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Kiltotan and Collinstown, Oldtown

Co. Westmeath

Geophysical Survey Report

Licence No.: 21R0317

ITM: 645111, 739000

Donald Murphy

25th January 2022

ACSU Ref.: 21108

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PROJECT DETAILS

Project	Geophysical Survey at Kiltotan and Collinstown, Oldtown, Co. Westmeath
Licence No.	21R0317
Townland(s)	Kiltotan and Collinstown, Oldtown
RMP No.	N/A
ITM Ref.	645111, 739000
Land Use	Pasture/arable
Survey Type	Fluxgate Gradiometer
Instrument	Bartington Grad 601-2
Sample/Traverse interval	0.25m/0.5m
Client	Lumcloon Energy Ltd
Planning Ref.	21/515; 21/532
Archaeologist	Donald Murphy
Report Authors	Donald Murphy and Robert Breen
Report Date	25 January 2022
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Revision	Date	Description	Status	Author	Reviewed	Approved
0	25.01.2022	Geophysical Survey Report	Draft	D.M, R.B	M.L	D.M

SUMMARY

This report details the results of a geophysical survey conducted at Kiltotan and Collinstown, Oldtown, Co. Westmeath (ITM 645111, 739000). The site lies to the north of the M6 Motorway and south of the R446 between Tyrellspass and Rochfortbridge.

The geophysical survey was carried out in response to a further information request attached to Planning Ref. 21/515; 21/532 by Westmeath County Council. The survey was undertaken to assess the archaeological potential of the site in relation to the LEL Flexgen Castlelost, LEL ESS Castlelost and LEL GIS Castlelost projects.

There are no monuments listed in the Record of Monuments and Places (RMP) or Sites and Monuments Record (SMR) within the site. However, a number of monuments, classed as ringforts are located in close proximity. The nearest are located between 150-200m from the edges of the site and consist of WM033-068----, WM033-062---- WM033-061---- . All were depicted since the 1836 OS map, however at present only WM033-062---- has surface expression. The remaining two were levelled sometime in the mid/late 20th century during field reclamation and are now visible as crop marks only.

The geophysical survey was conducted in January 2022 by Donald Murphy and Robert Breen of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 21R0317 issued by the Department of Housing, Local Government and Heritage. The surveyed area extended across 21 hectares and consists of 9 arable and pasture fields.

Areas of possible archaeological activity were identified in Fields 1, 3, 5, 6, 7 and 9. These areas represent concentrations of positive and negative responses suggesting archaeological activity and might represent features such as fulachta fia, ironworking sites and pit circles/pit concentrations, or areas of magnetic disturbances. Furthermore, areas of potential archaeological origin include positive anomalies that may represent cut features such as pits and postholes or they may even be natural in origin. Fields 1, 4, 5 and 9 also produced evidence for land use in the form of relict field boundaries, access, and cultivation activity. Throughout the survey area, small-scale ferrous responses were evident in the results and are likely to represent modern metal debris contained within the topsoil. Magnetic disturbances were noted, particularly along the northwest and south extent of the site. These are associated with the construction of the M6 motorway and buildings depicted on the Ordnance Survey Maps, now demolished.

The location of the site in close proximity to a number of recorded monuments, ringforts, the presence of previously unknown archaeological features immediately adjacent excavated during the M6 Motorway development suggest its further archaeological potential. Though no large scale monuments are apparent in the survey data, smaller anomalies of possible archaeological significance were identified throughout the site.

It is recommended that targeted test trenching of the anomalies recorded in the areas to be impacted should be conditioned within any grant of permission on the site and in advance of construction. This should be carried out under licence to assess the archaeological significance of the anomalies identified and determine the impact that development may have on any features identified.

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1. BACKGROUND & AIMS TO SURVEY

This report details the results of a Geophysical Survey conducted at Kiltotan and Collinstown, Oldtown, Co. Westmeath (ITM 645111, 739000). The site lies to the north of the M6 Motorway and south of the R446 between Tyrellspass and Rochfortbridge. The surveyed area extended across 21 hectares and consists of 9 arable and pasture fields.

The geophysical survey was conducted in January 2022 by Donald Murphy and Robert Breen of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 21R0317 issued by the Department of Housing, Local Government and Heritage. A full detailed gradiometer survey of each area was undertaken using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system. A total combined area of 21 Hectares was surveyed.

The objectives of the geophysical survey were to:

- identify any geophysical anomalies of possible archaeological origin within the specified survey area;
- accurately locate these anomalies and present the findings in map form;
- describe the anomalies and discuss their likely provenance in a written report; and
- incorporate all of the above in a report to the Client.

The findings of the survey will help inform the planning process and the scope of any future works at the site.

2. DESCRIPTION OF SURVEY AREA

The survey area is located in a mix of pasture and arable fields that are relatively flat but with gently undulating ridges and hollows throughout. The fields are bounded with mature hedgerows and wet ditches and farm access lanes. The main part of the site has an elevation of between c. 97-103m OD.

The soil within the site consists of pockets of mineral poorly drained (mainly basic) and a band of cutover/cutaway peat areas are located within the south portion of the site, however, deep well drained mineral (mainly basic) soils dominate and overly Waulsortian Limestones consisting of massive unbedded lime-mudstone bedrock, sometimes informally called "reef" limestones, although inaccurate; dominantly pale-grey, crudely bedded or massive limestone (Geological Survey of Ireland Spatial Resources, Public Data Viewer Series).

3. METHODOLOGY

A full detailed gradiometer survey was undertaken across the survey area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer, the work being carried out by hand or by cart, depending on ground suitability. A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 0.5m for all the survey areas with variations in the magnetic field between -100nT to +107.834nT. Where hand survey was employed, the survey grids measured 10m by 10m and were set out on the ground using a Trimble Geo7x with 1cm accuracy using the Irish Transverse Mercator projection (ITM). Survey using the cart was carried out using a Bartington cart system with mounted Trimble R10 GPS Antenna with sub centimetre accuracy. Fieldwork, data processing and reporting adhered to the most up-to-date guidelines for conducting archaeo-geophysical surveys (Schmidt et al. 2016; Chartered Institute for Archaeologists 2014; AHDS n.d; Bonsall 2014). The magnetometer was calibrated in the field in accordance with the manufacturers instructions. The survey data was logged to a laptop computer and archived to the company's cloud servers and internal servers. The data was then processed using Geoplot 3.0 software.

Processing included:

- clipping of the range to enhance weaker anomalies,
- removal of striping where required
- edge matching of adjacent survey panels
- interpolation of the data from 0.5m to 0.25m traverse spacing to enhance the quality

4. CONDITIONS OF SURVEY

Weather conditions during the survey period were relatively dry. Two of the fields had been ploughed and were under a young crop. The remaining fields were under short grass.

5. ARCHAEOLOGICAL BACKGROUND

5.1 Archaeological & Historical Background

The site is located in Kiltotan and Collinstown, Oldtown townlands within the Barony of Fartullagh in the civil parish of Castlelost in County Westmeath. The landscape surrounding the site has been subject to human development and settlement since prehistoric times. The monuments listed in the Record of Monuments and Places (RMP) clearly demonstrate that the surrounding landscape is dominated by recorded monuments classed as ringfort – raths. There are ten ringfort raths located within 300m radius from the edges of the site, with the three nearest consisting of WM033-068----, WM033-062---- WM033-061---- . All three were depicted since the 1836 map, however at present only WM033-062---- has surface expression, the remaining two were levelled sometime in the mid/late 20th century during field reclamation, and are now visible as cropmarks only. The Ringfort, as the name suggests, implies a circular enclosure with a minimum of one ditch and possible accompanying banks. They were generally circular, measuring circa. 24 – 60 metres in diameter. Early Irish laws stated that circularity was a feature of the model ringfort (Stout 1997). However, with the increase of development, more and more non-circular enclosures are coming to light. Therefore, for the purpose of this discussion, all of the above enclosures will be discussed under the category 'ditched enclosures'.

The majority of early medieval ditched enclosures date to the sixth to ninth centuries AD, and we see a significant decline in their use in the tenth century (O'Sullivan, Nicholl 2010). Though a site in Laytown, Co. Meath (McConway, 2002) could have a fourth-century date, other sites such as Ballynacarriga, Co. Cork (Noonan, 2004) and Raystown, Co. Meath (Seaver 2005) were probably occupied from the 5th century well into the 11th century.

Ditched enclosures are generally regarded as enclosed farmsteads, and the defences are thought to have been built in order to protect against cattle raids (Stout 1997). Some have provided little evidence for structures, suggesting the enclosure was used for storing cattle, known as a 'bodun', though the majority provide evidence to suggest they were inhabited settlements, with houses, farmyards, outbuildings and animals (O'Sullivan, Nicholl 2010). Excavated items retrieved from ringforts are of a domestic, craft or agricultural nature (Monk, 1995). Some larger sites such as Raystown, Co Meath fulfilled many functions; there was evidence for animal husbandry, cereal and grain processing, milling, burial and metallurgy (Seaver, 2016).

