



Geophysical Survey Report No. 30

**Churchyard Field, Clagan,**

**Co. L'Derry**

**Dr Siobhán McDermott**

## Contents

List of figures .....	1
List of tables .....	1
Site Specific Information .....	2
Survey methodology overview.....	3
Introduction .....	8
Description and interpretation of anomalies.....	11
Discussion.....	18
Recommendations.....	21
Bibliography .....	22
Acknowledgements .....	23
Appendix one: Georeferenced geophysical survey grid .....	24
Appendix two: Raw data plots .....	25
Appendix three: Processed data plots .....	27
Appendix four: Supporting visualisations .....	29
Appendix five: Historical mapping.....	32
Appendix six: Photographs of survey area.....	36

**List of figures**

Figure 1 Location and landscape setting of the geophysical survey area..... 5

Figure 2 Wider recorded historical & archaeological landscape setting. .... 6

Figure 3 Location of geophysical survey grid and survey methods..... 7

Figure 4 Interpretation diagram with levels of archaeological potential.. .... 17

Figure 5 Location and coordinates of local geophysical survey grids..... 24

Figure 6 Greyscale plot of raw magnetic gradiometer data. .... 25

Figure 7 Greyscale plot of raw electrical resistance data ..... 26

Figure 8 Greyscale plot of processed magnetic gradiometer data ..... 27

Figure 9 Greyscale plot of processed electrical resistance data ..... 28

Figure 10 ArcScene export of a 3d model of the processed magnetic gradiometry data. .... 29

Figure 11 Extract from the Petty map, c. 1650 ..... 30

Figure 12 Extract from Griffith's Valuation ..... 31

Figure 13 First Edition Ordnance Survey map series, c. 1830-2. .... 32

Figure 14 Second Edition Ordnance Survey map series, c. 1849-53. .... 33

Figure 15 Third Edition Ordnance Survey map series, c.1904-6. .... 34

Figure 16 Fourth Edition Ordnance Survey map series, c.1924. .... 35

Figure 17 Photograph of view from entrance in the north corner of the field looking south. .... 36

Figure 18 Photograph looking west onto trees along the bank of Lissan River. .... 36

**List of tables**

Table 1 Description and interpretation of archaeological anomalies identified by magnetic gradiometry... 11

Table 2 Description and interpretation of archaeological anomalies identified by electrical resistance. .... 16

Table 3 Geophysical survey grid coordinates georeference to Irish National Grid ..... 24

## Summary of results

Evaluation resolution magnetic gradiometry and electrical resistance surveys were carried out over a 1 ha area in the 'Churchyard Field', Clagan townland. The two survey methods were applied together to try and identify the location of a possible church site noted in the Northern Ireland Sites and Monuments Record (LDY 045:006 see Figure 2). There was surprisingly little correlation between the electrical resistance and magnetometry datasets. The electrical resistance survey in general returned little of interest with no evidence for stone-built features. The magnetic gradiometry survey mapped a series of enclosures, linear features and a number of dipolar anomalies.

Two collections of enclosing features have been identified. A plectrum-shaped enclosure, maximum external diameter of c. 120m and a bivalent oval shaped structure, c. 80m maximum external diameter, set erratically within the larger feature. It is suggested that they relate to some form of early medieval activity. While the plectrum-shaped enclosure falls within the scale expected of an ecclesiastical enclosure there is no other supporting evidence. Early medieval secular plectrum-shaped enclosures have been excavated elsewhere on the island but they do not appear to have the same irregular enclosing features as demonstrated at Clagan. It is possible that the bivalent feature is a rath however its proportions and landscape position is different than other examples in the area. The sheltered landscape position beside a river which functions as a baronial boundary, multiple episodes of irregularly placed enclosures, dipolar responds that suggest cereal and/or ceramic production, and the wider historical context suggest that this could be some form of secular-cemetery. A somewhat troublesome site type but nevertheless one that without further investigation may best explain the enclosures identified at Clagan.

## Site Specific Information

*Site Name:* Churchyard Field

*Townland:* Clagan

*Civil Parish:* Lissan

*SMR No:* LDY 045:006

*Grid Ref:* H 78641 83902

*County:* L'Derry

*Dates of Survey:* 21<sup>st</sup> – 25<sup>th</sup> July 2014

*Surveyors Present:* Siobhán McDermott, Ruth Logue & Harry Welsh

*Size of area surveyed:* 1 ha

*Weather conditions:* Sunny & bright

*Solid Geology:* Granite

*Drift Geology:* Diamicton Till

*Current Land Use:* Pastoral agriculture

*Intended Land Use:* No change intended

## **Survey methodology overview**

### ***Magnetic gradiometry survey***

*Instrumentation:*

Bartington Grad601-2 magnetic gradiometer

*Probe spacing:*

1m

*Grid size:*

30m x 30m

*Traverse interval:*

1m

*Sample Interval:*

0.125m

*Traverse Pattern:*

*Zig-zag*

### ***Electrical resistance survey***

*Instrumentation:*

Geoscan RM85 resistance meter

*Probe spacing:*

0.5m parallel twin probe array

*Grid size:*

30m x 30m

*Traverse interval:*

0.5m

*Sample Interval:*

1m

*Traverse Pattern:*

*Zig-zag*

### ***Georeferencing***

*Instrumentation:*

Lecia TS06-plus total station

*Station setup:*

Floating grid orientated towards magnetic north using a spotting compass (+/- 3 degrees)

*Spatial Accuracy:*

Survey grade internal accuracy ( $\leq 3$ cm)

*Georeferencing:*

The dataset was downloaded from the TS06+, initially process in LisCAD v.11 and imported into ArcGIS 10.2. It was georeferenced to the Ordnance Survey 10km vector data. The grid points were extracted as a separate feature class and used to georeference the geophysical survey datasets exported from Geoplot v.3.

*Data processing:*

The geophysical data was process in Geoplot c.3 software. The primary processes applied to the magnetic gradiometry data were low-pass filtering (LPF) and interpolated. Because the gradiometry data was collected with a 1L8 ratio of x:y both these processes were applied with an emphasis on the x axis. The processes applied to the electrical resistance data high pass filtering (HPF) which removes geological 'background' noise and LPF which helps to eradicate minor spikes in the data. The resulting data was also interpolated.

*Visualisations:*

The datasets were visualised in Geoplot v.3 using shade, trace, dot density and relief plots. Processed datasets were exported from Geoplot v.3 and imported into ArcGIS 10.2. Once georeferenced the rasters were statistically analysed in ArcMap 10.2 and they were interpreted in relation to the First, Third and Fifth Edition Ordnance Survey maps of the area, the 2006 orthorectified aerial photographs and relevant georeference bitmap imports. Further visualisation and interpretation was carried out in ArcScene 10.2.

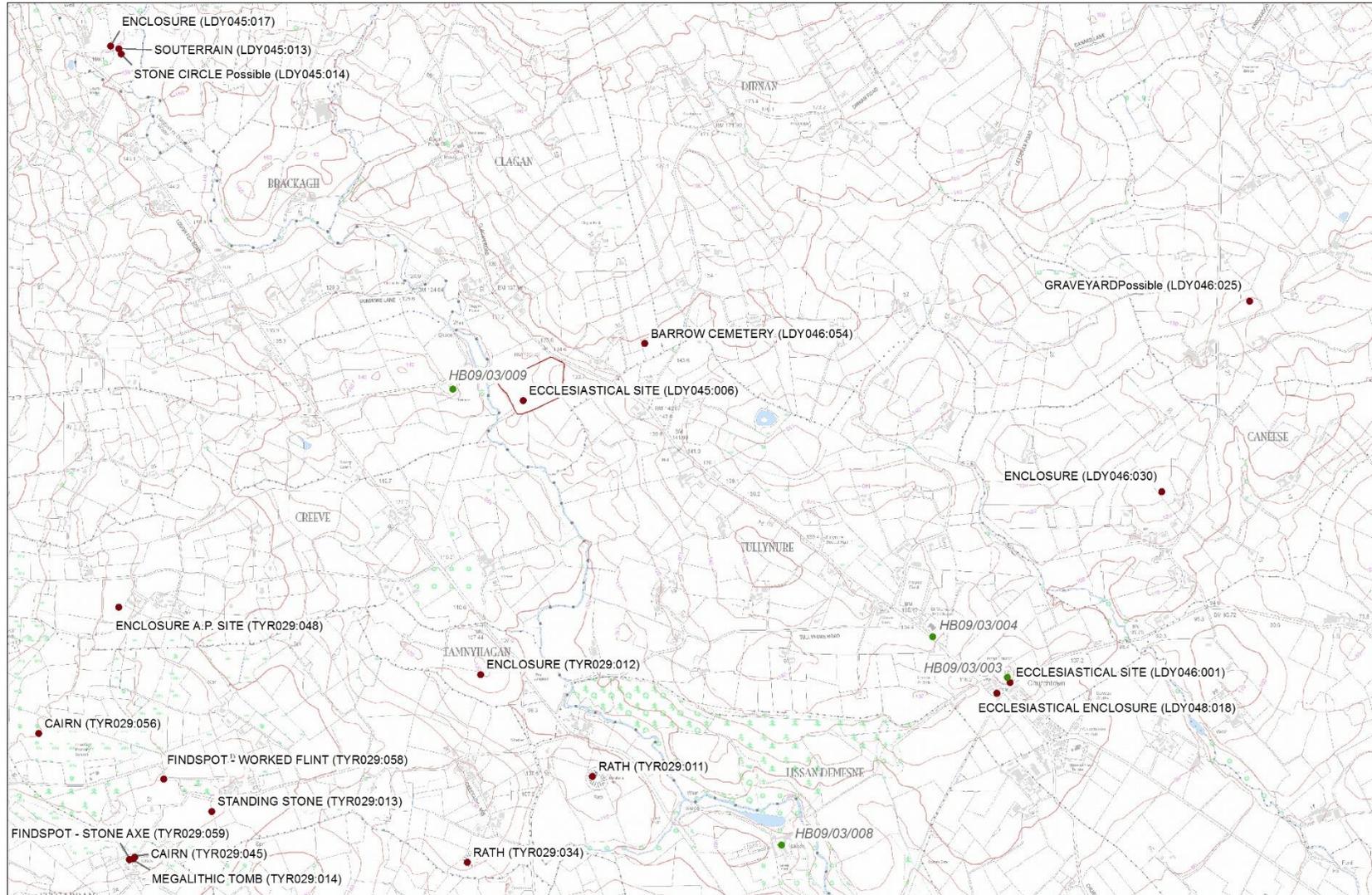
*Digital archive:*

The geophysical datasets were collected, processed and archived in accordance with Archaeological Data Services best practice.<sup>1</sup>

---

<sup>1</sup> Schmidt, A. & E. Ernenwein, 2011, Guide to good practice: Geophysical data in Archaeology [Online]  
[http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics\\_Toc](http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc)





**Legend**

- Listed Buildings Register
- NI Sites & Monuments Record

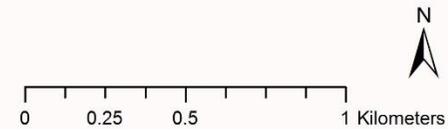


Figure 2 Wider recorded historical & archaeological landscape setting. The location of the survey area marked in red with key recorded features noted.\*

