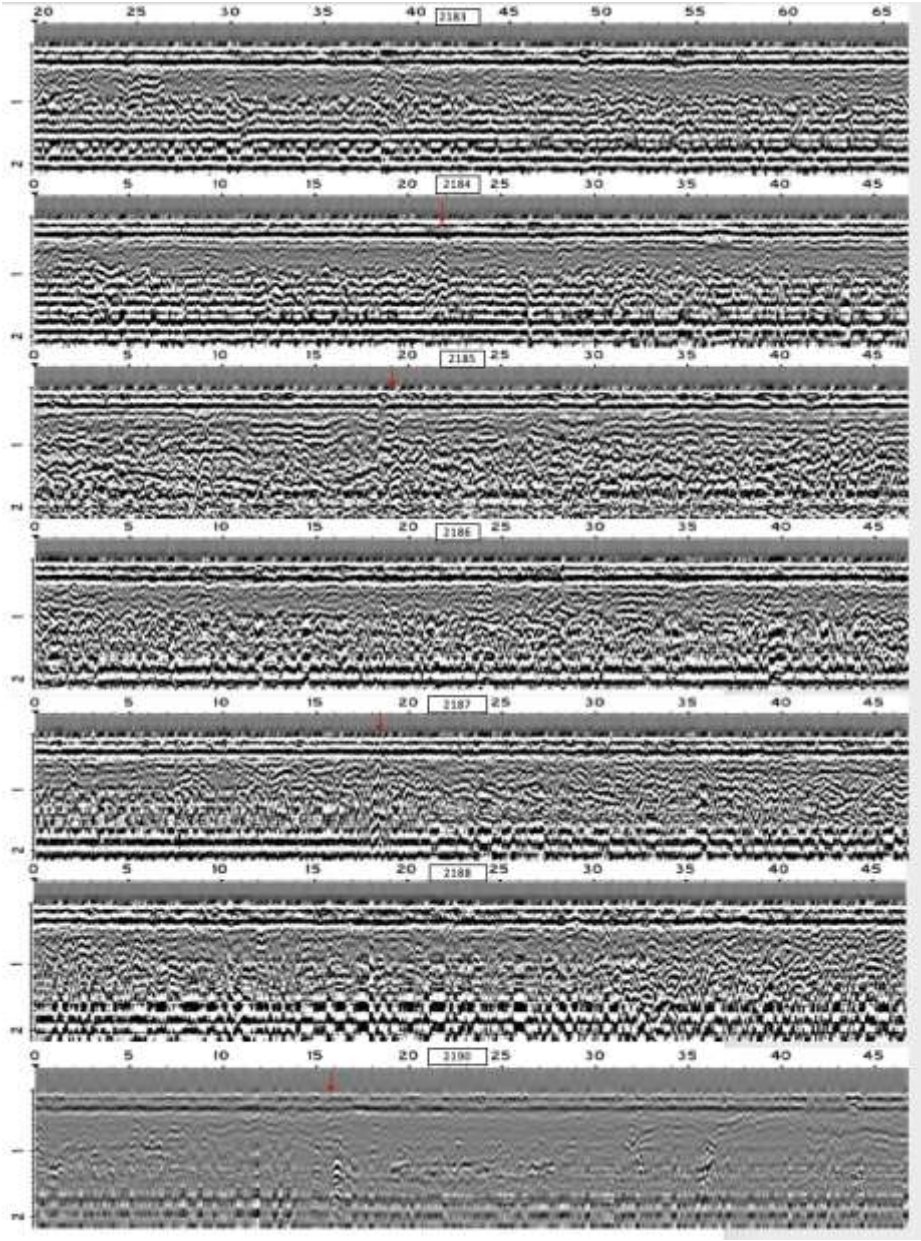

Figure 5. Selected reconnaissance 2D lines (see Fig. 4 for location), showing the bulk of the ground surveyed is without significant anomalies that could be buried features: those observed are arrowed (red) and relate to GPS positions within lines on Fig. 4. Most of these (arrowed features) were found to coincide with linear anomalies of the 3D surveys.