Ditched enclosures are the commonest field monument in Ireland. The majority of ditched enclosures were univallate with one bank and fosse. In many cases, the banks do not survive. There are, however, bivallate enclosures, for example, Cloonaboy, Co. Mayo (Gillespie & Kerrigan, 2010) and multivallate enclosures, such as Garranes, Co. Cork (O'Riordan 1942). While ringforts were generally 24 – 60 metres in diameter, the majority of non-circular enclosures were between 50m and 70 metres in diameter. Ditched enclosures tend to

be situated on sloping or well-drained hilly ground with good views (Stout, 1997). Ditched enclosures usually are found in clusters within a townland (Edwards, 1990).

Ditched enclosures usually have an entrance at the southeast. This is to avoid the prevailing cold westerly and northerly winds that the enclosure would be exposed to (Stout 1997). The entrance passage at Rath II at Ballypalady, Co. Antrim ranged from 0.76m at the outer end to 1.5m at the inner opening, suggesting it was not intended for keeping large livestock (O'Sullivan, Nicholl, 2010).

Evidence from excavations shows that enclosing ditches were, in some cases, allowed to silt up and had refuse deliberately dumped into them. Layers of slag were dumped into the ditch at Lisleagh, Co. Cork (Monk,1995).

Many sites, like that at Lissachiggel, Co. Louth had either cobbles or paving stones providing a dry passage into the enclosure. These entrances were known in early Irish literature and legal sources as the 'airdrocht' and were to be kept clean (O'Sullivan, Nicholl, 2010). O'Sullivan wrote that it was not unusual to see pathways laid within the interior to steer movement towards a particular direction and "upon entering the site, a person was often persuaded by laid pathways to move directly and immediately to the house doorway" (ibid.). The pathway was meant to be kept clean and dry, and likely, ditches and gullies would function as drainage features to keep the area dry.

Early Medieval houses within ditched enclosures tended to be circular or round, made of stone or post-and wattle walls. The roofs were thatched with reeds, turf or straw. According to the eight- century law text Críth Gablach, a typical farmer's house was 6-8 metres in diameter. Archaeological evidence shows that the majority were 4 to 5 metres in diameter, and some were significantly larger, at 6 to 10 metres in diameter (ibid). As pointed out by Mc Cormick, Kerr, Mc Clatchie and O'Sullivan, because of the basket-like construction any recuts or changes to the early medieval houses, are rarely seen in the archaeological record (McCormick, Kerr, McClatchie, O'Sullivan 2011). It was likely that the lifespan of a medieval house would have lasted for just a short period of time (20 to 30 years); with good maintenance a house could have stood for 50 to 60 years (O'Sullivan, Nicholl, 2010).

Associated with the enclosures and often found in its environs are fire pits, storage pits, refuse pits, a cooking pit and cereal-drying kilns. O'Sullivan and Nicholls wrote that pits are "one of the more enigmatic elements to be found within the enclosure…their function…difficult to discern. They would have been used for a variety of purposes; probably reused and cleaned-out many times and countless, no doubt, had multiple functions over their lifetime" (ibid). According to Mc Cormick, Kerr, Mc Clatchie and O'Sullivan cereal drying kilns are generally not associated with ditched enclosures, however there are several examples of sites with associated kilns, such as Johnstown 1, Co. Meath, Gortygrigane, Co. Tipperary and Camlin, Co. Tipperary (Cited in McCormick, Kerr, McClatchie & O'Sullivan 2011).

Often associated with the ringforts, are curvilinear field systems. At Cush, Co. Limerick a line of rectangular fields were excavated by O Riordain (1940) that were located along the west-facing slopes of the Slieve Reagh hillside with many of the field boundaries respecting the ringfort ditches. The field enclosures are generally long and thin, and run down the hillslope, while those at the northern end appear square in plan. Some of the fields are as long as c. 200m while others are considerably smaller (see plan in Mytum 1992). The use of some of the fields for crop husbandry was noted by Fowler (1966, 69-71) when he identified a block of ridge and furrow running east-west across part of the rectangular enclosure attached to the southern group of ringforts which may have been early medieval in date.

Excavations at Lough Gur in Limerick, again by Ó Ríordáin (1949), uncovered field systems associated with hut sites known as the 'Spectacles'. Each unenclosed house site was situated in a small rectangular field overlooking Lough Gur. The fields were only half an acre in size and the field boundaries comprised of double-stoned walls with rubble fills, ranging in width between 1m and 3m, except for one which was made from earth. Their close proximity to the houses and small size suggest they were probably used for tillage. Another field bank was situated up the hillside and was probably part of a wider field system used for pasture (Ó Ríordáin 1949).

A field system of bank and ditches preceded the construction of ringforts I and II at Lisduggan North, Co Cork. Twohig (1990) however, suggested that the older linear trenches provided the building material for a series of contemporary field banks. A third ringfort, in proximity to the west of ringfort's I and II, also post dated a series of linear bank and ditches which were again probably utilised for the

construction of the early medieval field banks. The building material was used in a series of banks which enclosed a range of fields on part of Knocknanuss Hill. The pattern of field systems at Lisduggan North were very irregular and Twohig (1990) has suggested that they most clearly resemble the field systems uncovered at Cush, Co. Limerick.

At Ballyutoag, Co. Antrim, a group of curvilinear enclosures, representing field systems, were associated with three smaller curvilinear enclosures which enclosed a number of hut sites. The series of curvilinear fields (Williams 1984) covered an area of approximately 24 acres and were formed by low earthen banks. A group of fields to the west of Enclosure's I and II contained cultivation ridges. Ballyutoag was probably an upland transhumance settlement where cattle grazed for the summer months and small levels of crop husbandry were undertaken. Excavation of some of the hut sites produced a meagre collection of artefacts which ties in with the evidence from the historical sources stating that booleying was the work of the impoverished classes and mainly women and children (Patterson 1994). The finds and radiocarbon dates from the excavations confirm an early medieval date for the settlement and field systems (ibid).

A ringfort, associated with curvilinear field systems, was situated on the townland boundary between Glebe and Laughanstown, Co. Dublin. Two small ditches, radiating from the south of the enclosure, represented early medieval field enclosures. The ditches probably had low banks topped by hawthorn or blackthorn and both species were represented in the charcoal samples. The curving hedgerow of the townland boundary complemented one of the field enclosures suggesting a large elongated field system attached to the south of the ringfort. Radiocarbon dates confirmed an early medieval date, between the seventh and ninth centuries, for one of the field boundaries (Seaver 2005).

By far the closest example of a similar site type excavated to date is the early medieval field complex at Boyerstown, Co. Meath which was excavated in advance of the M3 motorway project. Here five circular enclosures and an array of sub-rectangular and curvilinear enclosures were excavated. The earliest enclosure (60m x 30m) contained three internal divisions, and there were no internal features, or finds, with the exception of small amounts of animal bone. One of the internal divisions cut an earlier ditch which was dated to AD 460-650, so Enclosure 1 post-dated this period. Enclosure 2 (45m x 25m), also sub-rectangular, cut through the S-SE extent of Enclosure 1 and was dated to AD 700-900. An annex was visible to the north and was dated to AD 630-780. Two additional radiocarbon dates were recovered from ditch features. One ran into/was cut by Enclosure 1 and was dated to AD 580-680, and a small curvilinear ditch, the function of which is not clear, was cut by Enclosure 2 and was dated to AD 620-700. It is likely to have been associated with Enclosure 1. It is likely that all features on this site represent successive phases of enclosure activity and were broadly contemporary. It is probable that all of the ditches functioned as animal enclosures as there is an almost total absence of finds and only a small amount of animal bone was recovered. What appears to be a ringfort, based on the geophysical evidence, is located to the northwest of the field systems and is probably related to them.

The Boyerstown field systems display a range of rectangular, sub-rectangular and curvilinear fields. It is common to find ringforts, or open settlements, from the early medieval period associated with these types of fields (see examples above) but what is unusual about the Boyerstown evidence is that the clustering of fields occur away from the main settlement. The first and most difficult question that has to be asked is what the field systems at Boyerstown were used for. Only a tiny number of artefacts, five knives, were uncovered from the ditches at Boyerstown. No evidence for plough marks, such as ridge or furrow, were detected on either site. Animal bone was retrieved only in tiny quantities at Boyerstown so what we are dealing with essentially are a number of successive field systems, annexes and ditches which have returned radiocarbon dates between AD 460 and AD 900. It appears most likely that the fields enclosed livestock and that although the radiocarbon dates for the majority of the features, including Enclosures' I and II, the annex to Enclosure II and the small curvilinear ditch that was cut by Enclosure II, demonstrate broad contemporaneity, the geophysical signatures suggest various phases mainly concentrated within a 200-year period between the seventh and eighth centuries. It, therefore, appears that the archaeological evidence at Boyerstown represents successive phases of land enclosure where the purpose was to enclose livestock. The lack of animal bone from the ditches is not surprising because the majority of animals were slaughtered within, or close, to the

settlement during the early middle ages hence the common retrieval of large quantities of cattle, sheep and pig bone from the vast majority of ringfort enclosing ditches.