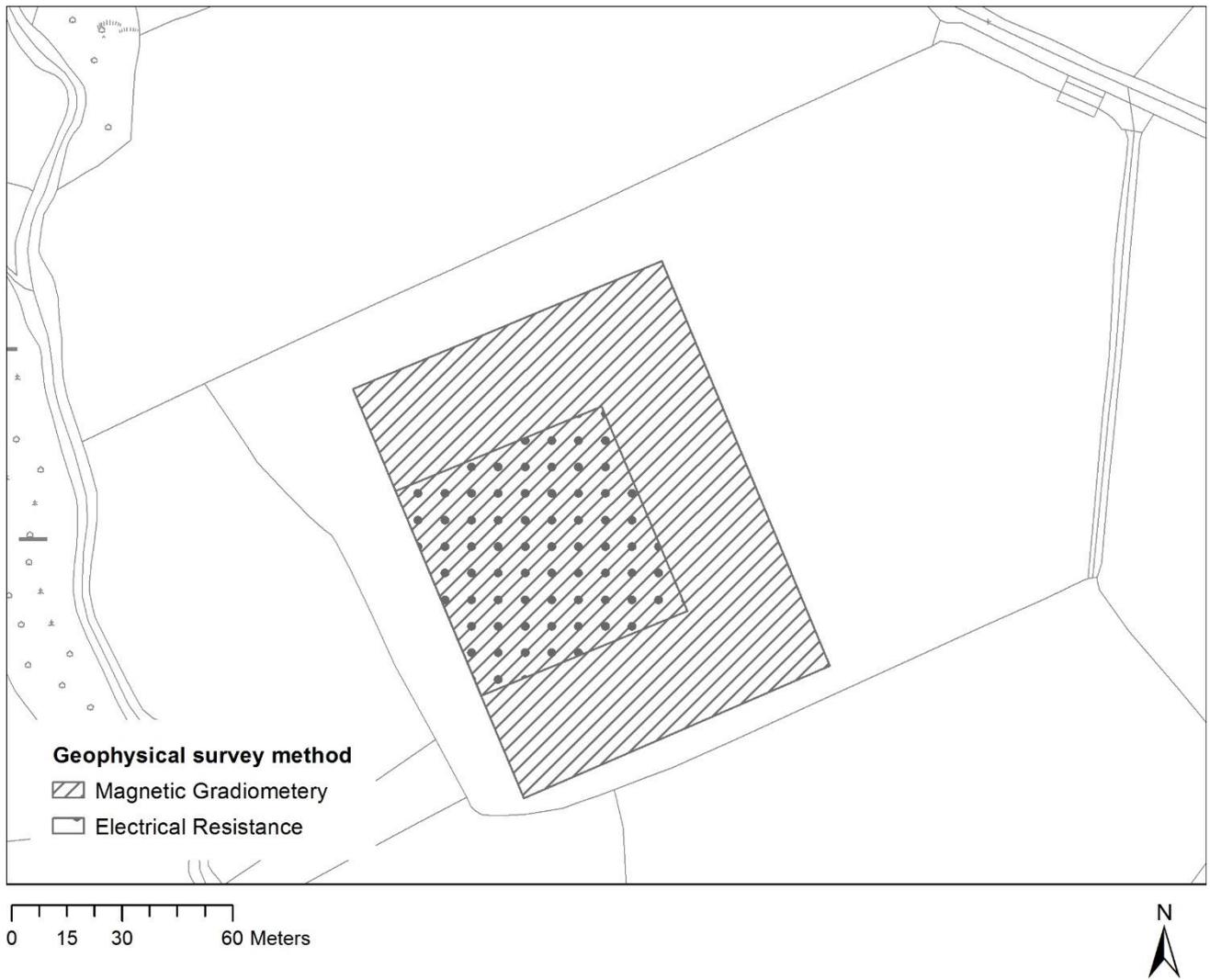


Figure 3 Location of geophysical survey grid and survey methods.

## Introduction

The survey area is located c. 6km north-northwest of Cookstown off the B162 which links the larger town with Draperstown. An area of 1 ha was surveyed to the south of Clagan townland, Lissan civil parish, in Co. L'Derry. It is at the northern limits (Figure 1) of the distinctive drumlin belt which dominates Ulster to the south and the water-logged uplands of the Sperrins to the north and west. Slieve Gullion, c. 528m OD, lying c. 1km due north marks the beginning of this upland range. Further to the west is the rich low-lying agricultural lands of the Lough Neagh basin. The landscape use is predominately agricultural and mainly pastoral. Field patterns are irregular with evidence of significant amalgamation since they were first surveyed by the Second Edition Ordnance survey, c. 1849 – 59 (Figure 14). Settlement patterns are typical of Irish rural dispersed settlement with the accompanying web of roads and some small hamlets such as Churchtown, c. 2km south-east, with associated services.

The survey area is situated on a gentle west-facing gradient, just above the 120m contour mark. It is overlooked to the north and east with fair views to the south. The ground surface slopes down to the shallow, fast-paced Lissan River to the west. The Lissan River functions as the county boundary between Tyrone and L'Derry. It is at the southern end of Clagan townland a large land parcel, c. 174 ha, which runs from north to south following the sloping gradient of Slieve Gullion. The larger size of Clagan townland is the result of a Gaelic landholding system that measured potential productivity instead of area (McDermott 2010b, 182). Larger upland parcels such as Clagan, and its neighbours Dunmore, Ballybriest and Mobuy, contrast sharply with the smaller townlands which occur in the rich, low-lying lands of the Lough Neagh basin to the east. The placename Claghan 'a round rocky hill' is first recorded in the early 17<sup>th</sup>-century *Patent Rolls of James I*. It is identified as part of the termon, or Church lands, of *Mallanaght* granted to the Archbishop of Armagh in 1614 (Morrin 1966, 273 – 4). The mid-17<sup>th</sup>-century Civil Survey names it as church lands, one part of a larger land parcel, which was in the ownership of a Doctor Cooke (Simington 1934, 188, also see Figure 11 this document).

The association with a possible church site is explicitly stated in the Ordnance Survey Memories. In this extract the church site is identified as being on the 'farm of John Ramsay'. Claggan House, c. 350m due north, and the survey area is included in the one land parcel in Griffith's Valuation (Figure 12) which is leased by a George Ramsay. The memoir extract records the destruction of stone walls and labourers digging up human bones. It names the field where the church is located as 'Church Field'.<sup>2</sup> Historians throughout the 20<sup>th</sup>-century referred to the tradition of there being a church site in the townland. It wasn't until fieldwork was undertaken in the 1980s that the location of the 'Churchyard Field' was identified to the south of Clagan House. The local farmer is reported to have ploughed up stone and mortar from the corner of the field as located on the Northern Ireland Site & Monuments Record as LDY 045:006 (Figure 2).

The wider archaeological landscape is dominated by a strong medieval horizon. Located c. 2.5km south-east of the survey area is Lissan Church (LDY 046:001), Tullynure townland. The current church (HB 09/03/003) appears to have been built in the 17<sup>th</sup>-century with 18<sup>th</sup>-century embellishments. It has no medieval diagnostic features. However, a limited excavation in the mid-1980s identified the location of an oval

---

<sup>2</sup> NI SMR 045:006 [Available online] [http://apps.ehsoni.gov.uk/ambit/docs/LDY/LDY\\_045/LDY\\_045\\_006/Public/SM7-LDY-045-006-02.pdf](http://apps.ehsoni.gov.uk/ambit/docs/LDY/LDY_045/LDY_045_006/Public/SM7-LDY-045-006-02.pdf)

enclosure surrounding the church site.<sup>3</sup> The ditch was c. 3.5m wide and c. 1.5m deep with a u-shaped profile. There was evidence for re-cutting and three sherds of everted-rim ware were retrieved from the upper fill deposits. The excavation evidence suggests that this is an ecclesiastical enclosure focussing on the church site. It strongly indicates that this is the location of the church which would have functioned as the medieval parochial centre of Lissan. Petty mapped the church lands of Lissan parish c. 1650 (Figure 11). In this document is a small parcel of land marked 'Corath – 51'. It lies north of the parcels 'Lissan, Tullymore & Tullynure' and 'Rosmore' and west of 'Killasky'. A number of these placenames can be mapped in the modern townland matrix – Lissan, Tullynure, Rosmore and Killybasky. The position of these surviving placenames suggests that the easternmost portion of Tullynure, within which Lissan church and enclosure are located, relates to the land parcel 'Corath' identified by Petty. This portion is recorded as being in 'the possession of the common-wealth' during the mid-17<sup>th</sup>-century Civil Survey but it is listed as land belonging to the See of Armagh (Simington 1934, 188). As such it would seem that this was medieval church land given over to the Church of Ireland at the time of the Ulster Plantation, with the possible implication that the pre-1641 tenant had been disenfranchised by the Cromwellian government following the end of hostilities. Evidence of medieval settlement seems to cluster to the lower lands to the south and east of the survey area avoiding the water-logged uplands of Slieve Gullion and the Sperrins beyond. About c. 1.5km to the south is a cluster of raths (TYR 029:009; TYR 029:010; TYR 029:011; TYR 029:034). They occupy prominent rises, the type of landscape position one would expect of this settlement type in the Drumlin belt (McDermott 2010a).

An archive search of the artefacts held by the National Museums Northern Ireland (NMNI) recovered two clusters of prehistoric material near to the survey area. The first assemblage of prehistoric artefacts, a flint core (NMNI BELUM.A22260), flake (NMNI BELUM.A22259) and scraper (NMNI BELUM.A22265), as well as a prehistoric pot (NMNI BELUM.A22261) was retrieved from the rath (TYR 029:011) near Marshall's Hill, Lissan townland. Three pieces of flint, a flake (NMNI BELUM.A22234) and two scrapers (NMNI BELUM.A22236/37), and a hammerstone (NMNI BELUM.A22235) were recovered from Clagan Hill, Clagan townland. This may be Clagan Rock which is situated c. 650m to the north of the survey area. The area within a 2km radius of the Clagan survey also displays evidence for prehistoric human activity. A cluster of cairns (TYR 029:056; TYR 029:055) is situated just over 2km to the south-west. Of these one, (TYR 029:045), appears to have been a cist burial. Flint has been found in the area (TYR 029:058; TYR 029:060) and a trackway (TYR 029:039) excavated in the near vicinity. Although the excavation did not supply dating evidence it is still believed to date to the prehistoric period. A wedge tomb (TYR 029:014) is situated at the south-eastern limit of this cluster of prehistoric activity. A Bronze Age pit burial (TYR 029:038) in Cluntyganny townland, 2km south, contained an unusual large Beaker vessel. A cemetery of four small barrows (LDY 046:054) lies c. 500m to the north-east of the survey area.

A number of historical map and aerial photography sources are available but none of them help identify any of the features mapped by the geophysical surveys. The survey area was mapped by the first four editions of the Ordnance Survey. Unfortunately the first and second surveys are slightly skewed when viewed in GIS. No doubt a result of problems during the datasets georeferencing. For Co. L'Derry the First Edition Survey (Figure 13) has limited applications as initially the survey did not map field boundaries. However it is clear that by 1830 a laneway, part of this is still preserved in the field boundaries, leads from the road towards

---

<sup>3</sup> NI SMR 048:018 [Available online] [http://apps.ehsni.gov.uk/ambit/docs/LDY/LDY\\_048/LDY\\_048\\_018/Public/SM7-LDY-048-018.pdf](http://apps.ehsni.gov.uk/ambit/docs/LDY/LDY_048/LDY_048_018/Public/SM7-LDY-048-018.pdf)

two small structures. The structures are arranged gable to gable in a south-west to north-east line. A strip of deciduous trees, a well and a long rectangular structure is recorded just over the river bank in Co. Tyrone. By the second survey (Figure 14), 1849 – 53, field boundaries are mapped and there would appear to be few significant changes between them and the modern field system. The two small structures remain and the structures just over the river have expanded. By 1904 (Figure 15) the Lissan River has experienced significant modifications. The structures which lay over the river in Co. Tyrone are now marked as a 'Corn Mill' and a mill race has been cut to power it. The two structures to the south of the survey area are gone. The final survey (Figure 16), 1920s, has very few changes for its immediate predecessor. Two series, 2006 & 2010, of ortho-rectified aerial photographs are available (Figure 3). Neither of which record any cropmarks that could relate to the possible enclosing features.

## Description and interpretation of anomalies (Figure 4)

### General comments:

The combination of magnetic gradiometer and electrical resistance survey techniques was identified as the best methodology to identify the location of a possible ecclesiastical site of unspecified period. An initial magnetic gradiometry survey revealed a number of features which appeared to enclose the location of the possible ecclesiastical site LDY 045:006. This was used to target the electrical resistance survey. Surprisingly the data captured by the electrical resistance survey was limited with the higher resistance returns more indicative of geology than wall footings or foundations.

The data is presented below in two tables one for each survey type. The descriptions and interpretations should be read with the accompanying interpretative diagram (Figure 4), and reference to the appropriate supporting images.

Table 1 Description and interpretation of archaeological anomalies identified by magnetic gradiometry.