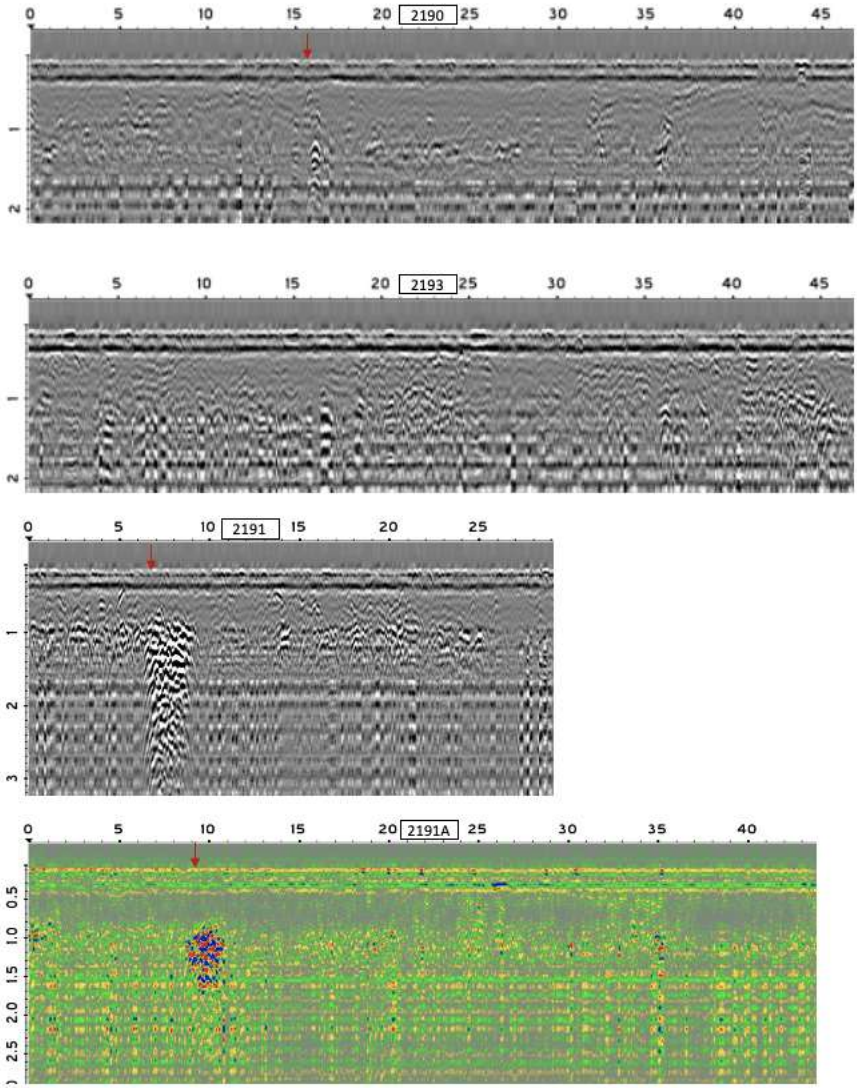

Figure 6. Further selected reconnaissance 2D lines (see Fig. 4 for location), showing the bulk of the ground surveyed is without significant anomalies that could be buried, upstanding or cut features: those observed are arrowed (red) and relate to GPS positions within lines on Fig. 4. The significant feature observed on Line 2191 is thus of note: this line (2191A) has been processed to accentuate radar amplitudes.

Figure 7. Detail of the Phase One 10 m x 10 m 3D survey (slice through the ground at 80 cm depth), same grid faded and overlain onto October 2021 drone orthoimage.

6. Discussion – Phase One

Possible explanations for the 3D depth-slice NE-SW linear feature (same as the major anomaly on vertical slice 2D Line 2191/Line 2191A: Fig. 6) were considered.

- Igneous dyke (Palaeogene): these are predominantly oriented NW-SE; if this is a dyke, it would be in the few percent in the north of Ireland and adjacent continental crust that are orthogonal, and would have to be very resistant to erosion, standing proud of bedrock (unknown depth below): none are mapped by Geological Survey of Northern Ireland in the area, possibly due to limited outcrop.
- A NE-SW oriented fault: these are known (overall NW-SE trend, Fig. 8) in the area, but like igneous dykes, have an orientation orthogonal to the feature :

Figure 8. Extrapolated faults in the area (from GSNI GeoIndex). https://mapapps2.bgs.ac.uk

- Land drain: other land drains in the area run from south-east to north-west (Fig. 2), a drain from the south-west into the wet ground (to the north-east) from this elevated position is possible, but would have to be deeper and of a far more substantial nature than others surveyed. The radar texture suggested the feature on Line 2191 comprises rocks.
- Remnant of railway construction: the feature on 3D is parallel to the railway: if an abandoned portion of track, it lies isolated and without an embankment; a substantial railway building would be unusual to have then been abandoned.
- Another linear feature: no small, shallow (>50 cm depth) isolated or large, deep (<1 m depth) metal was detected using a CEIA systems minimum mine detector, swept over the feature.