5.2 Recorded Monuments

There are no monuments listed in the Record of Monuments and Places (RMP) or Sites and Monuments Record (SMR) within the site. However, a number of monuments, classed as ringforts, are located in close proximity. The nearest lie between 150-200m from the edges of the site and consists of WM033-068----, WM033-062---- WM033-061---- . All were depicted since the 1836 map; however, at present, only WM033-062---- has surface expression. The remaining two were levelled sometime in the mid/late 20th century during field reclamation and are now visible as crop marks only.

The following is a list of the nearest Recorded Monuments located within the surrounding area (Figure 2). These descriptions are derived from the National Monuments Service Archaeological Survey Database (http://webgis.archaeology.ie/historicenvironment/).

Table 1: Recorded Monuments in the environs of the site

RMP/SMR No	Class/Site Type	Description
WM033-068----	Ringfort - unclassified	On a low rise of ground in gently undulating pasture. Levelled ringfort which is visible as a roughly circular area (diam. c. 45m) defined by a cropmark which is visible on the 2005 OSI aerial photograph. Marked 'Fort' on the OS fair plan map of the parish of Castlelost (SMR File).
WM033-061----	Ringfort - rath	In pasture, on gentle NNE-SSW slope of low rise of ground with good views in all directions. Ringfort (WM033-066----) 370m to the SSW. Only the cropmark of a levelled ringfort is visible on the 2005 OSI aerial photograph. Hachured as a large oval-shaped enclosure on the 1837 ed. OS 6-inch map. Monument described in 1976 as a roughly circular-shaped area (diam. 75m E-W) defined by an earthen bank and external fosse which are best preserved at N and are barely visible elsewhere. There is a small causeway across the fosse at N which may be an original entrance feature. The ringfort was bisected by a 19th century field boundary running NW-SE. The field to the S of this field boundary was in tillage in 2005, while the field to the N is in pasture.
WM033-062----	Ringfort - rath	In pasture, on slight S facing slope of ground with good views in all directions. Oval-shaped area (diam. 46m N-S; 37m E-W) defined by a poorly preserved bank mainly reduced to a scarp with slight remains of an external fosse that has been mainly filled in with the faintest traces of a possible outer bank. A water reservoir has been built immediately to the N. There are several gaps in the bank due to modern disturbance. A gap in the bank at SSE appears to be the original entrance gap (Wth 2.9m).
WM033-066----	Ringfort - rath	On a slight rise of ground with good views to the E. Ringfort (WM033-065----) 210m to the W, and second ringfort (WM033-061----) 370m to the NNE. Oval-shaped area (diam. 55m N-S; 64m NW-SE) defined by a substantial earthen bank covered in trees and bushes and wide flat-bottomed fosse with low external bank. The inner bank and fosse are best preserved from W-N-NE. The banks have been levelled and fosse filled in from E-S-SSW. No indication of an original entrance feature.

5.3 Protected Structures and National Inventory of Architectural Heritage (NIAH)

There are no protected structures listed in the Westmeath County Development Plan 2021-2027 within or in the immediate vicinity of the site. The nearest such structure, classed as 1820-1840 forge/smithy (RPS ID. 033-001) is located in the neighbouring Farthingstown, c. 940m to the northeast of the site. It is also listed within the National Inventory of Architectural Heritage (NIAH) as NIAH Reg. Id. 15320002 and described as: *Detached gable-fronted single-bay single-storey former forge/smithy, built c.1830. Now out of use. Pitched*

natural slate roof with clay ridge tiles. Squared rubble stone walls having a square-headed carriage arch to the main elevation (east) with timber sheeted double doors. Circular carved stone above carriage arch having simple brick surround. Road-fronted, on a small lane to the south of the former main Dublin to Galway road and to the southwest of Rochfortbridge.

A modest early-to-mid nineteenth-century forge, which is an interesting addition to the social history and to the built heritage of the Rochfortbridge area. This functional building is robustly built in local limestone and is in good structural order despite being out of use for a considerable period. The decorated stone above the carriage arch is an unusual feature that adds interest to this simple structure. This small-scale building is of a type once very common in rural Ireland but now becoming increasingly rare today, making this an important survival. It represents an interesting historical reminder of traditional rural industry and craft skills. This former forge is prominently sited just to the south of the former main Dublin to Galway road and adds incident to its rural location to the southwest of Rochfortbridge.

5.4 Previous Archaeological Investigations

An examination into previously excavated sites in the vicinity of the survey areas indicates that several archaeological investigations have been conducted within the wider area. Five such investigations took place in the immediate environs. Test trenching (04E0908) in relation to the M6 Motorway development identified sites that were later excavated (E2768, E2769, E2770), while test trenching to the west of the site in relation to quarrying (07E0867) identified a hearth and a relict field boundary.

The details of these investigations are derived from the Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie) and listed in the table below.

Table 2: Previous excavations in the environs of the site

Excavation.ie reference	Licence No.	RMP No.	Investigation type	Site type
2004:1748 - N6 KINNEGAD TO KILBEGGAN, Westmeath	04E0908	N/A	archaeological centre-line and offset testing programme	Various
2005:1570 - KILTOTAN/COLLINSTOWN, Westmeath	A001/007	N/A	Excavation	Burnt mound, pits and post-medieval agricultural features
2005:1571 - KILTOTAN/COLLINSTOWN, Westmeath	A001/008	N/A	Excavation	Late medieval/early modern
2007:1914 - Kiltotan and Collinstown, Westmeath	07E0867	N/A	Test trenching	Hearth

Test trenching (04E0908) in relation to the M6 Motorway development identified sites that were later excavated (E2768, E2769, E2770). All sites were located to the south of the current site.

Features excavated under licence E2768 were interpreted as a burnt mound, pits, furrows and ditches. Two areas were opened. In Area A, a mound of heat shattered stones, measuring c. 5m by 4m, and c. 0.35m depth was excavated. Following the removal of the mound, several pits were found and interpreted as storage pits and water holding troughs. One of the pits was radiocarbon dated (BC 2458-2150), placing the feature in the Early Bronze Age. The linears exposed were interpreted as post-medieval and were represented by furrows, drains and modern ditches, some associated with modern agricultural activity. In Area B, a large oval pit was excavated. It measured 1.35m by 1.04m with a depth of 0.58m. It returned an Early Bronze Age date (cal BC 2135-1928).

Excavations under licence E2769 exposed a large Bronze Age pit and post-medieval ditches. In Area A, a series of diagonal ditches and pits were identified during test trenching. Subsequent excavation carried out interpreted these as being natural in origin. However, a large enigmatic area of burning and a series of field boundaries were excavated. The burning area measured 5.2 by 3.86m and was 0.85m deep. It was radiocarbon dated to the Middle-Late Bronze Age (cal BC 1116-919). It was interpreted as an area of a repeated large fire. A disturbed pit was excavated in Area B and later interpreted as a tree bowl.

Early medieval furnaces and post-medieval ditches were excavated under licence E2770. Three areas were excavated. In Area A, a furnace pit was excavated; it measured 0.47m in diameter and was 0.15m deep. Small amounts of slag were retrieved, and the feature was interpreted as a smithing furnace. A radiocarbon date of cal. AD 899-1032 was obtained. In Area B, a 2m wide and 0.58m deep ditch was excavated. It was interpreted as relatively recent in date; however, it was not depicted on the First Edition of the Ordnance Survey Maps. Area C consisted of a modern ditch and an oval pit. The pit was 0.7m by 0.6m and 0.24m deep and was interpreted as a furnace. Smithing residues included a tuyere fragment, vitrified clay lining fragments, amorphous slag and fluid slag. The feature was dated to the late medieval/post-medieval period (cal AD 1420-1611).

5.5 Cartographic Evidence

Ordnance Survey maps of the areas were examined in order to identify any possible archaeological features and to trace the development of the site during the nineteenth and early twentieth centuries.

The 6-inch map of 1836 shows the site within two townlands, the south part within Kiltotan and Collinstown, while the northwest extent is in Oldtown. Within the site, the townland boundary is depicted. Adjacent to the northwest extent of the main portion of the site, a road is shown continuing northeast with a number of buildings depicted along it. The location of the site is shown within a rectangular field system consisting of small fields. By the time of the 1911 map, a number of fields within the southeast part of the site were depicted as rough pastures, and some of the buildings depicted previously within the site were no longer present. No major changes to the field system are apparent. The monuments in the vicinity are depicted as circular enclosures on both maps.

6. METHOD OF DATA INTERPRETATION

Interpretation of the results was made by examination of the raw data as greyscale images, XY trace, relief, and data plots. Archived raw data is presented in Figure 6 and an interpretation is presented in Figure 7.

7. SURVEY RESULTS

The geophysical survey was conducted by Donald Murphy and Robert Breen of Archaeological Consultancy Services Unit Ltd (ACSU) in January 2022 under licence 21R0317 (Figures 6, 7). The surveyed area extended across 21 hectares and consists of 9 arable and pasture fields. The geophysical survey of the proposed access lanes was not carried out as their restricted size and proximity to the existing field boundary would make the survey ineffective. Furthermore, the east portion of Field 1 was not suitable for the survey due to extremely soft ground condition owning it to the recently planted crop.