Code	Description	Interpretation
g1 (g1a, g1b, g1c)	<p>A series of negative linear features running east to west, before curving gently towards the south, through the northern quarter of the survey area for a maximum length of c. 87.5m, width c. 7m. The anomaly g1a appears to extend beyond the western limits of the survey area.</p> <p>Three anomalies trace the full extent of this possible feature. G1a runs west-southwest to east-northeast for a length of c. 61.5m with a max width of c. 3.7m. One meter to the south of g1a running parallel for a max length of c. 21.5m is g1c. This anomaly has a max width c. 2m. It is separated from g1a by a thin band of higher magnetic readings, max 1m wide. Also included in this series of features is the anomaly g1b which appears to be the south-eastern extension of g1a as it curves towards the south. It can be traced for a length of c. 17m and is c. 3.5m wide. Its relationship with g1a can be more clearly identified when the data is modelled in 3d (Figure 10).</p>	<p>The anomalies which comprise g1 map a possible double ditched curvilinear feature perhaps forming the northern part of a large plectrum-shaped enclosure. The southern limit of this enclosure may be traced by g2. The resulting enclosure would have an external diameter of c. 87.5m north – south, g1 – g3, or c. 107m east – west, g1 – g2.</p> <p>There is no topographical expression of any linear earthworks although a small knoll dominates grid squares A2-3 &amp; B2-3 which is the area that g1 would enclose. This corresponds with the location of LDY 045:006 as recorded in the NI SMR.</p>

g2	<p>A large positive curvilinear feature running north – south through the south-eastern quadrant of the survey area. The anomaly appears to extend beyond the southern limits of the survey area which is defined by a modern field boundary.</p> <p>The anomaly can be traced for a length of c. 41m before it runs off the southern edge of the survey area. It has a maximum width of c. 4m and is more clearly defined at its northern limits and appears to align with g1b to the north.</p>	<p>The northern section of g2 appears to align with the south-eastern section of g1. There is no evidence of g2 being double ditched. The feature g2 runs up to the modern field boundary which suggests that it pre-dates the laying out of the contemporary field system.</p> <p>It may be part of a series of enclosing features which focus on the area associated with the ecclesiastical site in the NI SMR.</p>
g3 (g3a & g3b)	<p>Two negative parallel semi-circular features in the south-western quadrant of the survey area. They can be traced running west to east before curving gently to the north for a total distance of c. 31m with a maximum width of c. 7.5m.</p> <p>The anomaly g3 is comprised of two parallel curvilinear negative magnetic features (g3a mean -2.8 nT, g3b mean -1.3 nT). The most southerly anomaly, g3a, is better defined. It can be mapped for a length of c. 30m with a maximum width of c. 2.5m. The northern feature, g3b, can be traced for a maximum length of c. 23m with a width of c. 1.9m. They are set c. 2.5m apart with the area in-between they associated with higher magnetic readings.</p>	<p>The features which make up g3 may be understood as the remnants of a bivallate rath or enclosure. The northern portions of the enclosure may be traced by g5, g4 and possibly g7 and g12. Projections using the plan of g3a &amp; g3b suggest that this rath would have an overall diameter c. 44m enclosing an area of c. 31m internal diameter. These measurements fit within the expected proportions of medieval raths. The enclosure would have a larger maximum external diameter of c. 80m north to south.</p>
g4	<p>Lower resistance curvilinear feature c. 9m south of g1 in the north-eastern quadrant of the survey area. It can be traced for a distance of c. 9.5m, running east to west, with a maximum width of c. 2m.</p>	<p>A possible phase of enclosing activity focussed on the possible site location of LDY 045:006 perhaps associated with g5.</p>
g5	<p>Curvilinear band of positive and negative c. 6m south of g1 and north of g4. It can be traced for a length of c. 26.5m with an overall width of c. 4m.</p>	<p>This is an amalgamation of positive and negative magnetic returns which traces a gentle arc more clearly on the 3d visualisations (Figure 10). Appears to run parallel to g4 and may be part of an episode of activity focussed on the possible location of LDY 045:006. It is possible that g7 is the eastern extension of this feature.</p>

g6	Subtle negative magnetic linear feature running roughly east to west, abutting g1b. The anomaly is c. 12.5m in length and c. 2.5m with width.	Linear feature which cuts over the path of g1c if it were to extend this far south-east. Possibly associated with a different period of activity or none archaeological in nature.
g7 (g7a & g7b)	<p>Two negative linear features which may form the eastern limit of g5. This relationship is more evident on the 3d models than in the 2 dimensional plans.</p> <p>The most western element, g7a, is c. 8m long and c. 2m wide. The eastern component, g7b, is c. 6m long and c. 2.5m wide. The magnetic returns are very similar, mean average of -2.17 and -2.41 nT respectively. The easternmost feature, g7b, corresponds with an area of low electrical resistance, r2.</p>	G7b coincides with an area of lower resistance r2 in the resistivity survey. If it g7b is an extension of g7a, which may also relate to g5, then the lower resistance readings suggest that these may be cut features with a fill which retains more moisture than the surrounding soil matrix.
g8	<p>Irregular area of dipolar readings along the southern boundary of the survey area. It appears to extend beyond the southern limits of the survey area. The mapped portion is trapezoid in character with a negative returns forming a right-angled return to the north. They enclose an area of positive magnetic readings.</p> <p>The anomaly measures c. 8m south-west to north-east, c. 13m north-west to south-east to north-west.</p>	<p>The anomaly g8 corresponds with the location of a house mapped by the First and Second Edition Ordnance Surveys (Figure 13 &amp; Figure 14). This is especially apparent when adjustments are made for the georeferencing of the earlier maps which are skewed c. 20m to the north-west. There are no dipolar returns evident for the second, more easterly house recorded in both mapping surveys. This maybe because the second structure is not within the area covered by the geophysical survey, it had a different use or it experienced different conditions than the structure represented by g8.</p> <p>The anomaly g8 is comprised of dipolar readings. The negative returns appear to form a right angle and could map structural elements of a 19<sup>th</sup>-century dwelling. The gable wall is a typical location for a hearth in Irish vernacular architecture. Dipolar readings in general indicate the presence of burning perhaps due to a hearth or the destruction of the house by fire, or that it was used for some industrial role such as metal working or a cereal-drying kiln.</p>
g9	Irregular linear collection of positive magnetic readings running north-west to south-east between g8 and g13c in the south-western quadrant of the survey area.	The higher readings are not as pronounced as g8. A boundary was recorded by the First and Second Ordnance Survey (Figure 13 & Figure 14) running from the western house location from the north-east to the south-west. However g9 does not follow the same path.

	The anomaly measures c. 26m in length and c. 4.5m in width.	The anomaly appears to cut into g3a which has been interpreted as archaeological in nature. It is probable that g9 is later in date possible related to agricultural activity associated with g8 the 19 <sup>th</sup> -century structure. It is tempting to suggest this may be the remnants of a mill-race however the land to the immediate west drops away significantly to the river edge.
g10	<p>Subtle negative linear feature running roughly north to south in the north-eastern quadrant of the survey area. It extends beyond the northern limits of the survey area.</p> <p>The anomaly measures c. 27m in length and c. 2.5m in width.</p>	<p>This feature is more clearly identifiable in the ArcScene 3d model (Figure 10). Its linear form does suggest that it is human-made although its relationship to the various enclosing feature, g1, g2 &amp; possibly g3, is difficult to discern.</p> <p>It is tempting to interpret g10 as a feature associated with a possible entranceway in g1. However that would need there to be a break between g1a and g1b. This is not likely, although subtle the 3d modelling of the magnetic data would suggest that g1a &amp; g1b are part of the one continuous feature.</p>
g11 (g11a & g11b)	<p>Two parallel linear positively magnetic features running north-west to south-east in the south-eastern quadrant of the survey area. They lie c. 12m east of g2 and appear to extend beyond the survey limits.</p> <p>The most eastern anomaly, g11a, measures c. 16.5m in length and c. 3m wide. It is situated c. 10m north-east of g11b running parallel to it. The anomaly g11b measures c. 10m in length and c. 3.5m wide.</p>	The linear form and parallel plan of these two features suggest they are human-made. They are not evident in the mapped or aerial photography sources. They do not abut g2 and therefore it is not possible to interpolate a spatial relationship.
g12	<p>A subtle negative linear feature running roughly north to south in the south-eastern quadrant of the survey area. It is situated c. 13m west of g2.</p> <p>The anomaly measures c. 12m in length and c. 2m wide.</p>	A possible extension of g3 if it were to form an enclosure with g7, g4 & g5.
g13	Series of large irregular dipolar anomalies which occur throughout the southern half of the survey area.	Dipolar readings are dotted throughout the survey area. Notably, a series of larger dipolar readings are irregularly scattered across the southern portion of the survey area. The magnetic returns are not strong enough to suggest

(g13a, g13b, g13c, g13d, g13e)		ferrous signals. They could be pits filled with burnt or fired material, or evidence of burning <i>in situ</i> for example cereal drying kilns. Plots of dipolar data are distorted by the geophysical nature of the readings and should not be taken as indicative of the form of the sub-surface feature.
g14	<p>A semi-circular collection of positive returns to the middle of the survey area. Situated c. 40 south of g1.</p> <p>Four positive returns appear to define a semi-circular area c. 7m external diameter east to west.</p>	The evaluation grade survey resolution will not easily record anomalies less than 1m in width on the y-axis. However this collection of features do appear to be regular in form. They occur towards the centre of the possible enclosure and may be a series of small pits.
g15 (g15a & g15b)	<p>Two positive oblong anomalies. One, g15a, situated to the immediate south of g7b roughly corresponding with an area of lower resistance, r2, mapped by the electrical resistance survey. The other, g15b, is situated in the southern third of the survey between g3a and g12.</p> <p>Both features, g15a &amp; g15b, measure c. 4m north – south , c. 3.5m east – west .</p>	The scale and form of these features suggest they may be pits.

Table 2 Description and interpretation of archaeological anomalies identified by electrical resistance.

Code	Description	Interpretation
r1 (r1a, r1b, r1c & r1d)	A series of undefined high resistance features in the south-western quadrant of the survey area.	These appear as four separate anomalies after the passing of a high pass filter. This may be because the process exaggerated r3a and r3b which created false artefacts. There is no regular form to r1 and it is suggested that it maybe geological in nature.
r2	An irregular are of low resistance which in itself appears insignificant. However it occurs in an area in which a number of magnetic features also occur, g7b & g15a.  The anomaly measures c. 5m north – south, c. 6m east – west.	In itself this area of low resistance is not significant and it would not have been mapped on its own merits. However it does correspond with the magnetic anomalies g7b & g15a. This has led to the interpretation that g15a, g7 in general, and probably also g5, retain more moisture then the surrounding soil matrix.
r3 (r3a, r3b & r3c)	A three parallel subtle lower resistance linear arcs which occur to the west of the survey area. The feature r3b appears to cut through r1. All three components are more clearly visible after high pass filtering (Fig xxx).  The anomaly r31 runs for a length of c. 31m, r3b for c. 18.5m and r3c for c. 16m. They have an average width of c. 1m.	These features are more evident after high pass filtering although they are subtly present in the raw data. The features r3a and r3b appear to align with positive magnetic bands either side of g3b. This would suggest that the r3a & r3b map the location of lower moisture-rich ditches. Which would make the bivallate anomaly associated with g3 oval in plan. However the returns for g3 fall outside of the area covered by the electrical resistance survey and no definite conclusion can be drawn.