Possible explanations for the 3D right-angle anomaly west of the linear feature were considered.

- Coincidence of two land drains (NW – SE and SW – NE): it would be unusual to position land drains away from wet ground, in a currently well-drained position.
- Footprint of a more recent building than any earlier structure (e.g. temporary railway structure): none are known from the area.

7. Results – Phase Two

Eight 2D lines were gathered on 1st March 2022 (to re-locate features, positions not relevant), followed by a 30 m x 30 m 3D grid, over the right-angle on 1st March 2022).

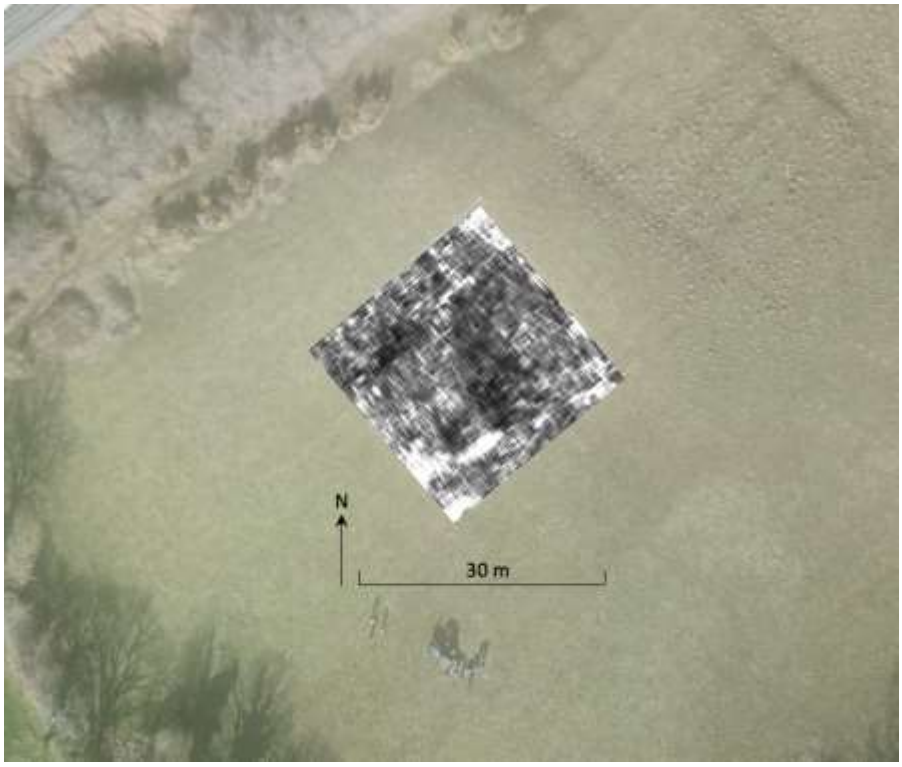

Figure 9. Greyscale 30 m x 30 m 3D slice at 1.35 m depth of the Phase 2 survey, overlain on March 1st drone flight orthoimage.

Figure 10. Greyscale radar amplitude 30 m x 30 m 3D slice at 1.35 m depth of the Phase 2 survey, overlain on March 1st drone flight orthoimage.