Areas of possible archaeological activity were identified in Fields 1, 3, 5, 6, 7 and 9. These areas represent concentrations of positive and negative responses suggesting archaeological activity and might represent features such as fulachta fia, ironworking sites and pit circles/pit concentrations, or areas of magnetic disturbances. Furthermore, areas of potential archaeological origin include positive anomalies that may represent cut features such as pits and postholes or they may even be natural in origin. Fields 1, 4, 5 and 9 also produced evidence for land use in the form of relict field boundaries, access, and cultivation activity. Throughout the survey area, small-scale ferrous responses were evident in the results and are likely to represent modern metal debris contained within the topsoil. Magnetic disturbances were noted, particularly along the northwest and south extent of the site. These are associated with the construction of the M6 motorway and buildings depicted on the Ordnance Survey Maps, now demolished.

The majority of the fields were bounded by hedges, wet ditches and post and wire fences, and this caused some interference along the edge of the surveyed areas.

7.1 Field 1

Field 1 is located within the northeast extent of the site. It consists of a south portion of a large, irregular arable field. It is bounded by mature hedgerows. Only the west portion of the field was suitable for the survey. It was depicted as consisting of parts of 3 fields since the 1836 map, with the boundary running roughly north to south and dividing the field in half. Its southeast extent and the very south tip of the western field were depicted as a rough grassland by the time of the 1911 map. The townland and field boundaries were removed sometime before the 1995 aerial; the boundaries and field drains are clearly visible as cropmarks. The field has remained unchanged since.

Table 3: Geophysical Survey Results from Field 1

Townland	Kiltotan and Collinstown, Oldtown		
ITM Co-ordinates	645170, 739090		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
1A	Negative responses	?Agricultural	A number of negative responses forming a north to south aligned anomaly. Might represent a field drain or similar.

Townland	Kiltotan and Collinstown, Oldtown		
ITM Co-ordinates	645170, 739090		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
1B, 1C	Negative responses	? Agricultural	A number of negative responses forming two oval areas in the west part of the field. Might represent drains.
1D	Positive trends	? Agricultural	A series of weak, parallel linear anomalies, aligned southwest northeast - likely to be of agricultural origin, might represent furrows.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance, might represent remains of townland boundary between Oldtown and townland of Kiltotan and Collinstown, depicted on all of the Ordnance Survey maps.

7.2 Field 2

Field 2 is located within the western portion of the site. It consists of a roughly rectangular pasture field. It is bounded by an access lane from the south, west and north and a wet ditch from the east. It was depicted as consisting of parts of 2 fields on the 1836 map and bounded from the northwest by a road. By the time of the 1911 map, the north field was divided into three small fields. In 2005 the area adjacent and to the south was subject to test trenching associated with the construction of the M6 motorway. Two areas were opened (Kiltotan and Collinstown 12, E2768). A Burnt mound and pits dating to the Early Bronze Age were excavated.

Table 4: Geophysical Survey Results from Field 2

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644949, 738860		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features.
2A	Modern disturbance	Magnetic disturbance	L shaped disturbance associated with farm access. Visible on aerial imagery.
2B	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking areas, or represent an area of magnetic disturbance.
2C	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance,

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644949, 738860		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
			like fulachta fia or metalworking areas, or represent an area of magnetic disturbance.
2D	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking areas, or represent an area of magnetic disturbance.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.3 Field 3

Field 3 is located within the northwestern portion of the site. It consists of a small, roughly rectangular pasture field. It is bounded by an access lane from the northwest and a wet ditch from the southwest. It consists of the northwest portion of a larger field shown on the 1836 map, bounded from the northwest by a road. Its southeastern boundary was established by the time of the 2005 aerial, and the field has been used as a paddock since.

Table 5: Geophysical Survey Results from Field 3

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644914, 739035		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
3A	Positive response	?Archaeology	Concentration of a series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
3B	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking or represent an area of magnetic disturbance.
-	Positive and negative response	Building depicted on OSI map	Remains of a farm yard with an L shaped building and an outbuilding, depicted on the 1836 map, demolished prior to the 1911 map.

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644914, 739035		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.4 Field 4

Field 4 is located within the northwestern portion of the site. It consists of a small, roughly irregular pasture field bounded by an access lane from the northwest and a field boundary from the east. The 1836 map shows it as a south portion of a triangular field, bounded from the northwest by a road. The field is located in Oldtown townland, and its southern boundary is also a townland boundary between Kiltotan and Collinstown. A small square building, likely an outbuilding, was depicted within the southwest part of the site on the 1836 map. By the time of 1911 map, a well and two small buildings are shown. These appear to be likely associated with the farmyard on the west side of the road. The buildings are not visible by the time of the 1995 aerial.

Table 6: Geophysical Survey Results from Field 4

Townland	Oldtown		
ITM Co-ordinates	644940, 739113		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
4A	Positive trends	?Agricultural	A series of weak linear anomalies, aligned northwest-southeast - likely to be of agricultural origin, might represent furrows.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.5 Field 5

Field 5 is located within the central portion of the site. It consists of a long, roughly triangular pasture field, bounded by an access lane from the south and wet ditches from east and west. It was depicted on the 1836 map as consisting of a part of two fields. By the time of the 1911 map, it was divided into three fields, and its south extent is shown as a rough pasture. The 1995 aerial shows only the south portion of the east boundary, suggesting it was partially backfilled. In 2005 the area adjacent and to the south was subject to test trenching associated with the construction of the M6 motorway. No features were exposed.

Table 7: Geophysical Survey Results from Field 5

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	645020, 738920		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
5A	Positive response	Former boundary/wet ditch	Faint linear anomaly, northeast to southwest aligned likely representing former boundary in the form of wet ditch depicted on the 1911 map.
5B	Positive response	Former boundary	Faint linear anomaly, northeast to southwest aligned likely representing former boundary in the form of a wet ditch.
5C	Positive trends	?Agricultural	A series of weak linear anomalies, aligned northwest-southeast - likely to be of agricultural origin, might represent furrows.
5D	Positive response	?Archaeology	Concentration of a series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
5E	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking areas, or represent an area of magnetic disturbance.
5F	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking areas, or represent an area of magnetic disturbance.
5G	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking areas or represent an area of magnetic disturbance.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.6 Field 6

Field 6 is located within the eastern portion of the site. It consists of an irregular pasture field bounded by an access lane from the south and wet ditches from east and west. It was depicted on the 1836 map as consisting of a part of three fields. The majority of the site is in the townland of Kiltotan and Collinstown, while only the very north extent is in Oldtown. By the time of the 1911 map, the south portion

of the field is shown as a rough pasture. The south boundary of the middle field, likely representing an L shaped wet ditch, was altered. The 1995 aerial shows the south portions of the east and west boundaries only. This suggests that the northern portions were backfilled. In 2005 the area adjacent and to the south was subject to test trenching associated with the construction of the M6 motorway. No features were exposed.

Table 8: Geophysical Survey Results from Field 6

Townland	Kiltotan and Collinstown, Oldtown		
ITM Co-ordinates	645150, 738900		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
6A	Positive and negative responses	?Archaeology	Linear anomaly, east west aligned likely representing a spread or a pit, or represent an area of magnetic disturbance.
6B	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia or represent an area of magnetic disturbance.
6C	Positive response	?Archaeology	Concentration of a series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
6D	Positive response	?Archaeology	Concentration of a series of anomalies that may be of archaeological significance and represent features of archaeological potential such as possible pits or cut features
6E	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia or represent an area of magnetic disturbance.
6F	Positive trend	Former boundary	Linear, roughly east to west aligned anomaly, representing field boundary depicted on all of the Ordnance Survey maps. Band of response along it, represents debris associated with the removal of the boundary.
6G	Positive trend	Former boundary	Linear, northwest to southeast aligned anomaly, representing townland boundary between Oldtown and townland of Kiltotan and Collinstown. Depicted on all of the Ordnance Survey maps.

Townland	Kiltotan and Collinstown, Oldtown		
ITM Co-ordinates	645150, 738900		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.7 Field 7

Field 7 is located within the eastern extent of the site. It consists of a rectangular pasture field bounded by an access lane from the south and wet ditches from east and west. It was depicted on the 1836 map as consisting of parts of two fields. By the time of the 1911 map, the eastern portion of the north field is shown as a rough pasture. The 1995 aerial shows the south portions of the west boundary only. This suggests that the northern portion was backfilled. In 2005 the area adjacent and to the south was subject to test trenching associated with the construction of the M6 motorway. No features were exposed.

Table 9: Geophysical Survey Results from Field 7

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	645260, 738900		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as pits or cut features
7A	Positive and negative responses	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia or represent an area of magnetic disturbance.
7B	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia. Possibly associated with Anomaly 6B in Field 6. Might represent an area of magnetic disturbance.
7C	Positive and negative response	Magnetic disturbance	Magnetic disturbance associated with electricity pylon.
7D	Positive and negative responses	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia or represent an area of magnetic disturbance.