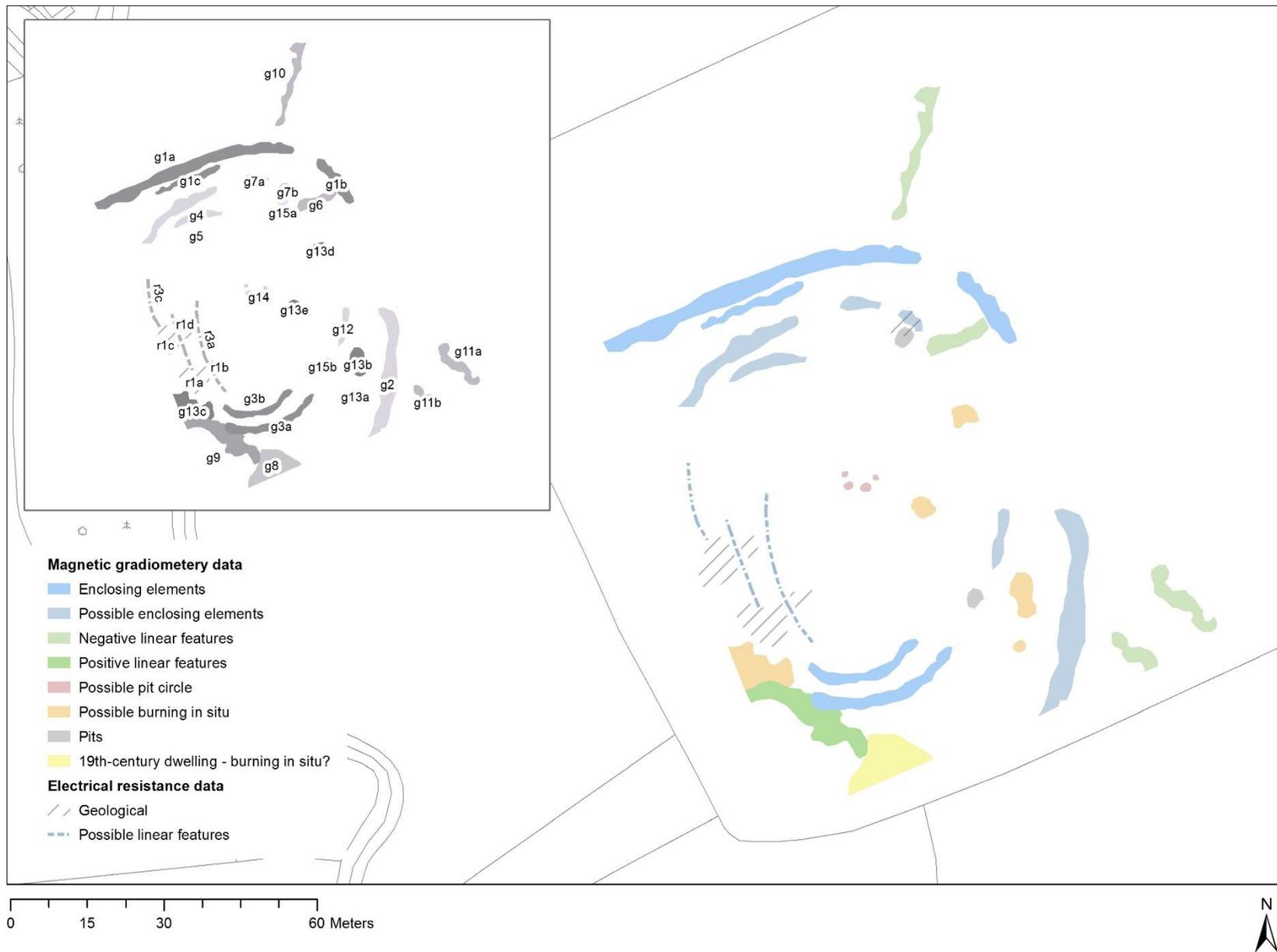


Figure 4  
 Interpretation  
 diagram with  
 levels of  
 archaeological  
 potential.  
 Insert with  
 anomaly  
 identifiers.

## Discussion

The magnetometry survey has captured a series of linear features which appear to enclose the area associated with a possible church site in the Northern Irish Sites and Monuments Register (LDY 045:006). The site located on the NISMR is identified as a possible church due to an entry in the Ordnance Survey Memoirs. The memoir entry itself references the townland and the proprietor but does not identify the position beyond that. The location of this landholding can be identified using Griffith's Valuation (Figure 12). The memoir extract mentions the removal of the church walls which were used in the construction of nearby bleach mills and the presence of bones. A bleach mill in ruins is marked c. 350m to the north-west in the second edition Ordnance Survey map of the area (Figure 14). The same structure appears to be recorded in the first survey (Figure 13) but it is not identified as having any specific use. Fieldwork during the 1980s identified the current location through placename evidence gathered from the local farmer. The oral tradition of worked stone, mortar and human remains being found was also repeated.

Surprisingly there was very little correlation between the electrical resistance and magnetic gradiometry survey data. The electrical resistance survey did not identify any evidence for the high resistance foundations or footings one would expect from a building with stone walls, or a stone or rammed earth floor. Churches made out of stone were mainly constructed in Ireland from the 11<sup>th</sup>- to 12<sup>th</sup>-centuries onwards. Most early medieval stone churches were not built on foundations instead the walls were laid directly on the ground with the lowest course laid out to form a shallow plinth. Often the ground surface was prepared prior to construction usually to level and shore it up (O'Sullivan *et al.* 2014, 153-4). Overall the electrical resistance returns were high throughout. This was probably partially due to the hot, dry weather conditions when the site was surveyed. A collection of higher resistance readings, r1, have an amorphous plan in the raw data (Figure 7) which are no more clearly defined by processing the data set (Figure 9). Indeed passing a high pass filter over the electrical resistance survey data emphasised a number of lower resistance linear anomalies, r3, which appear to cut through r1. These parallel, lower resistance anomalies roughly align with linear features, g3, g4 & g5, captured by the magnetometry survey (Figure 4). This has supported the interpretation that r3 is related to this enclosing activity and r1 is geological in nature.

The magnetometry data appears to capture at least two episodes of enclosing activity. No chronological relationship can be identified. A larger plectrum-shaped enclosure may be associated with the linear features g1 and g2. The spatial relationship of g1a and g1b suggest it was double ditched for at least part of its length. These are lower magnetic features which appear to be defined by higher magnetic readings along their edges. This is most clearly defined along the northern edge of g1a (Figure 10). These may be the higher magnetic readings expected from an organically rich soil, perhaps from a wooded palisade decomposing *in situ*.

Neither of the anomalies which form the larger plectrum-shaped enclosure were mapped in their entirety: g2 appears to extend under the modern field boundary to the south. While g1 extended beyond the western limits of the survey area and would also appear to extend beyond the modern field boundaries to the west. If they are part of the one enclosing feature then it would have an overall external diameter of c. 110m north-west to south-east. Set erratically within this larger plectrum-shaped enclosure a series of curvilinear magnetic anomalies (g3, g4, g5, g7 & g12) appear to form a double-ditched oval enclosure. The eastern and western portions of this feature are not mapped perhaps due to erosion of the feature as a consequence of ploughing. The oval enclosure has an external diameter of c. 80m north to south. What appears to be a semi-circular series of pits, g14, is situated towards the epicentre of the enclosures.

Secular and ecclesiastical enclosures are known from the early medieval period. The oral tradition of a church located at the site could indicate the presence of a forgotten early ecclesiastical settlement. From the 7<sup>th</sup> century onwards there was a growing interest in the internal spatial organisation of ecclesiastical sites. This is evidence in the archaeological record by the construction of *valla* or enclosing elements to protect the sanctity of the site. Certainly the diameter of the plectrum-shaped enclosure and the width of the anomalies, g1a & g2, falls within the range expected for an early medieval ecclesiastical enclosure. There is evidence that the banks which, together with the ditches, would have formed these ecclesiastical enclosures were deliberately levelled and in-filled, perhaps as the function or concept of the *valla* became obsolete in the 9<sup>th</sup> century (O'Sullivan *et al.* 2014, 145-8).

Yet, apart from the form of the plectrum-shaped enclosure there are few other elements that would indicate an early ecclesiastical function. The site lacks the placename evidence, architectural elements including bullaun stone, stone cross or cross decorated slab and founder's tomb, holy well and wider enclosing elements preserved in field boundaries (Stout & Stout 2008, 71). Internally, neither the magnetometry nor electrical resistance surveys indicate the presence of rectangular plan features one would associate with a church structure. There is also no evidence of the type of internal organisation, domestic activity to the west and ritual activity to the east, found in other small single enclosure sites (O'Sullivan *et al.* 2014, 167). Further, the second double-ditched oval enclosure sits awkwardly within the plectrum-shaped anomaly as if whoever laid them out was aware of the others existence but that they weren't part of the one episode. It does not have the order one would associate with an early ecclesiastical settlement.

Some excavated examples of early medieval plectrum-shaped enclosures appear to indicate they held a more secular role. At Newtown, Co. Limerick (Coyne 2005), a single ditched plectrum-shaped enclosure was dated to the 9<sup>th</sup> – 10<sup>th</sup> centuries. The enclosing ditch was 3m wide with remnants of a palisade trench along its north-eastern length. A figure-of-eight like structure was excavated from the interior along with a series of pits and postholes which may have had a geophysical signature similar to g14 at the evaluation resolution used in this survey. In both these interpretations the oval enclosure relates to another period of secular settlement activity similar to a bivallate rath. However the sheltered landscape setting is not typical of neighbouring raths which are usually located in prominent positions utilising drumlin rises.

It is possible that our understanding of the Clagan enclosures has become muddled because of the association with a church site made in the Ordnance Survey Memoirs. The presence of human remains does not equate to a church, this is especially true for the early medieval period. While not associated with monumental features or ecclesiastical sites early medieval 'settlement-cemeteries' may be located in low-laying positions near rivers (Stout & Stout 2008, 73-4), boundaries or significant topographical features (O'Sullivan *et al.* 2014, 300). Situated at c. 120m OD the Clagan enclosures are at the bottom of a drumlin slope overlooked to the north, east and west. The location is c. 80m east of the Lissan River which is used to demarcate the boundary between the historic baronies of Loughinsholin and Dungannon. In the Gaelic medieval landholding system the New English found an effective template through which to measure and administrate their colonial project in Ireland. The barony often took on the mantle of the earlier *trícha cé* a landholding unit associated with petty kings. Although Duffy (2006, 52) warns that 'baronies are not maps of the actual political geography of the medieval Ireland'. However, the location of the enclosures identified during this geophysical survey so close to a baronial boundary, and one which focuses on a distinguishable topographical feature, may indicate their usefulness in this situation.

Within this hierarchy of landholding the *trícha cé*t was further sub-divided into *túath*, *balie baitaig* and in Tyrone *sessiagh* which became our modern townlands (McDermott 2010a, 38 – 44). Duffy (2006) has demonstrated how the *túath*, which were ruled by hereditary leaders, provided the basis for the parochial structure in counties Fermanagh and Monaghan. This parochial structure was first recorded in the 1306 papal taxation record with 'Lissan' parish listed in this account (Sweetman 1881, 202). The civil parish of Lissan is divided between the two baronies which makes it difficult to relate to the historical geography of the area given the Gaelic hierarchy of landholding. Unless when they, the parish and barony, were formed they were echoing the shifting political geography of this area of mid-Ulster.

The 8<sup>th</sup>-century saw the expansion of Cenél nEógain into mid-Ulster at the expense of the Airgialla. The confederation of tribal groupings lost influence and territory to their northern neighbours. Some, the Uí Chremthainn, shifted southwards into what is now south Tyrone and Monaghan to wrestle territory from other lordships throughout the preceding centuries. The Uí Thuirti, who during the 8<sup>th</sup>-century controlled the area north of the Ballinderry River around Magherafelt, moved eastwards across the Bann. Their ruling family, O'Flynn, remaining in their ancestral territory – the barony of Loughinsholin – as a tributary kingdom within the Cenél nEógain (Byrne 1973, 25 – 7). This complex historical geography may explain the nature of relict land-holding features in this area of mid-Ulster.

Stout & Stout (2008, 82) have suggested secular-cemeteries fulfilled societies burial needs up until the 8<sup>th</sup>-century. After this there was an increasing emphasis on burial within consecrated ground and an expansion of Church control into burial rituals. Within this context a number of entries in the Gaelic Irish chronicles give tantalisingly hints at shifting power dynamics within the region. An entry in the Ulster Annals from 744AD records the killing of Colmán, Bishop of Lesán [Lissan] in Uí Thuirti.<sup>4</sup> Hennessy's (1887, 204 -7) translation reads:

'[a] battle between the Ui-Tuirtri and the Airthera [the east parties]. Congal, son of Eicneach, was victor; and Cuchongalt, son of Ua Cathasaigh, escaped by flight; and Bochaill, con of Conchobhar, and Ailill Ua Cathasaigh, were slain. In Inis-itir-da-Dabul it was fought.'

The latter passage while recording a battle does not appear to mention a Colmán, Bishop of Lesán. Indeed Hennessy's (ibid, 206 fn3) translation suggests the possible location of the battle in north Co. Armagh.

It is an extract from the *Annals of Tigernach*<sup>5</sup> which clearly states '[t]he slaying of Colmán, bishop of Lissan by the Uí Thuirti'. This may be the chronicle entry referenced by Hamlin (1976, 580-1) in their research on the early medieval archaeology of Lissan parish. Given the wider socio-political context: the expansion of the Cenél nEógain into mid-Ulster, the eventual displacement of the Uí Thuirti and the Irish Church's attempt to exercise greater control burial over practices. It not impossible to hypothesis that the Clagan enclosures mark a settlement-cemetery associated with this earlier tribal grouping who as well as being physically displaced and politically subjugated also saw control over their burial rituals shift to the Church and its emerging parochial centre at Lissan. The resulting power struggle saw bloody conflict and the eventual dominance of the Cenél nEógain.