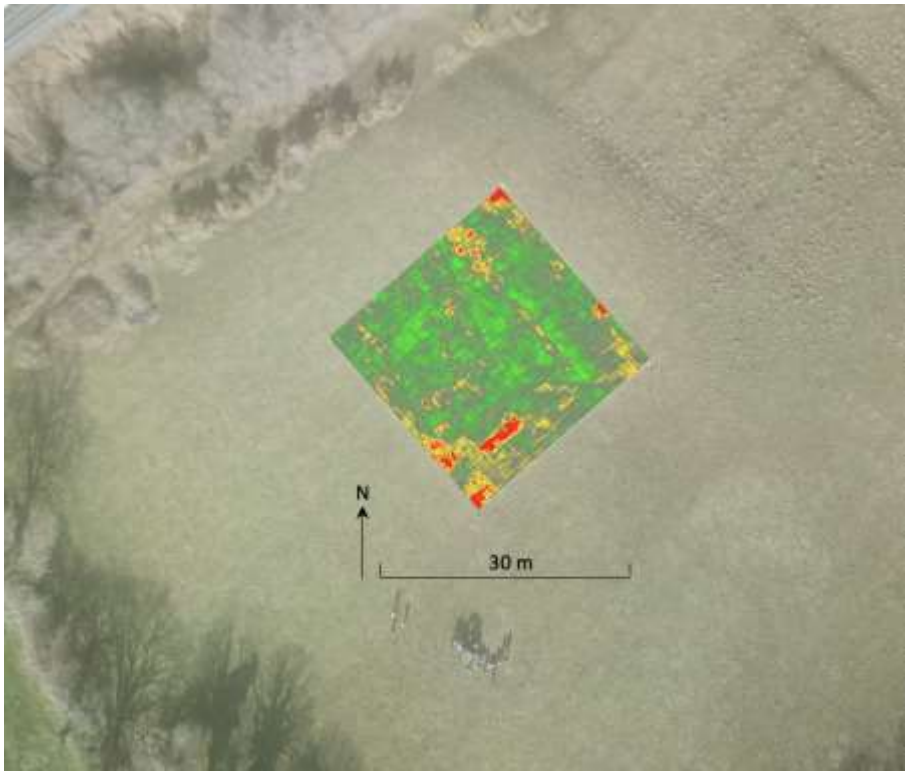

Figure 11. RGB 30 m x 30 m 3D slice at 1.35 m depth of the Phase 2 survey, overlain on March 1st drone flight orthoimage.

8. Discussion – Phase Two

Greyscale radar amplitude and colour plots confirm the shape, location, size and orientation of the right-angle feature identified in Phase One. However, this right-angle is offset from that seen on orthoimagery: a vague 3D lineament is observable coincident with the aerial photographs (Figs. 9, 10, 11).

9. Conclusions/Recommendations

The linear, south-west – north-east oriented feature is substantial and confirmed: the right-angle feature to the west of this is more subtle, and may comprise either two parallel corners (inner on orthoimagery, outer on GPR 3D slices), or an inclined, single feature at 1 to 2 m depth to the south-east, rising to surface north-west: no inclined surfaces were observed on 2D GPR data, but the frequency and design of the 450 MHz radar antenna may not be capable of resolving this.

For near-vertical and steeply-inclined structures, multiplexer GPR antennas[3] are capable of obtaining the imagery required: these are bulky (size of a fridge-freezer). A fully-licensed archaeological excavation, perhaps as two or three trenches to intersect radar anomalies at 90^0, would have the advantage of establishing makeup and retrieving artifacts.

10. Acknowledgements

The surveys were kindly funded by the Department for Communities: Historic Environment Division through the Historic Environment Fund; and the Armagh City, Banbridge and Craigavon Borough Council and The National Lottery Heritage Fund through the Lurgan Townscape Heritage Scheme (Lurgan TH). David Weir (Lurgan TH, Armagh City, Banbridge, & Craigavon Council) instigated this work and assisted on site. The permissions provided by

the council, the Historic Enquiries Division and by landowner Finola Mulholland allowed this work to proceed. Charles Mulholland is also very gratefully acknowledged for his logistical help on both survey days. The help of Queen's University students Lauren Carberry-O'Neill and Lisa White was essential. Mike Langton of GuidelineGeo loaned the 450 MHz HDR radar system.