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	645260, 738900		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
7E	Positive and negative responses	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, such as pits or cut features or fulachta fia or represent an area of magnetic disturbance.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.8 Field 8

Field 8 is located within the western extent of the site. It consists of triangular pasture field bounded by an access lane from the northwest, field boundary from southwest and a building from northwest. It consists of northwest corner of a field depicted on the 1836 map bounded by a road running along its southwest boundary. On the 1995 imagery, a building is visible within the plot adjacent and to the northwest. Sometime after 2005, an access road was added bounding the site from the southeast.

Table 10: Geophysical Survey Results from Field 8

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644880, 738855		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
8A	Positive trends	?Agricultural	A series of weak linear parallel anomalies, aligned northwest-southeast - likely to be of agricultural origin, might represent furrows.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance.

7.9 Field 9

Field 9 is located within the west portion of the site. It consists of a long, roughly triangular arable field. It is bounded by the M6 motorway from the south, an access lane from the northwest and southeast. It was depicted on the 1836 map as consisting of a part of eight fields. The map shows the field bounded by a road along its northeast and roughly west extents. Three buildings are depicted along the west portion of the site. These are no longer shown by the time of the 1911 map. However, a long rectangular structure is depicted within the southwest part of the site. It appears that the boundaries were removed prior to 1911, and the field is shown as consisting of parts of 4 fields. The 1995 aerial illustrates the site as a part of two fields, with the building depicted on the 1911 map still standing. Only the road along the field's northwest boundary is visible. In 2005 the area adjacent and to the south was subject to test trenching associated with

the construction of the M6 motorway. Two large areas and two minor ones were opened (Kiltotan and Collinstown 13, E2769; Kiltotan and Collinstown 14, E2770). Excavations under licence E2769 exposed a large Middle Bronze Age pit and post-medieval ditches. The early medieval and late medieval/post medieval furnaces and the post-medieval ditches were excavated under licence E2770.

Table 11: Geophysical Survey Results from Field 9

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644790, 738777		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
-	Positive response	?Archaeology	A series of anomalies that may be of archaeological significance and represent features of archaeological potential such as pits or cut features
9A	Positive responses	Former boundary	Two parallel, faint linear anomalies, northeast to southwest aligned, representing former boundary depicted on the 1911 map.
9B	Positive responses	Former boundary	L shaped, faint linear anomaly, northeast to southwest aligned, representing a plot/former boundary depicted on the 1836 map.
9C	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking or represent an area of magnetic disturbance.
9D	Positive response	?Archaeology	Concentration of a series of anomalies that may be of archaeological significance and represent features of archaeological potential such as spreads, pits or cut features. A possibility its associated with the linear building depicted since the 1911 map can not be excluded.
9E	Positive response	Former boundary	Linear anomaly, northwest to southeast aligned, representing former boundary depicted on the 1836 map. Associated with anomalies 9F.
9F	Positive responses	Former boundary	Linear anomalies, roughly L-shaped, consisting of two parallel northwest to southeast aligned; the other northeast to southwest aligned, representing former boundary depicted on the 1911 map. Associated with anomalies 9A and west extent of 9E.
9G	Positive response	?Agricultural	Two parallel linear anomalies, roughly east to west aligned - likely to be of agricultural origin, might represent a dirt track

Townland	Kiltotan and Collinstown		
ITM Co-ordinates	644790, 738777		
Anomaly Ref.	**Form/Nature of Anomaly**	**Possible Source(s) of Anomaly**	**Description**
			used by farmer along fenceline during construction of the M6 motorway as visible on aerial photographs.
9H	Positive and negative response	?Archaeology	Concentration of a series of positive and negative anomalies that might represent features of archaeological significance, like fulachta fia or metalworking or represent an area of magnetic disturbance.
9I	Positive trends	?Agricultural	A series of weak linear parallel anomalies, aligned northeast to southwest - likely to be of agricultural origin, might represent furrows.
-	Modern disturbance	Magnetic disturbance	Areas of modern disturbance. Including a linear band, east to west aligned that likely represents access used during the construction of the motorway.

8. DISCUSSION & CONCLUSIONS

The geophysical survey was conducted in January 2022 by Donald Murphy and Robert Breen of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 21R0317 issued by the Department of Housing, Local Government and Heritage. The surveyed area extended across 21 hectares and consists of 9 arable and pasture fields.

Areas of possible archaeological activity were identified in Fields 1, 3, 5, 6, 7 and 9. These areas represent concentrations of positive and negative responses suggesting archaeological activity and might represent features such as fulachta fia, ironworking sites and pit circles/pit concentrations, or areas of magnetic disturbances. Furthermore, areas of potential archaeological origin include positive anomalies that may represent cut features such as pits and postholes or they may even be natural in origin. Fields 1, 4, 5 and 9 also produced evidence for land use in the form of relict field boundaries, access, and cultivation activity. Throughout the survey area, small-scale ferrous responses were evident in the results and are likely to represent modern metal debris contained within the topsoil. Magnetic disturbances were noted, particularly along the northwest and south extent of the site. These are associated with the construction of the M6 motorway and buildings depicted on the Ordnance Survey Maps, now demolished.

9. RECOMMENDATIONS

The location of the site in close proximity to a number of recorded monuments, ringforts, the presence of previously unknown archaeological features immediately adjacent excavated during the M6 Motorway development suggest its further archaeological potential. Though no large scale monuments are apparent in the survey data, smaller anomalies of possible archaeological significance were identified throughout the site.

It is recommended that targeted test trenching of the anomalies recorded in the areas to be impacted should be conditioned within any grant of permission on the site and in advance of construction. This should be carried out under licence to assess

the archaeological significance of the anomalies identified and determine the impact that development may have on any features identified.

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Cartographic Sources

Extract from 1st edition Ordnance Survey (OS) 6-inch map (survey 1836- published 1838),

Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1911 – published 1913)

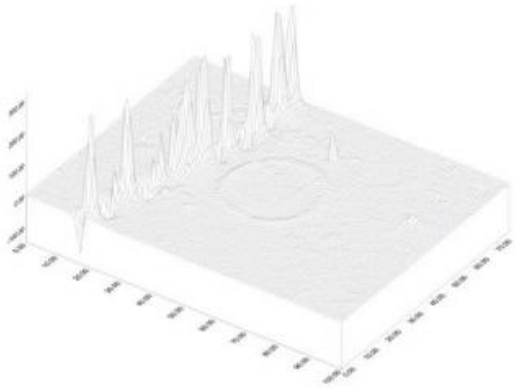
Appendix 1 - Summary Technical Information & Glossary of Terms

Fluxgate Gradiometer Survey: Surveys are undertaken using the Bartington Grad 601-2 survey instrument which was specifically designed for archaeological prospection. It includes sensors that are highly stable, minimizing requirements for excess data processing. The instrument has a vertical 1 m sensor separation permitting finite resolution of buried archaeological features. Surveys can be undertaken in scan or detailed (zig-zag traverse) modes for reconnaissance or high-density mapping. The fluxgate enables reliable flexibility during fieldwork. Frequent realignment of the instruments and zero drift correction ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions. The instrument can be employed in both commercial and research-based investigations allowing for completion of projects within short timescales. Regular grid sample densities from standard 1600 readings to 12800 readings per 20m by 20m grid are permitted. A constant high quality of data is assured by experienced field staff operating in accordance with English Heritage Research & Professional Guidelines No. 1, *Geophysical Survey In Archaeological Field Evaluation* (David 1995).

Bartington Grad 601-single axis dual sensor gradiometer.

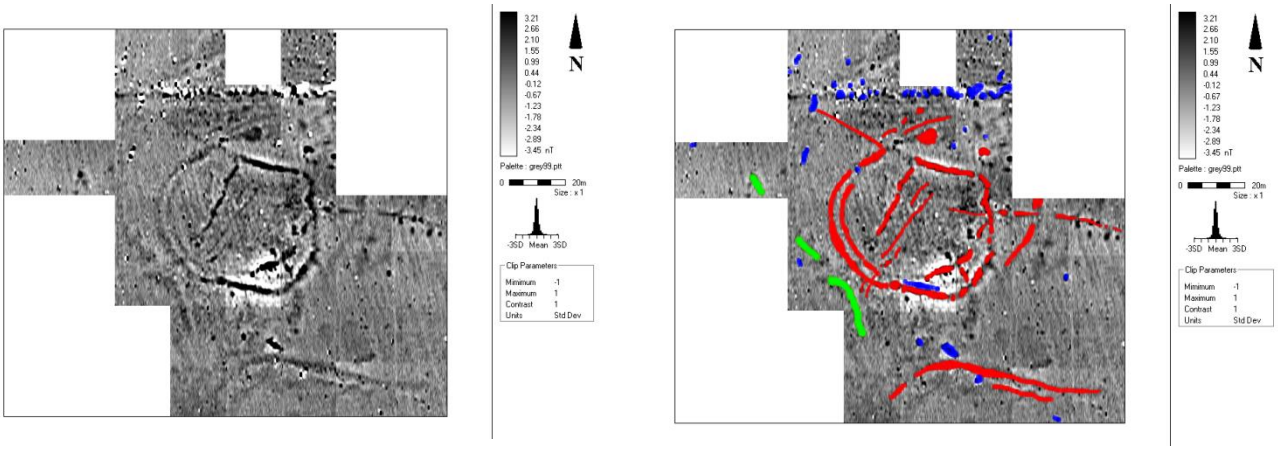
Data Display Formats

XY Trace: The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.