O'Sullivan *et al* (2014, 312) have warned about the 'disparate and variable' nature of the classification, 'settlement-cemetery'. However, of those characteristics that can be identified many of them appear to

---

<sup>4</sup> *Annals of Ulster* [Online] <http://www.ucc.ie/celt/online/T100001A/>

<sup>5</sup> *Annals of Tigernach* [Online] <http://www.ucc.ie/celt/published/T100002A.html>

relate to the Clagan enclosures. As discussed above the Clagan enclosures are situated in a low-laying, sheltered position near a river which also marks a baronial boundary. In general settlement-cemeteries are smaller than ecclesiastical enclosures. Although at c. 110m the Clagan example falls within the acceptable range for both site types. The absence of burial cuts from the magnetic and electrical resistance data does not mean evidence of absence. If the grave-cut was rapidly back filled we would expect little difference in the magnetic signatures. Similarly electrical resistance data is better at identifying stone features or in-filled anomalies with variations in moisture from the surrounding soil matrix. Often settlement-cemeteries display evidence for multiple enclosing elements which undergo episodes of in-filling and re-cutting (Stout & Stout 2008, 70-1). At Faughart Lower, Co. Louth a bivallate enclosure was replaced by a larger single-ditched example (O'Sullivan *et al* 2014, 311). Indeed these sites often appear to incorporate a significant settlement element in the form of artefacts, waste, industrial and crop-processing materials. Cereal-drying kilns appear to be a feature of these sites for examples Raystown, Co. Meath, and Corbally, Co. Kildare produced five and 26 kilns respectively (ibid, 306-8). It has been suggested that the dipolar anomalies associated with g13 could be cereal-drying kilns. Without further investigation the above hypothesis cannot be tested. Yet, the form and nature of the geophysical returns do suggest that this site may reveal further important details about the early medieval archaeology and history of this area of mid-Ulster.

### **Recommendations**

It is recommended that further non-invasive techniques be used to aid our understanding of the site which could eventually inform a programme of excavation.

Further magnetic gradiometry survey to the fields to the south and west of the survey area and an extension of the survey to the east may define the limits of some of the linear features.

An exploration of historical landholding boundaries, especially parish and barony, in relation to the changing medieval historical geography of the area would greatly aid an understanding of the archaeological landscape.

A programme of field-walking along the Lissan River specifically for evidence of mill races and a field visit to the site of the bleach mill ruins recorded by the Second Ordnance Survey to see if there are any masonry fragments.

Phosphate analysis over the survey area may help to identify if there are burials present.

Using a methodology of auger survey targeted on the larger dipolar features, developed by Jarrod Burks, Ohio, could provide a non-intrusive approach for securing use and dating evidence.

## Bibliography

Aspinall, A., Gaffney, C., & Schmidt, A., 2009 *Magnetometry for archaeologists*. AltaMira Press: Plymouth.

Byrne, F.J., 1973 *Irish kings and high-kings*. Four Courts Press: Dublin.

Coyne, F., 2005 'Excavation of an early medieval 'plectrum-shaped' enclosure at Newtown, Co. Limerick', in *North Munster Antiquarian Journal*, **45**, pp 51 – 63.

Hamlin, A.E., 1976 'The archaeology of early Christianity in the North of Ireland'. [Unpublished PhD thesis] Department of Archaeology: Queen's University Belfast.

McDermott, S., 2010a 'Negotiating the colonial process: society and settlement in Truagh, north Co. Monaghan, c. 1591 – c. 1800'. [Unpublished PhD thesis] School of Archaeology & Geography: University of Ireland, Galway.

McDermott, S., 2010b 'The archaeology of the twelve tates of McKenna, c. 1591', in *Clogher Record*, **20**, pp 171 – 204.

Morrin, J., 1966 *Irish patent rolls of James I: facsimile of the Irish record commissioners' calendar prepared prior to 1830*. Dublin.

O'Sullivan, A., & Nicholl, T., 2010 'Early medieval settlement enclosures in Ireland: dwellings, daily life and social identity', in *PRIA*, **111C**, pp 59-90.

O'Sullivan, A., McCormick, F., Kerr, T.R., & Harney, L., 2014 *Early medieval Ireland, AD 400 – 1100: The evidence from archaeological excavations*. Royal Irish Academy: Dublin.

Simington, R., 1934 *The Civil Survey A.D. 1654 – 56 counties of Donegal, Londonderry and Tyrone vol iii with the returns of church lands for the three counties*. [Online] <http://www.irishmanuscripts.ie/digital/The%20Civil%20Survey%201654%20Vol%20III%20Co%20Donegal/>.

Stout, G., & Stout, M., 2008 *Excavations of an early medieval secular cemetery at Knowth Site M, County Meath*. Wordwell: Bray.

Sweetman, H., 1881 *Calendar of documents relating to Ireland preserved in her majesty's Public Record Office, London: 1302 – 1307*. [Online] <https://archive.org/stream/cu31924091754808#page/n7/mode/2up>

Taylor, K., 2006 'N18 Ennis Bypass and N85 Western Relief Road: Final Archaeological Report'. Unpublished report submitted to Clare County Council. [Online] <http://www.tvasireland.ie/Reports/n18ar128.pdf>.

## **Acknowledgements**

I would like to thank Tony McCance, Cookstown District Council, and Edith Logue, NIEA, for helping me access the site. I would like to thank Ruth Logue and Dr. Harry Walsh, Centre for Archaeological Fieldwork, Queens University Belfast, who helped me survey the site. Cormac McSparron, Centre for Archaeological Fieldwork, Queens University Belfast, for yet again bouncing about the ideas and the reading leads which aided the interpretation.

Thank-you also to Greer Ramsey and Carole Hearst, National Museums Northern Ireland, for their assistance.

Appendix one: Georeferenced geophysical survey grid



Figure 5 Location and coordinates of local geophysical survey grids for Area A (top) and Area B (bottom).

Local Grid coordinate	Irish National Grid coordinate		Local Grid coordinate	Irish National Grid coordinate	
0,0	E 278719	N 383895	60,0	E 278776	N 383918
0,30	E 278708	N 383923	60,30	E 278764	N 383946
0,60	E 278696	N 383951	60,60	E 278752	N 383974
0,90	E 278684	N 383979	60,90	E 278741	N 384002
0,120	E 278673	N 384007	60,120	E 278729	N 384031
30,0	E 278747	N 383907	90,0	E 278804	N 383930
30,30	E 278736	N 383935	90,30	E 278792	N 383958
30,60	E 278725	N 383963	90,60	E 278780	N 383986
30,90	E 278713	N 383991	90,90	E 278769	N 384014
30,120	E 278701	N 384019	90,120	E 278757	N 384042

Table 3 Geophysical survey grid coordinates georeference to Irish National Grid

Appendix two: Raw data plots

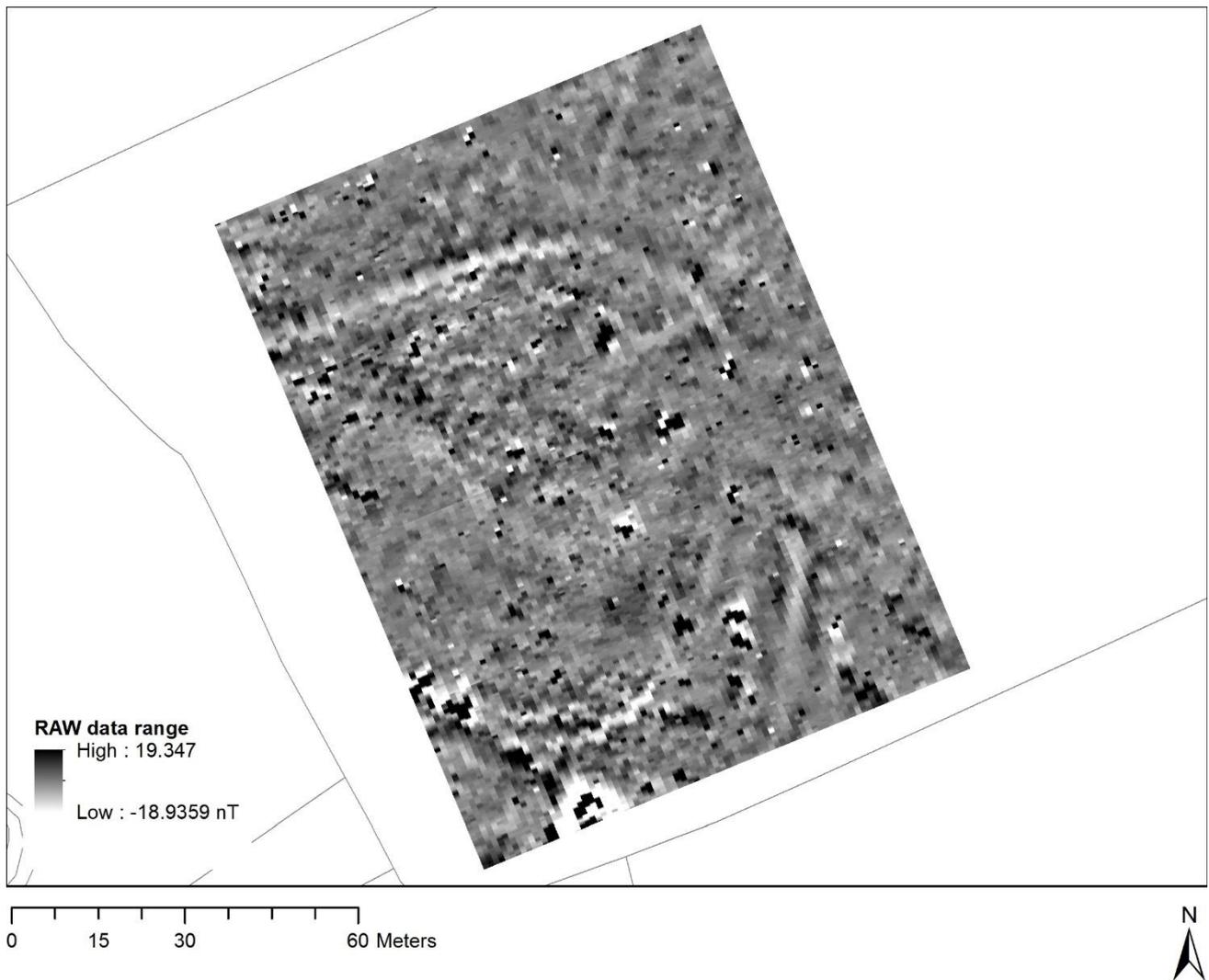


Figure 6 Greyscale plot of raw magnetic gradiometer data with ZMT applied.

Statistics:

Mean: 0.13 nT

Std Dev.: 2.90

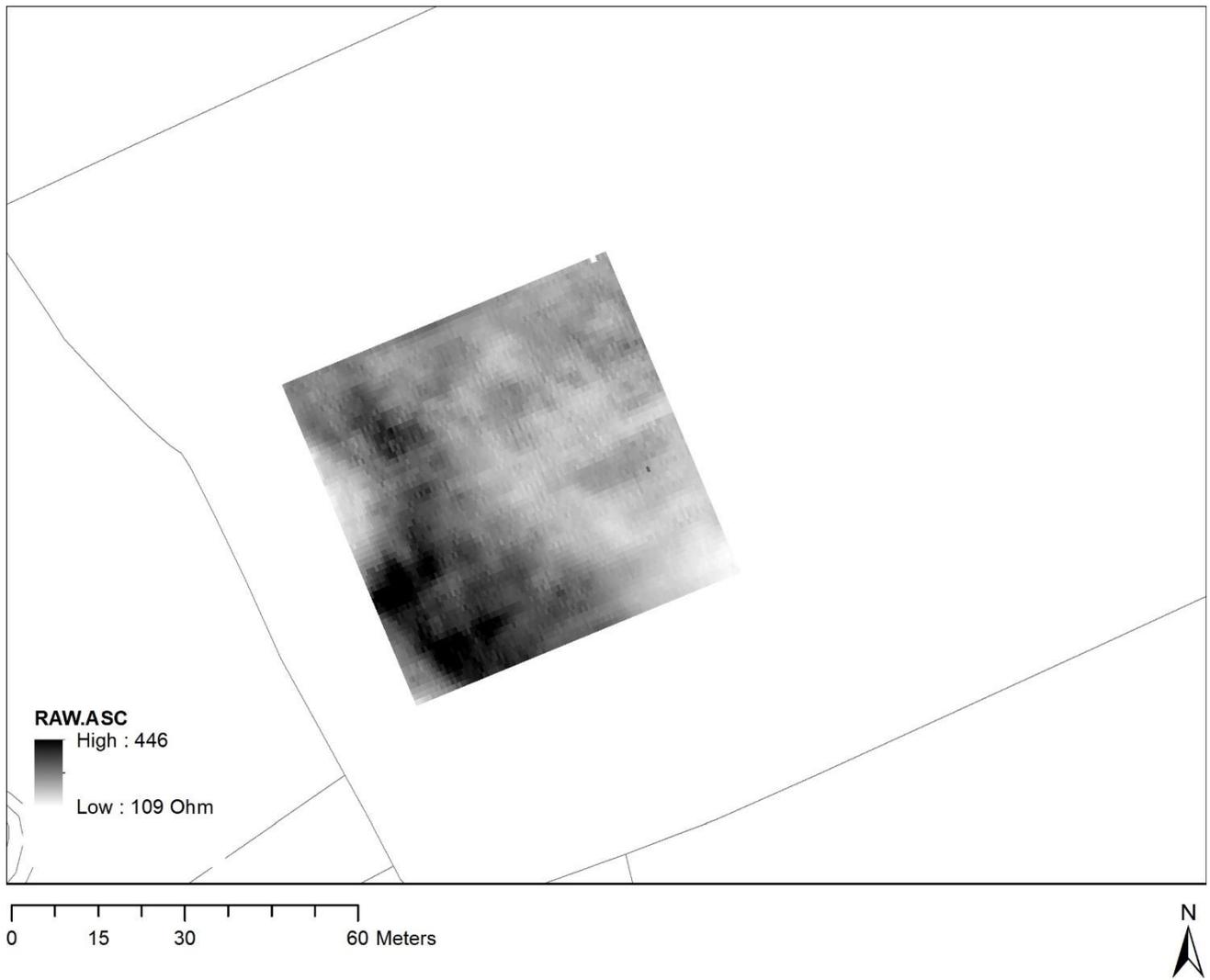


Figure 7 Greyscale plot of raw electrical resistance data clipped to +/- 3 standard deviation.

Statistics:

Mean: 254.44 Ohm

Std Dev.: 67.27

Appendix three: Processed data plots

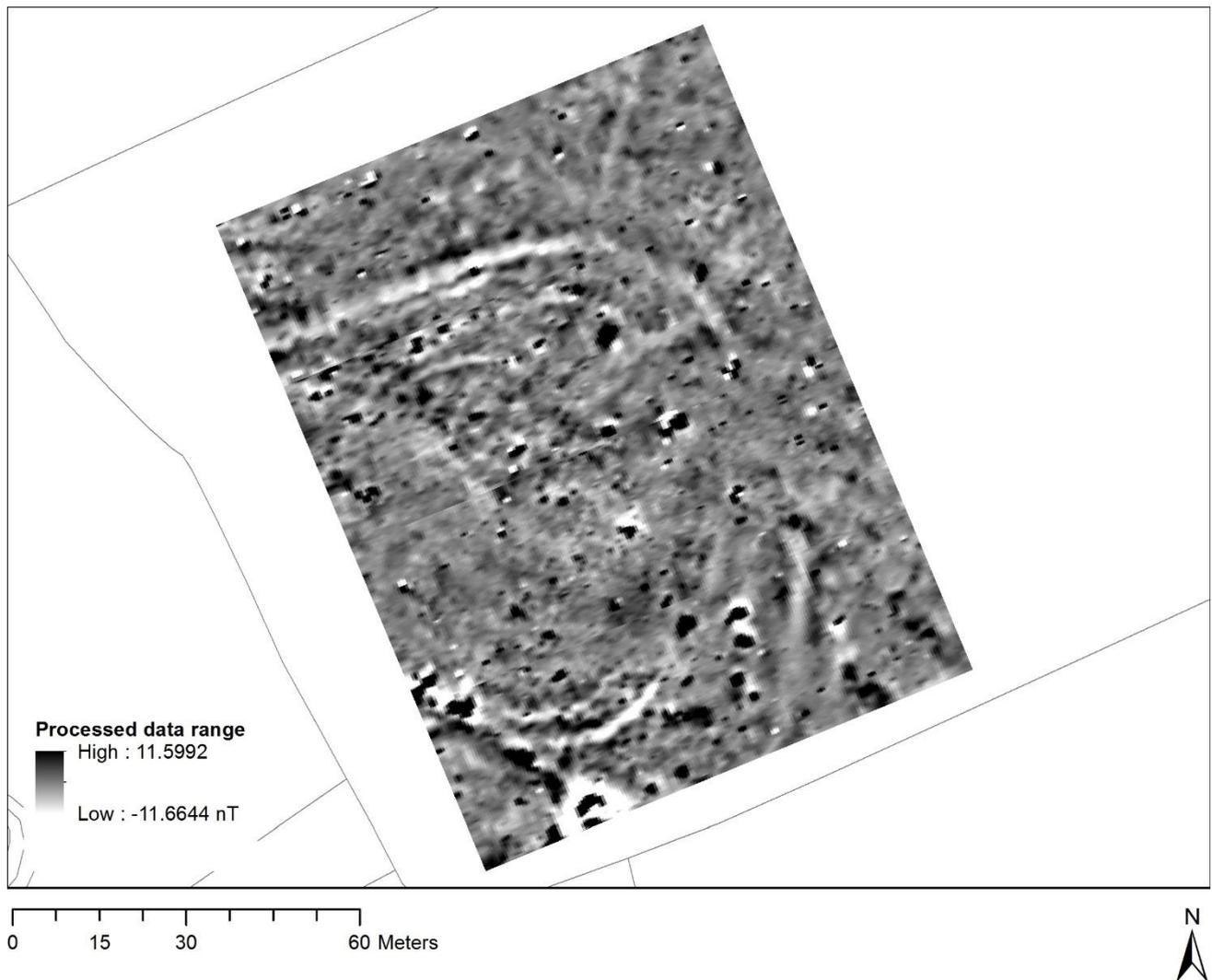


Figure 8 Greyscale plot of processed magnetic gradiometer data with ZMT, destaggered, LPF Gaussian weighting applied x1 on the y-axis, and  $\sin(x)/x$  interpolation along the y-axis.

Statistics:

Mean: 9.43 nT

Std Dev.: 2.39

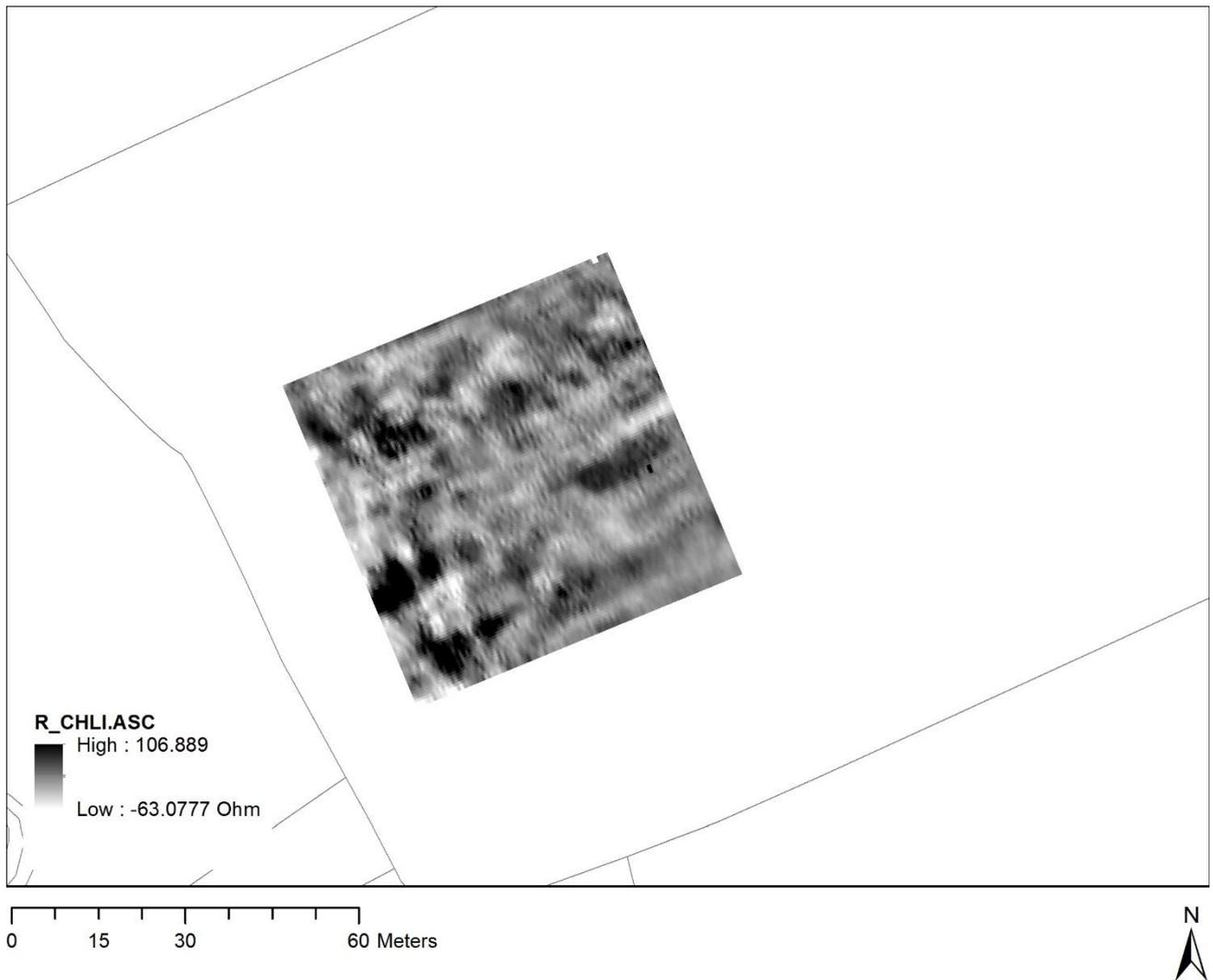


Figure 9 Greyscale plot of processed electrical resistance data. Data was clipped +/- 3 standard deviations, HPF (Uniform weighting applied on the x- and y-axis), LPF (Gaussian weighting applied on the x- and y-axis).

Statistics:

Mean: 0.18 Ohm

Std Dev.: 18.69

**Appendix four: Supporting visualisations**

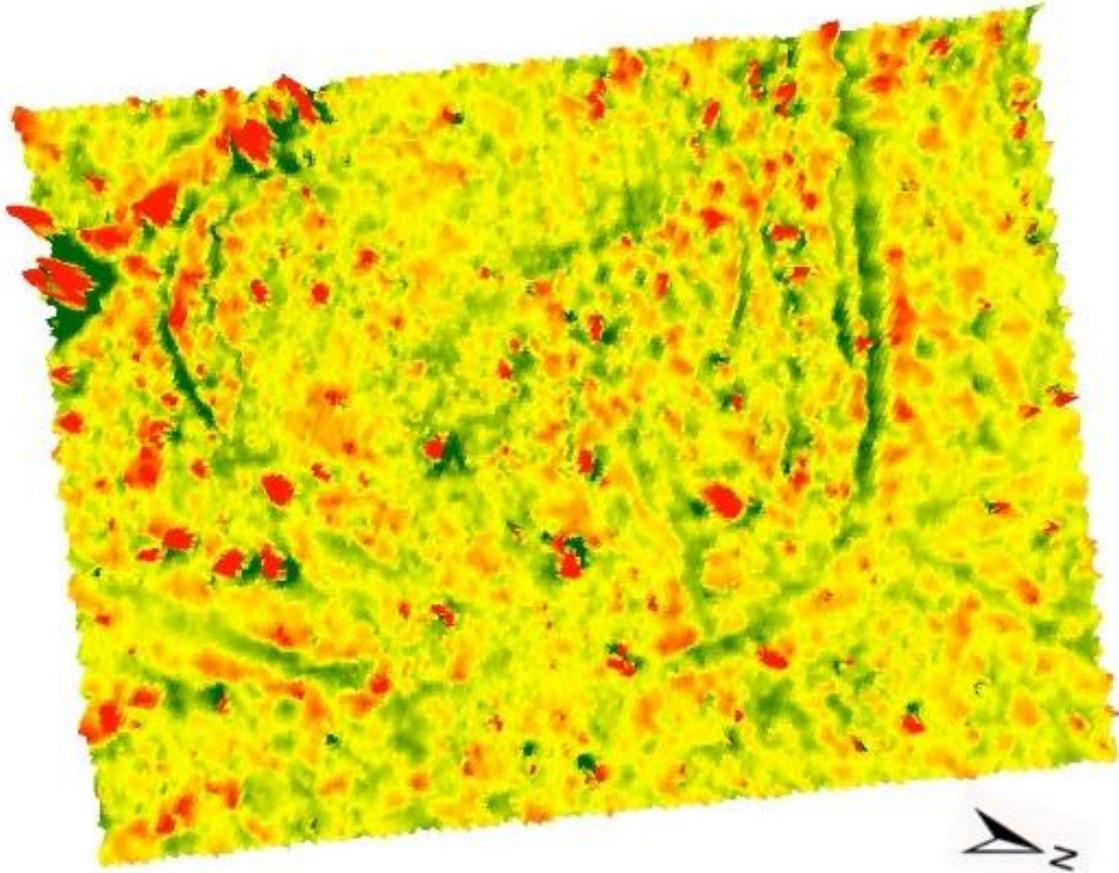


Figure 10 ArcScene export of a 3d model of the processed magnetic gradiometry data. Lower magnetic readings are in green and higher readings in red.