11. Appendix

GPR – How the Method Works

GPR uses the transmission and reflection of radio waves (typically 25 to 2GHz) in imaging the subsurface. Radar waves, introduced in the ground, may reflect back to surface when they intersect objects or surfaces of varying dielectric permittivity. Thus a GPR system requires a source antenna and receiving antenna (built to measure the same central frequency). The transmitting antenna generates a pulse of radio waves that the receiver detects at a set time interval: the longer the time interval, (potentially) the deeper the waves will have travelled into the ground (or to a nearby surface object) and back again. When the ground has a slow radar wave velocity, so a buried object may appear deeper than in ground with a fast transmissive velocity. As the antennas pass over discrete objects with different dielectric properties to the surrounding medium (boulders, pipes, coffins, trenches), they may generate hyperbolae, or arc-like reflections, or depressions. Radar waves also travel horizontally from the transmitting antenna, which in open ground simply dissipate with distance. However, in areas with upstanding structures, especially those that have a significant dielectric contrast to their surroundings, interference from such surface objects can create artefacts on the radargram. When such isolated objects (powerlines, telegraph wires, metal poles, trees) are passed during a traverse, a series of hyperbolae may be generated that appear like a subsurface object but are simply out-of-plane reflections. Radar antennae are commonly elongate (bow-tie shape), generating radar waves in a widening arc from their long axis. Thus when moved in parallel to the antennae axis, the radar waves may reflect from a larger subsurface area in front and behind the antenna, (the so-called footprint) than when moved with the antennae at right angles to survey direction. Antennae may be shielded with radio-wave attenuating materials (e.g. aluminium) that reduce such out-of-plane interference. Unlike other forms of electromagnetic radiation used in geophysics, radio waves have far higher rates of attenuation, and thus penetration and reflection depths are typically low, but horizontal accuracy is high, coupled with rapid, real-time results, unlike all other geophysical techniques bar metal detectors and magnetometer raw data. The receiving antenna has either electronic or fibre-optic link to a recorder that converts incoming radio waves to digital format and displays these graphically as wavelets. As the transmitter-receiver array is moved, so these wavelets are stacked horizontally to produce a radargram, a kind of x-ray slice into the Earth, but recorded in the time taken for radar waves to penetrate and reflect, as opposed to real depth. The speed of radio wave propagation is determined by the makeup of the transmitting medium: in this case the speed of light and dielectric permittivity. Magnetic properties can also influence radar wave speed. Changes in dielectric permittivity can cause radar wave reflection, without which GPR profiling would be impossible. Radar wave attenuation, or signal loss is extreme in conductive media such as seawater, clays (especially hydrous) and some leachate. GPR has good depth penetration (tens to hundreds of metres) in ice (with minor fracturing/interstitial water), hard rocks like limestone and granite and clay-poor quartz silts or sands. Vertical resolution *vs.* depth penetration is of major concern when choosing antenna frequency. Low frequencies (15-50MHz) achieve deep penetration with poor horizontal resolution in the received signal, due to the long wavelength. High frequencies (500-1000MHz) show high resolution with weak penetration (centimetres to metres). Low-frequency antennae are

large (a few metres long), high frequency antenna are small (tens of centimetres). Again, this can influence the use of the method, as deeply-buried targets in enclosed spaces are virtually impossible to survey.
As with all geophysical methods, some intelligence concerning the likely size and makeup of the target is useful: where unknown or questioned, then a range of antennas should be used, and in very poorly understood locations, with other geophysical and invasive techniques (Blunderbuss Approach). Moisture contents influence radar wave velocity because in homogenous media porosity has a direct relationship to dielectric permittivity. Thus dry sand will allow increased wave propagation: sand with high freshwater content will give improved vertical resolution. A problem with unshielded antennas is the effect of 'out-of-plane' reflections (see above, trees, poles), analysed by surveying the same line with different antenna orientations; this is suppressed by shielding. It is easy to think of the radar wave as a focused beam (the ray-path at right-angles to the wave) when in fact the radar wave as it travels into the subsurface is more like a figure of eight bubble, ovates-shaped at first, expanding and becoming both a single oval and distorted as it travels at different speeds into the ground. Thus lateral to the antennae, on or in the ground surface may be structures that cause reflections at ground level. The effect of these surface features can be diminished by altering the orientation of the antennae, or by shielding the above-ground portion of the antennae, such that the radio wave is focussed to penetrate the ground. GPR has found its best uses in imaging glaciers, sand deposits (river, non-saline coastal sands), aquifers (porous nature), archaeological features (moats, buried buildings, graves) and concrete/pavements.