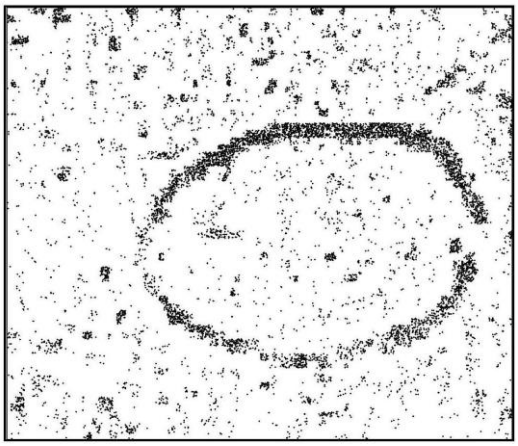
XY Trace of enclosure site

Greyscale: As with dot density plots, the greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection.



Early medieval enclosure greyscale

Dot Density Plot : Each datum is assigned a cell in which the intensity or number of dots displayed is proportional to the magnitude of the individual response. The visibility or presentation of responses within a given survey area is governed by numeric parameters specific to both soil morphological and archaeological conditions observed on site. Typically, the range of weak to strong responses is manifested by a low to high level of dot density. The format is useful for displaying gradiometer and resistance data particularly for identifying low-level responses.



Dot Density plot of oval shaped enclosure

Glossary of Interpretation Terms

Archaeology: This category refers to responses usually supported by comparative archaeological evidence (i.e., photographic transcriptions, excavation, etc.). The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.

Archaeology ?:This term corresponds to anomalies that display typical archaeological patterns where no record of comparative archaeological evidence is available. In some cases, it may prove difficult to distinguish between these and evidence of more recent activity also visible in the data.

Industrial: Such anomalies generally possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and associated industrial debris.

Area of Increased Magnetic Response: These responses often lack any distinctive archaeological form, and it is therefore difficult to assign any specific interpretation. The resulting responses are site specific, possibly associated with concentrations of archaeological debris or more recent disturbance to underlying archaeological features.

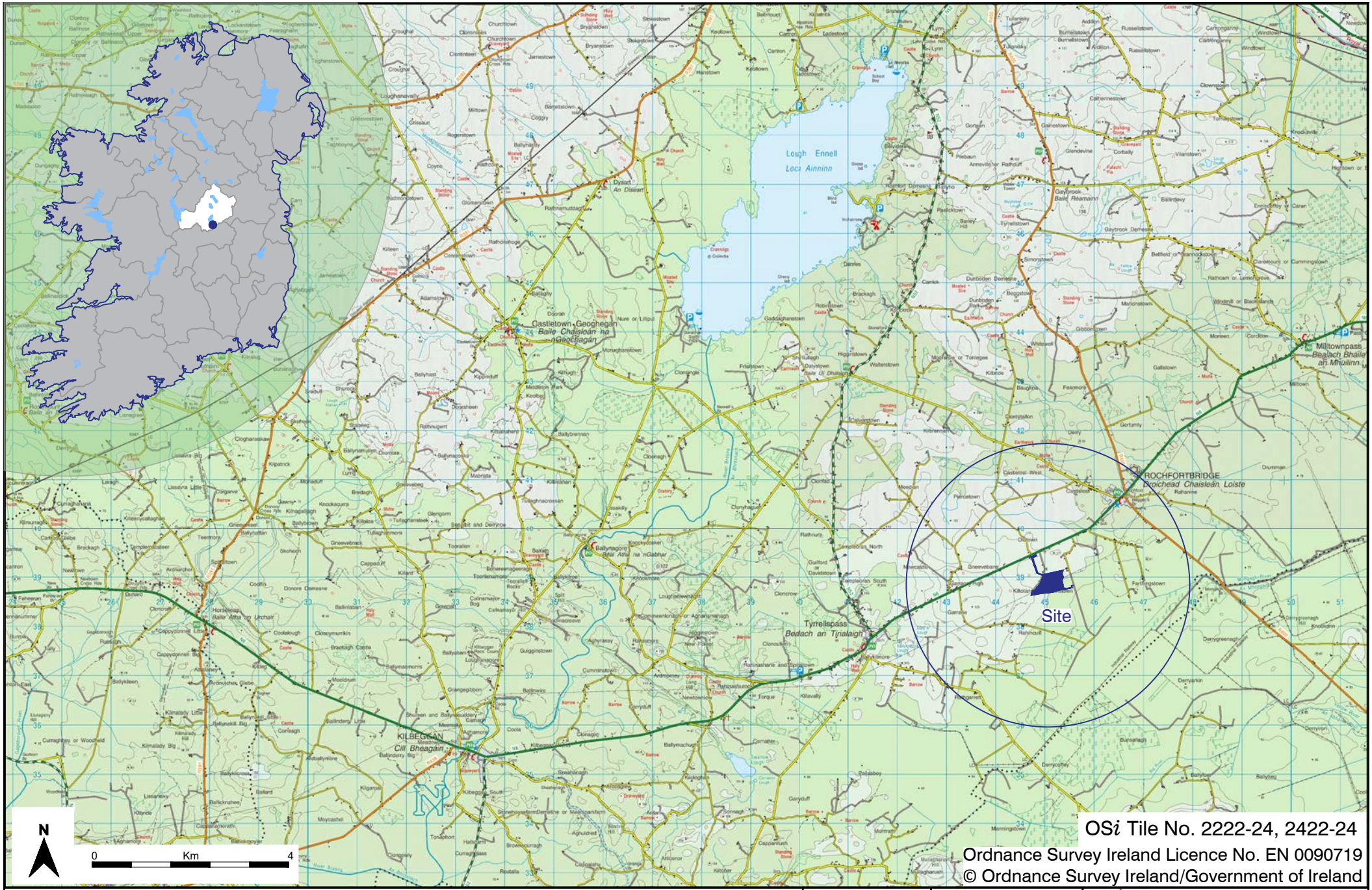
Trend :This category refers to low-level magnetic responses barely visible above the magnetic background of the soil. Interpretation is tentative, as these anomalies are often at the limits of instrument detection.

Ploughing/Ridge & Furrow : Visible as a series of linear responses, these anomalies equate with recent cultivation trends.

Natural?: Resulting from localised natural variations in the magnetic background of the subsoil, these responses are often recorded in areas of low-lying land prone to flooding.

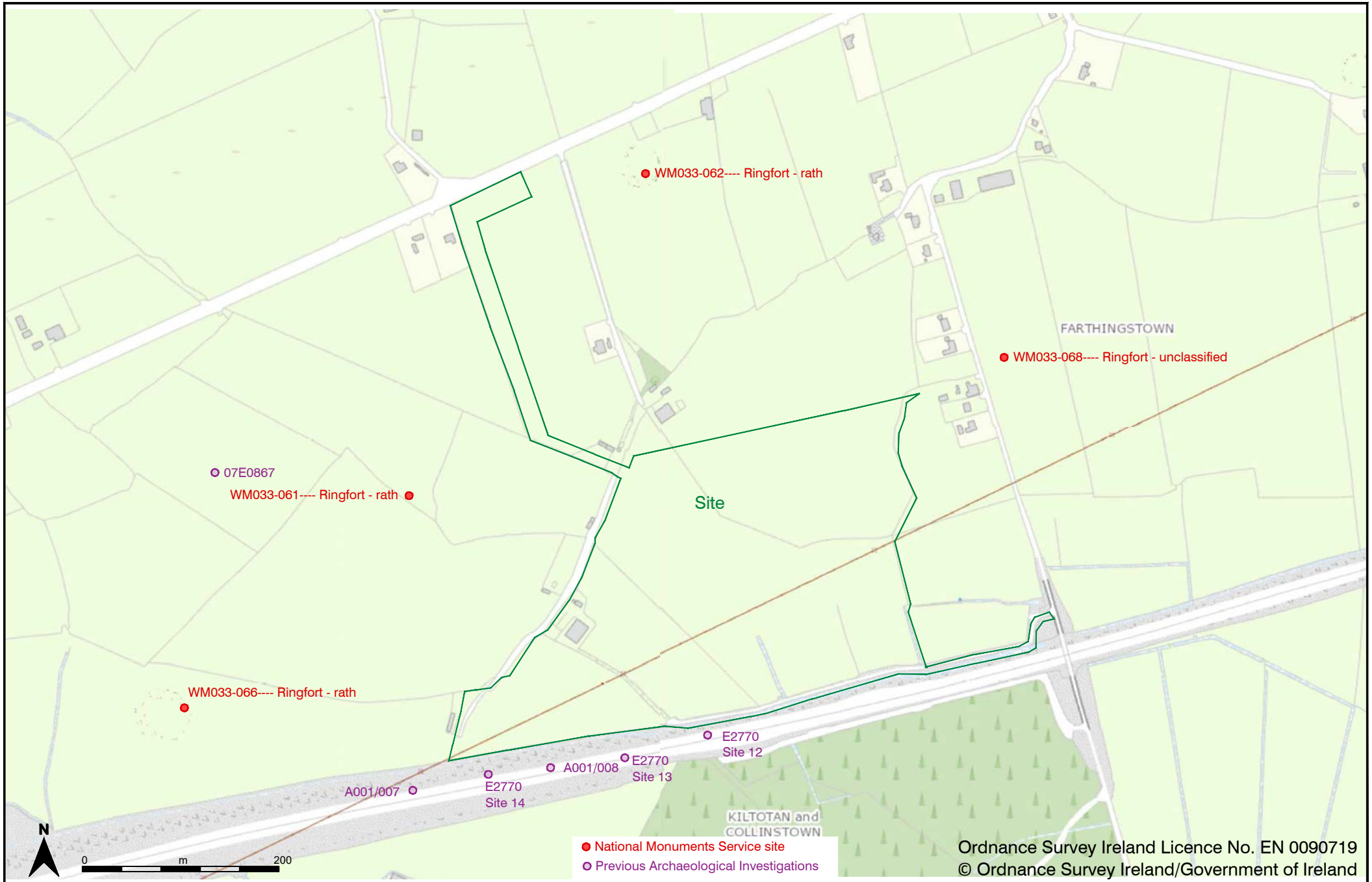
Ferrous : These anomalies exhibit a typically strong magnetic response, often referred to as 'iron spikes,' and are the result of modern metal debris located within the topsoil.