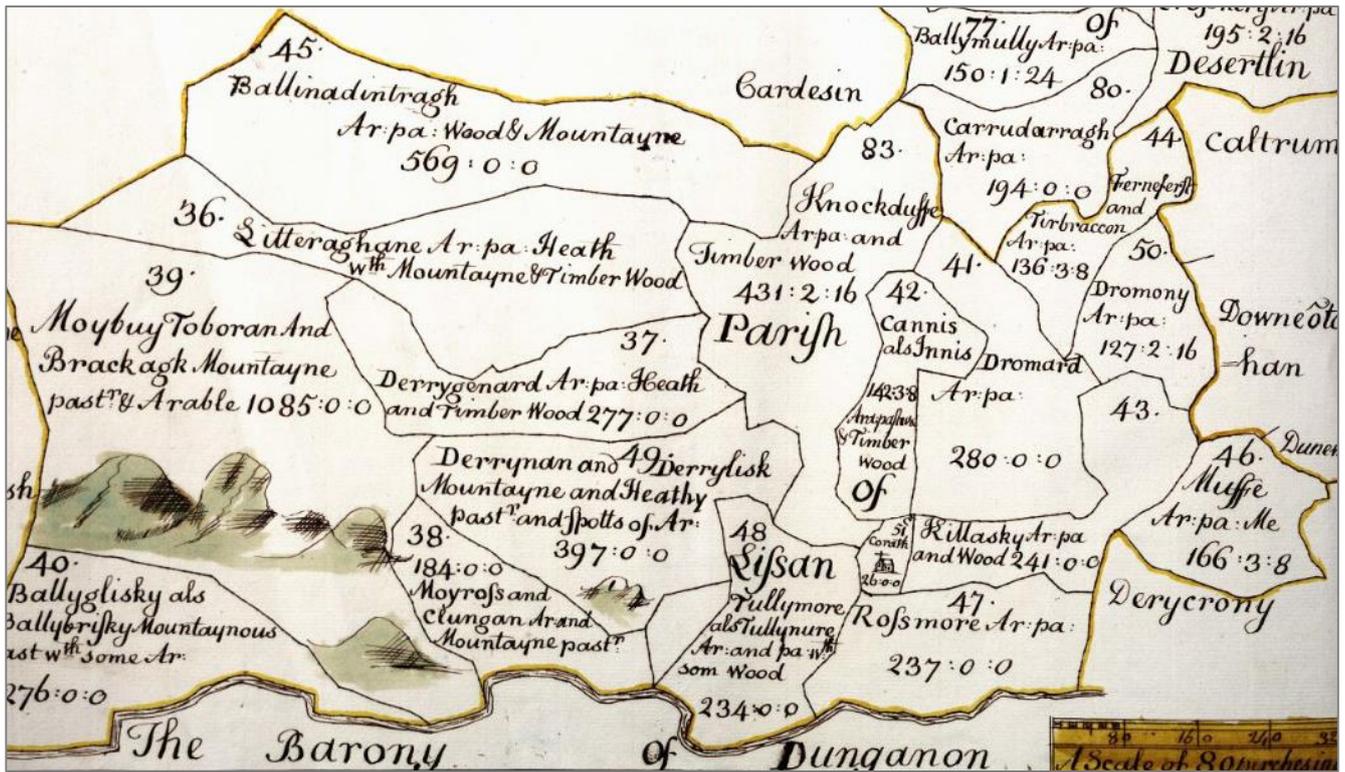


Figure 11 Extract from the Petty map, c. 1650, 'The Church land in the parishes of Lissan & Desertmartin in Loghinsholin barony by Ed. Wilson'.<sup>6</sup>

<sup>6</sup> Available online [<http://downsurvey.tcd.ie/down-survey-maps.php#bm=Loghinsholin&c=Derry&indexOfObjectValue=-1&indexOfObjectValueSubstring=-1&p=Lissan+Desertmartin+and+Desertlin>]

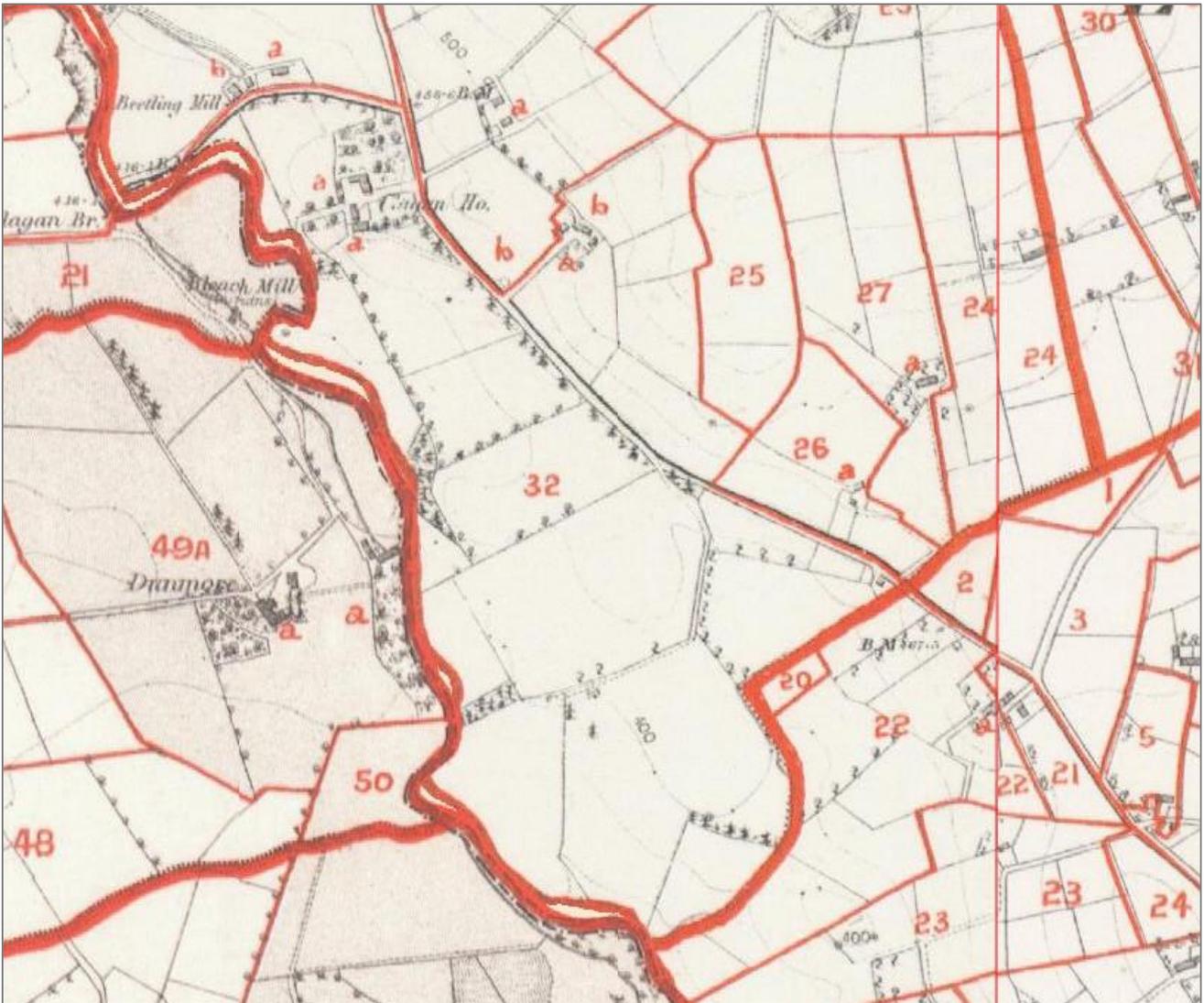


Figure 12 Extract from Griffith's Valuation showing the land parcel [32] worked by the Ramsey Family c. 1858-9.  
Available online at <http://www.askaboutireland.ie/griffith-valuation>

Appendix five: Historical mapping

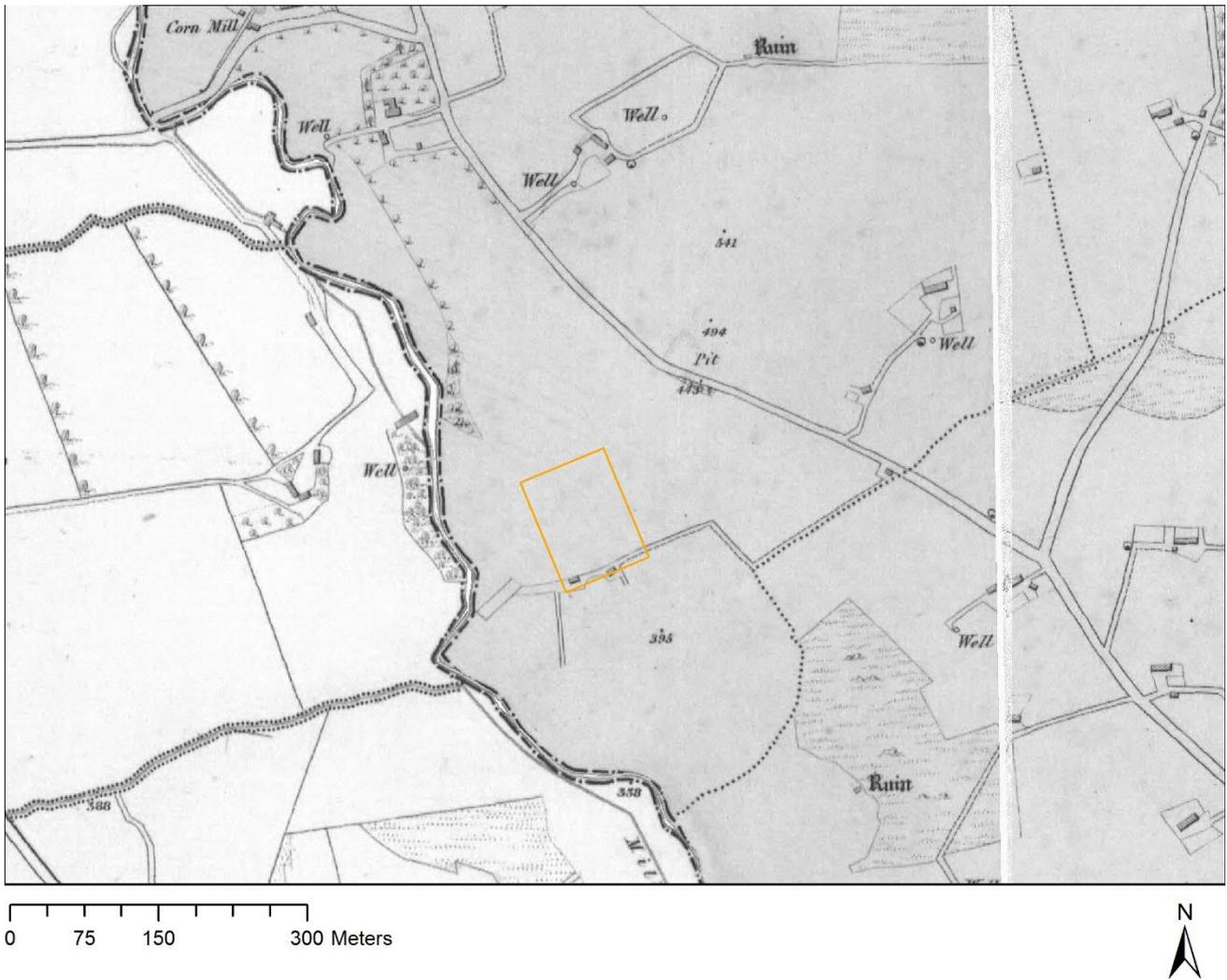


Figure 13 Geophysical survey (highlighted in yellow) in relation to the First Edition Ordnance Survey map series, c. 1830-2.

