

# **Greater Dublin Drainage**

## **Alternative Sites Assessment and Route Selection Report (Phase 4): Final Preferred Site and Routes**

### **Appendix 6 Cultural Heritage**

- **Summary Report on Geophysical Surveys Carried out at Annsbrook, Clonshagh & Newtowncorduff, Co. Dublin**
- **Geophysical Survey Report**

**June 2013**




# Document control sheet

P 04 F8

Client: Fingal County Council

Project: Greater Dublin Drainage Job No: 32102900

Document Title: Cultural Heritage Assessment

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**SUMMARY REPORT  
ON GEOPHYSICAL SURVEYS CARRIED OUT AT  
ANNSBROOK, CLONSHAGH &  
NEWTOWNCORDUFF,  
CO. DUBLIN**

**AS PART OF THE  
GREATER DUBLIN DRAINAGE  
SCHEME**

**SURVEYS BY TARGET ARCHAEOLOGICAL  
GEOPHYSICS**

**LICENCE REFS: NEWTOWNCORDUFF 13R23,  
ANNSBROOK 13R24,  
CLONSHAGH 13R25**

**MAY 2013**

## **1. Background**

A series of geophysical surveys have been carried out at three 20ha sites within County Dublin as part of the Greater Dublin Drainage Scheme. The surveys have been conducted in order to inform the selection of the best site for development as a waste water treatment works. It follows on from an initial scoping exercise, which identified a total of nine possible sites for development. These sites were then subject to environmental assessment in order to define the three most preferred sites. A detailed archaeological, architectural and cultural heritage assessment was carried out on the nine sites by IAC Ltd during Phase 2 of the Alternative Site Assessment (ASA) and Route Selection. This involved a detailed desktop assessment and wind shield inspection of the proposed sites. Recorded and previously unrecorded sites and structures of archaeological and architectural potential were noted as constraints to be avoided within the assessment.

As a result of the overall environmental assessment completed during ASA Phase 2, three sites emerged as potentially the best areas in which to develop the waste water treatment works. These are all located within Fingal County at Annsbrook, Clonshagh and Newtowncorduff (Figure 1).

Please note that this summary report should be read in conjunction with the Alternative Sites Assessment and Route Selection Report (Phase 2); Emerging Preferred Sites and Routes Appendix 6 Cultural Heritage Assessment and the full technical geophysical report for the investigations, which is attached to this summary as Appendix 1.

### **1.1 Annsbrook**

There are two RMP sites located within 1km of the proposed site at Annsbrook and both represent sites that have already been excavated (DU007-034, DU007-035). Over 1.2km to the south of the proposed site is the archaeological complex associated with the Augustinian monastery at Gracedieu. There are ten sub-constraints listed within this site (DU007-01501-10), all of which are located between 1.26km and 1.51km of the proposed site.

Five sites of archaeological potential were identified within the vicinity of the proposed site. These consist of the site of Annsbrook House (CH 26), which is likely to date to the early 18th century; the site of a mill race (CH 89) and a potential bridge site (CH 105). CH 105 is also located in close proximity to the proposed access road, as is ruined bridge CH 106. Both features are located to the west of the proposed access route, whereas CH 108 (site of post medieval structures) is located to the immediate east. The site of the mill race is associated with the site of the original Woodpark House and mill to the east (CH 90).

The proposed site is located within the townland of Annsbrook, although part of the eastern boundary is formed by the boundary that separates Annsbrook and Woodpark. The proposed access route to the site will cross one townland boundary and will run adjacent to a stream.

In the evaluation carried out during Phase 2 of the ASA of the site no predicted impacts were anticipated upon National Monuments, protected structures and water courses. One imperceptible negative impact was anticipated on the site the monastery at Gracedieu. Four moderate negative impacts were anticipated on previously unrecorded CH (cultural heritage) sites. One slight impact was anticipated on the demesne associated with Woodpark House and one moderate impact on a townland boundary.

### **1.2 Clonshagh**

There are seven RMP sites located within 1km of the proposed site at Clonshagh. The closest of these consists of DU015-056, which is the site of an enclosure located c. 295m to the east. This site is likely to represent a levelled ringfort. The proposed site is located within

the townlands of Clonshagh and Clonshagh (E.DKinsaley). The boundary that separates the two crosses the site.

A total of seven areas of archaeological potential have been identified within the vicinity of the site. The closest of these consist of a possible enclosure (CH 62), which was marked as a tree ring on the first edition OS map. This is located c. 150m east of the site. Two additional ring fort sites have also been identified within aerial photographs. CH 58 is located c. 530m north-east, whilst CH 66 is located c. 730m to the west.