Area of Strong Magnetic Disturbance: This term refers to large-scale magnetic interference from existing services or structures. The extent of this interference may in some cases obscure anomalies of potential archaeological interest.

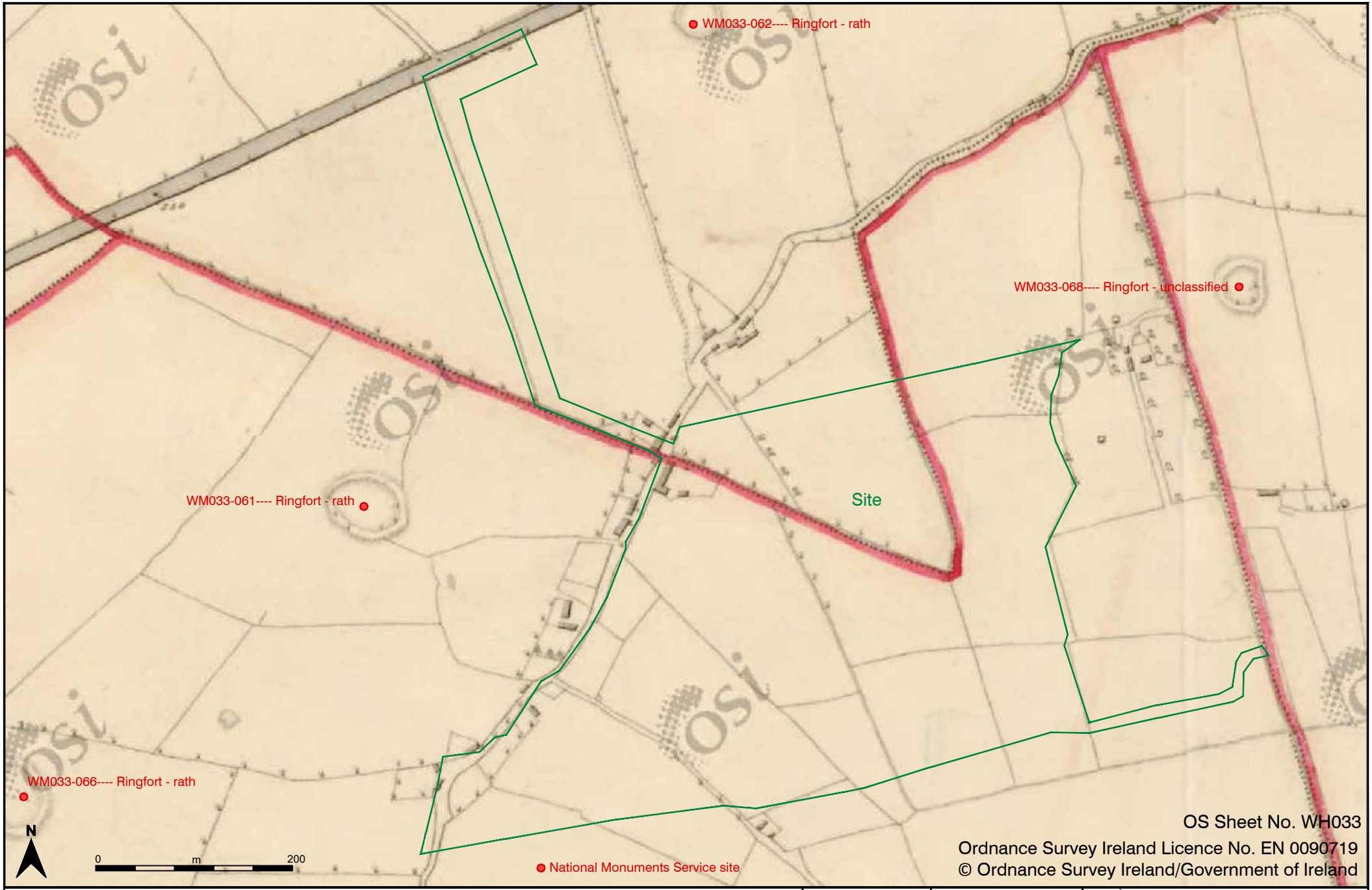


OS*i* Tile No. 2222-24, 2422-24

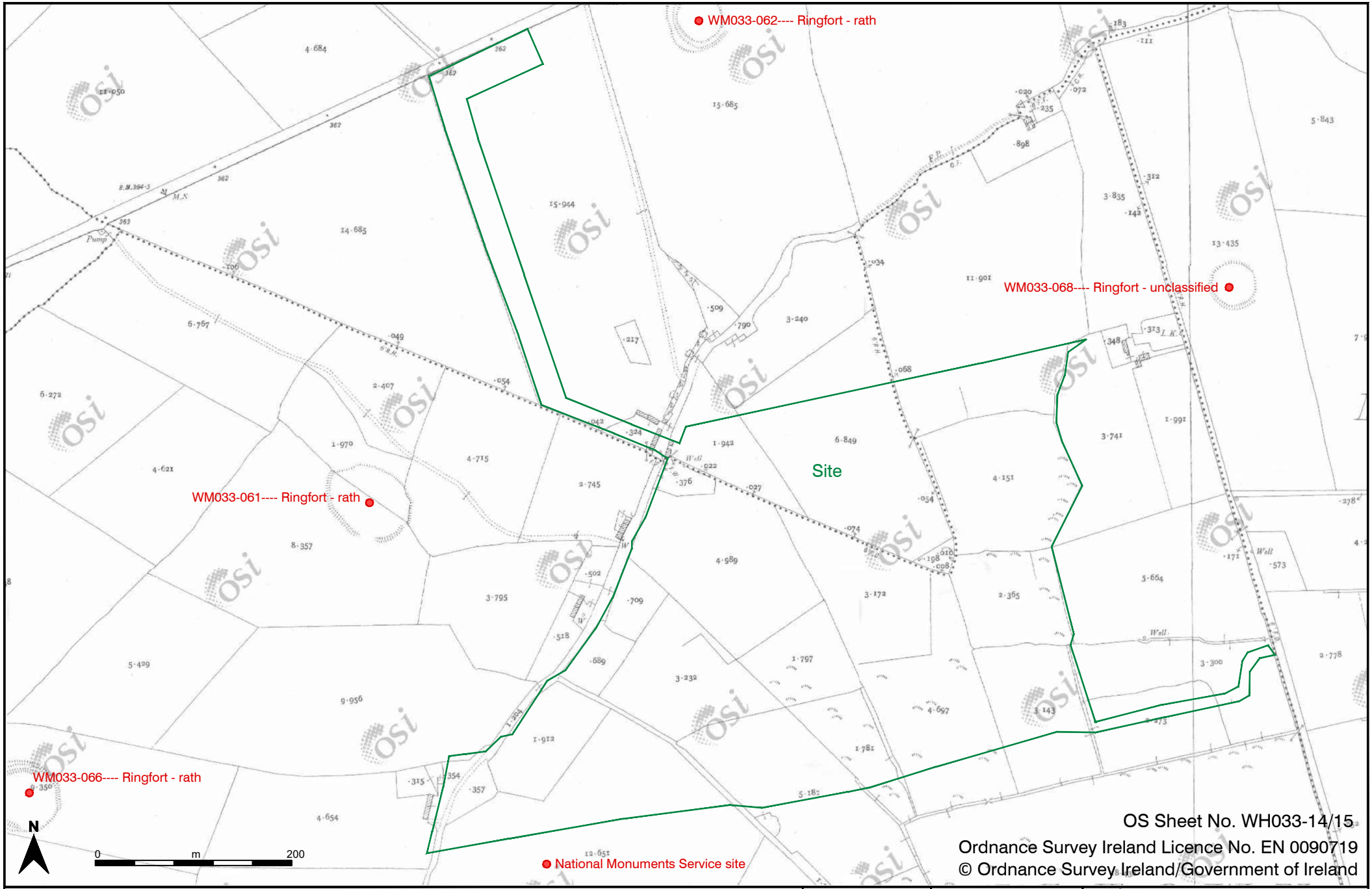
Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0001	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 1 Location of site		**Scale** 1:100,000 @ A4	



Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0002	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 2 Location of site, previous archaeological investigations and nearby *Sites and Monuments Record* sites		**Scale** 1:7,000 @ A4	



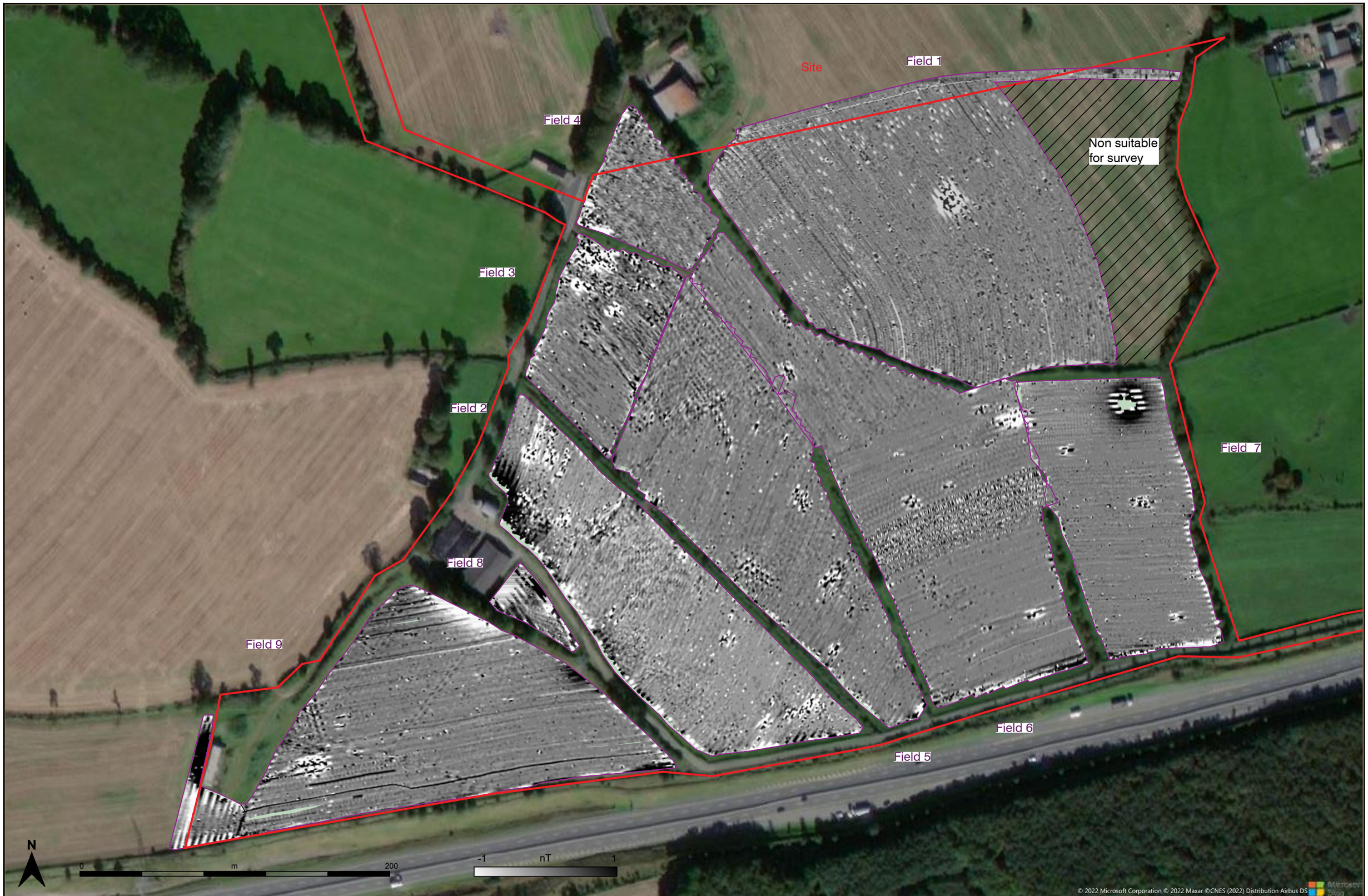
Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0003	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 3 Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1836 - published 1838), showing location of site		**Scale** 1:5,000 @ A4	



OS Sheet No. WH033-14/15

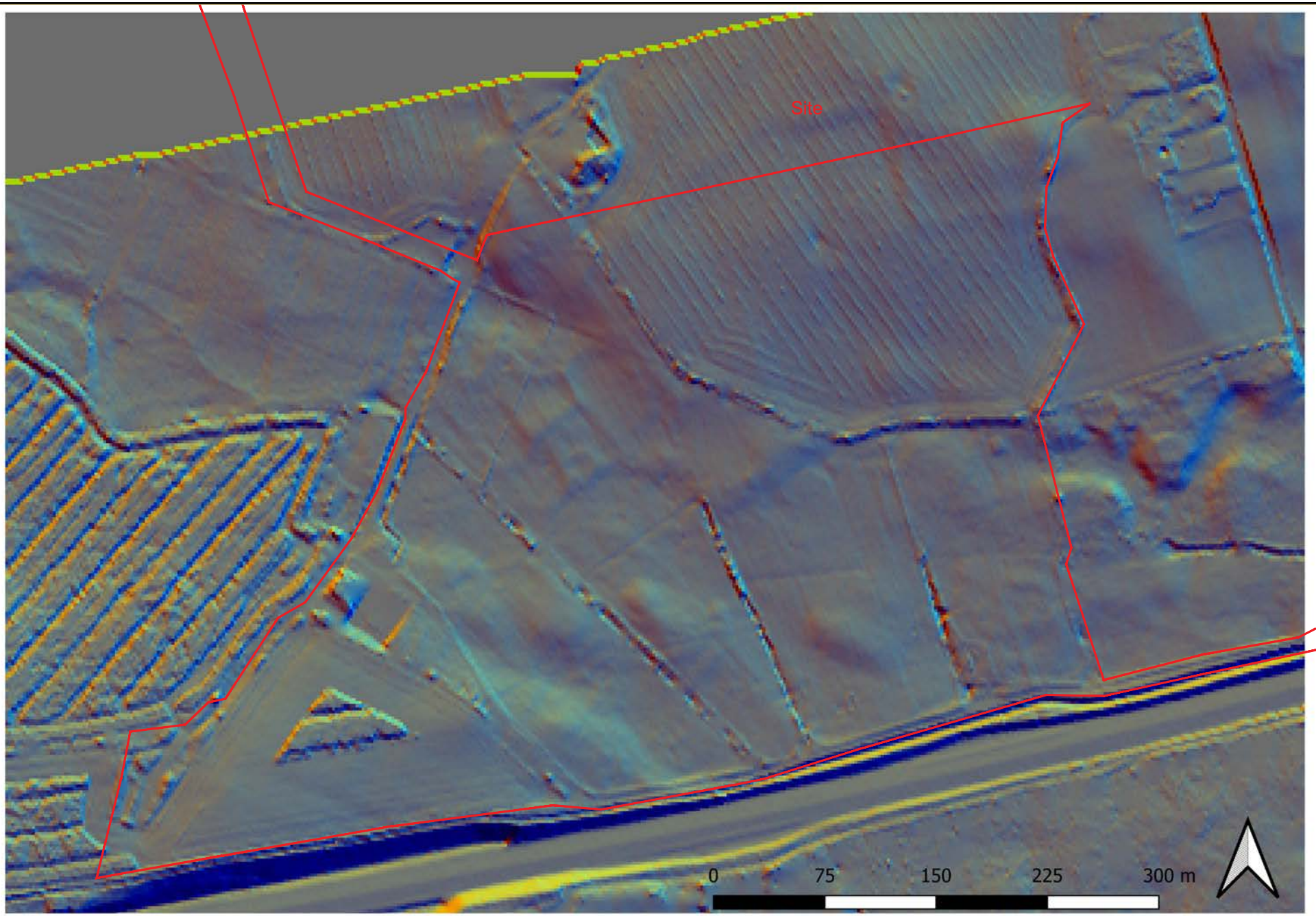
Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0004	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 4 Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1911 - published 1913), showing location of site		**Scale** 1:5,000 @ A4	

Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0005	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 5 Aerial view of site, showing development areas		**Scale** 1:5,000 @ A4	



Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0006	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 6 Aerial view of site, showing geophysical survey results (grey scale images)		**Scale** As scalebar	

Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0007	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 7 Aerial view of site, showing geophysical survey interpretation		**Scale** As scalebar	



Project Geophysical survey at Kiltotan, Collinstown, Oldtown townlands, Mullingar, Co. Westmeath	**Date** January 2022	**Drawing No.** 21108_C0008	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 8 Multi-hillshade LiDAR image of site. Contains Irish Public Sector Data (Geological Survey Ireland & Transport Infrastructure Ireland) licensed under a Creative Commons Attribution		**Scale** As scalebar	