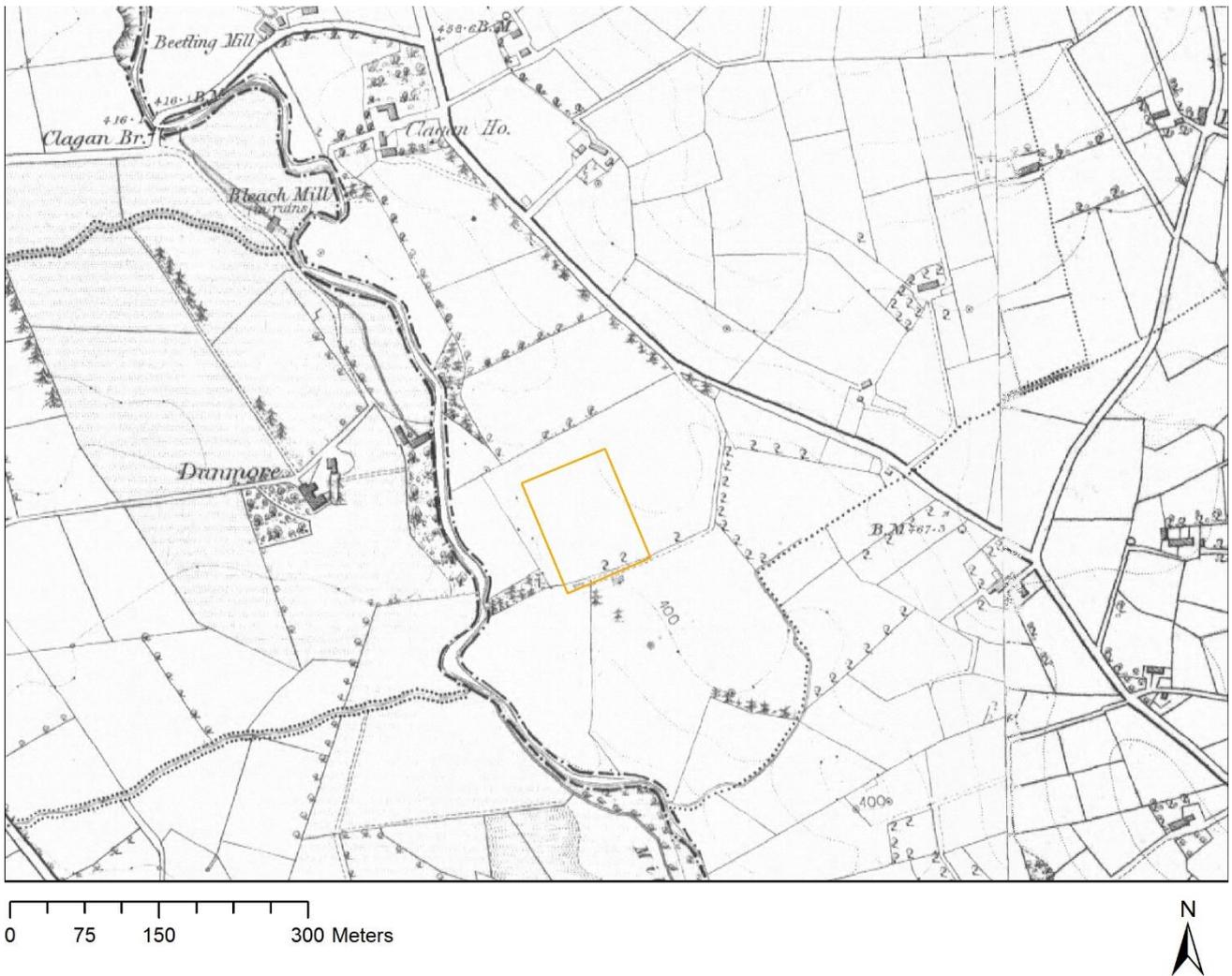


Figure 14 Geophysical survey area (highlighted in yellow) in relation to the Second Edition Ordnance Survey map series, c. 1849-53.

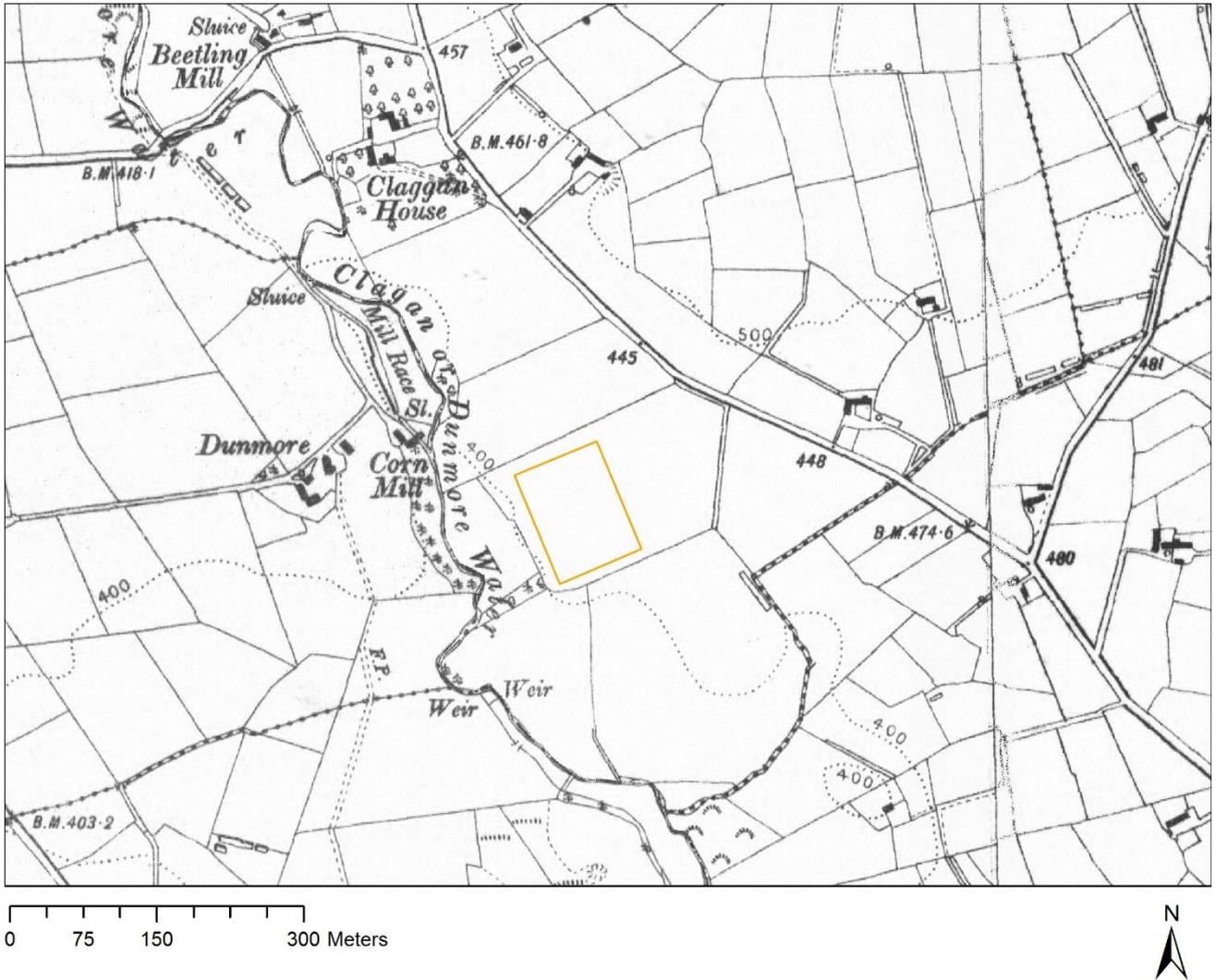


Figure 15 Geophysical survey area (highlighted in yellow) in relation to the Third Edition Ordnance Survey map series, c.1904-6.

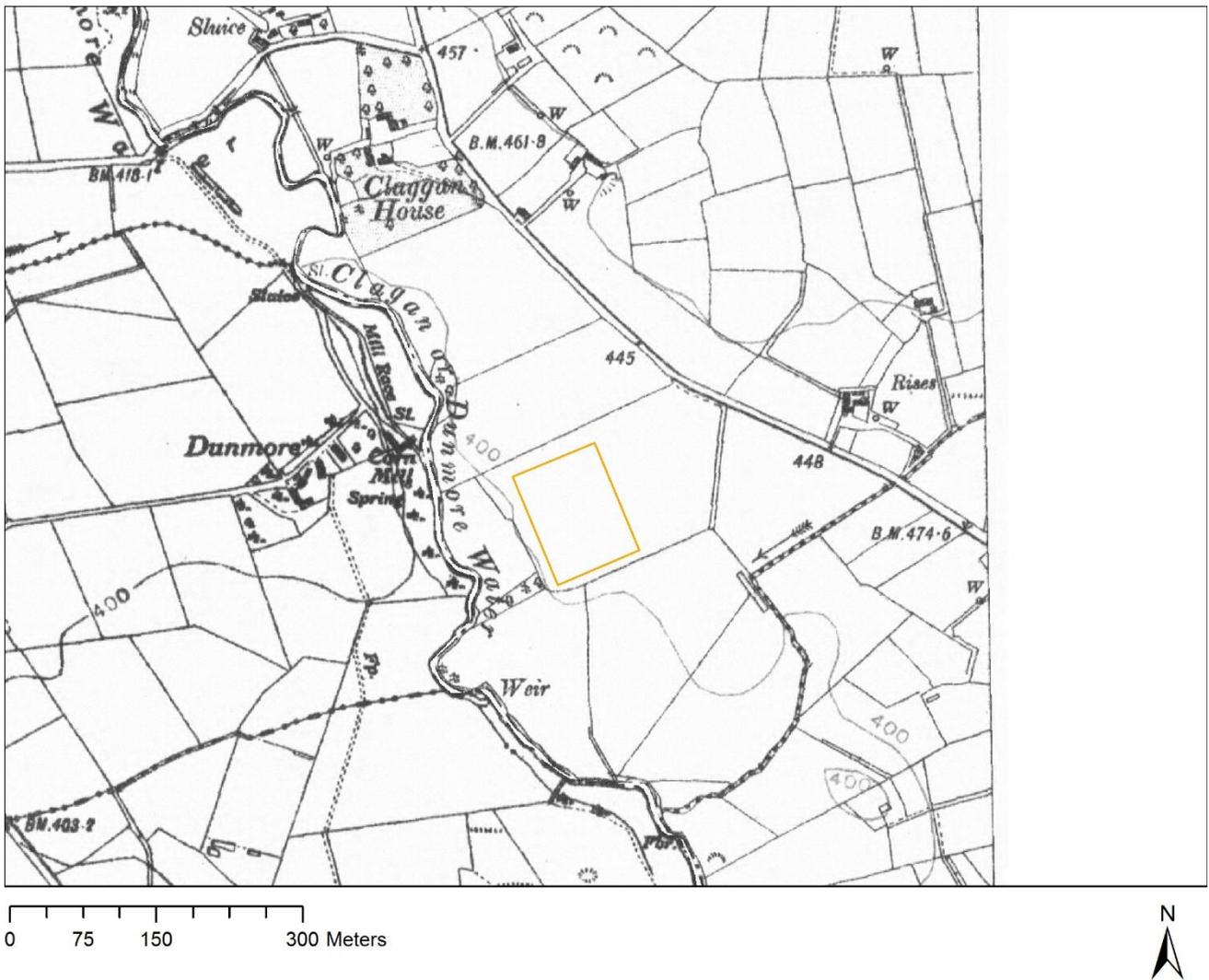


Figure 16 Geophysical survey area (highlighted in yellow) in relation to the Fourth Edition Ordnance Survey map series, c.1924.

**Appendix six: Photographs of survey area**



Figure 17 View from entrance in the north corner of the field looking south.



Figure 18 View from eastern limit of survey area looking west onto trees along the bank of Lissan River.