In the evaluation of the site carried out during Phase 2 of the ASA no predicted impacts were anticipated upon National Monuments or water courses. Three imperceptible negative impacts were anticipated on existing RMP sites. Three imperceptible negative impacts were also anticipated on previously unrecorded CH (cultural heritage) sites. Three slight impacts were anticipated on surrounding demesne landscapes, whilst one imperceptible impact was predicted on a protected structure/NIAH structure. Two moderate impacts were predicted on townland boundaries.

### **1.3 Newtowncorduff**

There are six RMP sites located within 1km of the proposed site at Newtowncorduff. The closest is DU008-069, an excavated *fulacht fiadh* site located c. 410m to the west of the site. The proposed site is located within the townland of Newtowncorduff. The northern border of the site is formed by the townland boundary that divides Newtowncorduff and Ballough. This boundary is crossed by the proposed site access. The site access also crosses a stream to the north-east.

Four sites of archaeological potential were identified within the vicinity of the proposed site. These consist of two mounds (CH 11) and a possible ring ditch site (CH 12); a possible medieval village site (CH 25) and a possible castle and mill site, which may be medieval in date, located c. 950m to the south. The proliferation of medieval and potential medieval sites indicates that the proposed site may be located within a landscape that has a higher potential for medieval archaeological remains.

In the evaluation of the site carried out during Phase 2 of the ASA no predicted impacts were anticipated upon National Monuments, RMP sites or designed landscapes. One moderate and one imperceptible impact were predicted on protected structures/NIAH structures. Four imperceptible and three slight negative impacts were anticipated on previously unrecorded CH (cultural heritage) sites. One potentially significant impact was identified on a watercourse and one moderate impact was predicted on a townland boundary.

## **2 Summary of Geophysical Survey Results**

Geophysical surveys of the three 20ha sites were carried out during March and April 2013 under licence to the Department of Arts, Heritage and the Gaeltacht (Licence Refs 13R23, 13R24, 13R25).

The surveys consist of detailed gradiometer survey with data collected along parallel traverses using a sensor spacing of 1m, and crossline sampling rate of 10hz equivalent to 1 reading every 10-15cm.

### **2.1 Annsbrook**

Some areas within the 20ha were not accessible to survey. These included sections close to existing boundaries where machinery had created rough track ways and the remaining sections between AG1, AG5 and AG6, which form difficult ground that were either very boggy in nature, deeply rutted or currently under vegetable cultivation. The lack of access to several small areas has not impacted on the overall conclusions drawn from the survey. The survey areas are referred to as AG 1-7 and marked on Figure 2.

AG 1 lies in the northern most field within the development area. The geophysical survey results were characterised by a number of likely field drains, aligned WNW-ESE and a former field boundary running north-south across the centre of the site. This is marked on the first edition OS map (1843). In the north-eastern most part of the area a series of responses were identified, which may represent a ploughed out enclosure. No indication of this site exists within the desk based resources. Three other scattered responses were noted within the area, which may have an archaeological origin and represent pits of an archaeological nature. These could be any date and may also represent geological or modern ferrous material.

Within AG2 and 3, linear anomalies were noted, which are likely to represent modern land drains. The first edition OS map of 1843 shows two field boundaries running in a NNE-SSW direction through these two fields. One of these is likely identified by the ferrous response in AG 3. AG 4, 5 and 6 are also characterised by linear anomalies. Within AG 4 the anomalies are aligned WNW-ESE, whereas in AG 5 and 6 they are mostly aligned NNE-SSW. Two small isolated responses of possible archaeological origin were also noted in AG 6.

With AG 7, an area of increased response, indicating a cluster of possible archaeological features was noted. These are located c. 80m north of the development area boundary. Whilst no obvious features are marked within the material assessed at the desktop stage, this area is in proximity to the site of Annsbrook House (CH 26). Rocque shows the house to the west in his map of 1760. It is possible that these anomalies relate to an outbuilding connected to the house. No evidence of an outbuilding to the north of the house was identified in the survey. This is shown as present in Rocque's map.

## **2.2 Clonshagh**

Some areas within the 20ha were not accessible to survey. These included sections close to existing boundaries where machinery had created rough and deep track ways and the remaining sections between CG 4.1-CG 4.3, which are currently under brassica cultivation. The lack of access to several small areas has not impacted on the overalls conclusions drawn from the survey. The survey areas are referred to as CG 1-5 and marked on Figure 3.

CG 1 is the western most field within the proposed development area. The geophysical results are characterised by the presence of a broad linear response, likely to represent a former paleo-channel. A small linear trend at the centre of the survey area may represent a natural feature or a boundary.

CG 2 forms the southern portion of the proposed development area. Although the area subject to survey was relatively narrow, a number of strong magnetic linear anomalies were noted throughout the area. These are likely to represent former field boundaries, some of which are marked on the first edition OS map (1843). Discrete curving linear anomalies were noted in the north-west part of CG 2, which have the potential to represent a possible early medieval field system. These features extend outside of the proposed development area. Similar features were noted in the narrow eastern part of the survey area. These may represent an enclosure, although interpretation is difficult due to the narrow nature of the survey area.

The most interesting response within CG 3 consists of the remains of a possible sub-circular enclosure, located in the north-east corner of the field. The entire feature was not identified during the survey due to disturbance around the corner of the field. However, it is located to the immediate north-east of the boundary of the proposed development area. It occupies an area to the immediate south-east of a paleo-channel, which was also identified as an anomaly in the survey and is clear on some of the aerial photograph sets. The topography in the area shows that it partially occupies a gradual north facing slope that runs towards the



stream, which currently borders the field. Other anomalies within CG 3 include magnetic disturbance from overhead cables and a number of linear features that are likely to represent former boundaries. The eastern linear trends have the potential to represent a plough damaged rectangular enclosure, although that interpretation is tentative.

Access within CG 4 was limited due to a vegetable crop. Three areas within the overall field were surveyed, revealing linear anomalies and trends, orientated east-west. These are likely to represent recent drainage.

Linear anomalies were also identified throughout CG 5. These are likely to represent drainage features, cultivation and a probably former boundary. The linear responses here are numerous and the potential that plough damaged archaeological remains may be indicated in this location should not be dismissed.

### **2.3 Newtowncorduff**

Some areas within the 20ha were not accessible to survey. These included sections close to existing boundaries where cows had chewed up wet ground excessively and where fallen trees, recent hedge clearance and electricity pylons have precluded survey. The lack of access to several small areas has not impacted on the overall conclusions drawn from the survey. The survey areas are referred to NG 1-9 and marked on Figure 4.

NG 1 contained no significant anomalies. NG 2 contained a number of linear anomalies indicating the presence of cultivation furrows running east-west. Some linear trends were also noted. NG 3 produced the most interesting results to date within the proposed development area. These include a sub-square enclosure with associated field system and the presence of a possible further circular enclosure to the south-east. These remains were not identified within the desktop resources during the assessment. However, the main enclosure is similar in size and plan to the medieval moated site (DU008-016) located c. 720m SSE. It is likely that the sub-square enclosure is medieval in date, with an associated field system.

Within NG 4 several linear responses were identified, which may represent archaeological or natural features. NG 5 revealed further linear anomalies on various alignments, including a former boundary running north-south across the field. This boundary is marked on the first edition OS map (1843). The results indicate the presence of modern drainage features across the field. NG 6 contained a former field boundary aligned north-south across the field, as well as weak linear and rectilinear trends apparent throughout the area. One linear trend at the centre of the area appears to extend from the field system associated with the probable medieval site to the west. As such elements of the medieval field system may be preserved in NG 6.

Within NG 7, an earlier field system is possibly indicated by two intersecting line trends which traverse NG7 north-east-south-west and east-west. Further weak linear trends extend through NG7, mainly to the north-west and west and these may represent remains of recent land use or cultivation. Land drains aligned approximately north-west-south-east extend through the central portion of NG7. Part of the possible field system extends into the western portion of NG 8. Land drains were also identified within the area, on a WNW-ESE alignment.

Within NG 9, a cluster of anomalies at the centre of the area is thought to derive from natural soil/geological variations. Remains of a former boundary and part of a possible early field system are evident traversing NG9 northeast-southwest and northwest-southeast through the southern portion of the survey area. Linear trends in the northern part of the area conform to the current patterns of cultivation in the area and are thought to represent agricultural activity.

### **3. Conclusions**

The geophysical surveys that have been carried out within the three potential development areas have aided in the assessment of the suitability of the sites. The survey results at Newtowncorduff suggest that significant archaeological remains survive within a portion of the development area. These may represent a medieval farmstead and associated field systems, as well as a possible circular enclosure. The associated field system may occupy a relatively large area. The presence of these remains means that more archaeological mitigation would be required in the form of archaeological testing and possibly excavation. The process of the development design would also need to be mindful of the location of these features and aim to design them out in order to prevent direct impacts.

In terms of potential archaeological remains, the geophysical results at the Annsbrook and Clonshagh sites indicate some archaeological potential, although at Clonshagh the activity is located either outside or on the very edge of the development area. At Annsbrook the potential activity is located slightly further into the site. Whilst further archaeological assessment at both sites would be required, the potential remains could be designed out of the development relatively easily.

The results of the site selection assessment, along with the geophysical results would suggest that the Clonshagh and Annsbrook sites are more preferable for development than the Newtowncorduff site.





Annsbrook

Newtowncorduff

Clonshagh



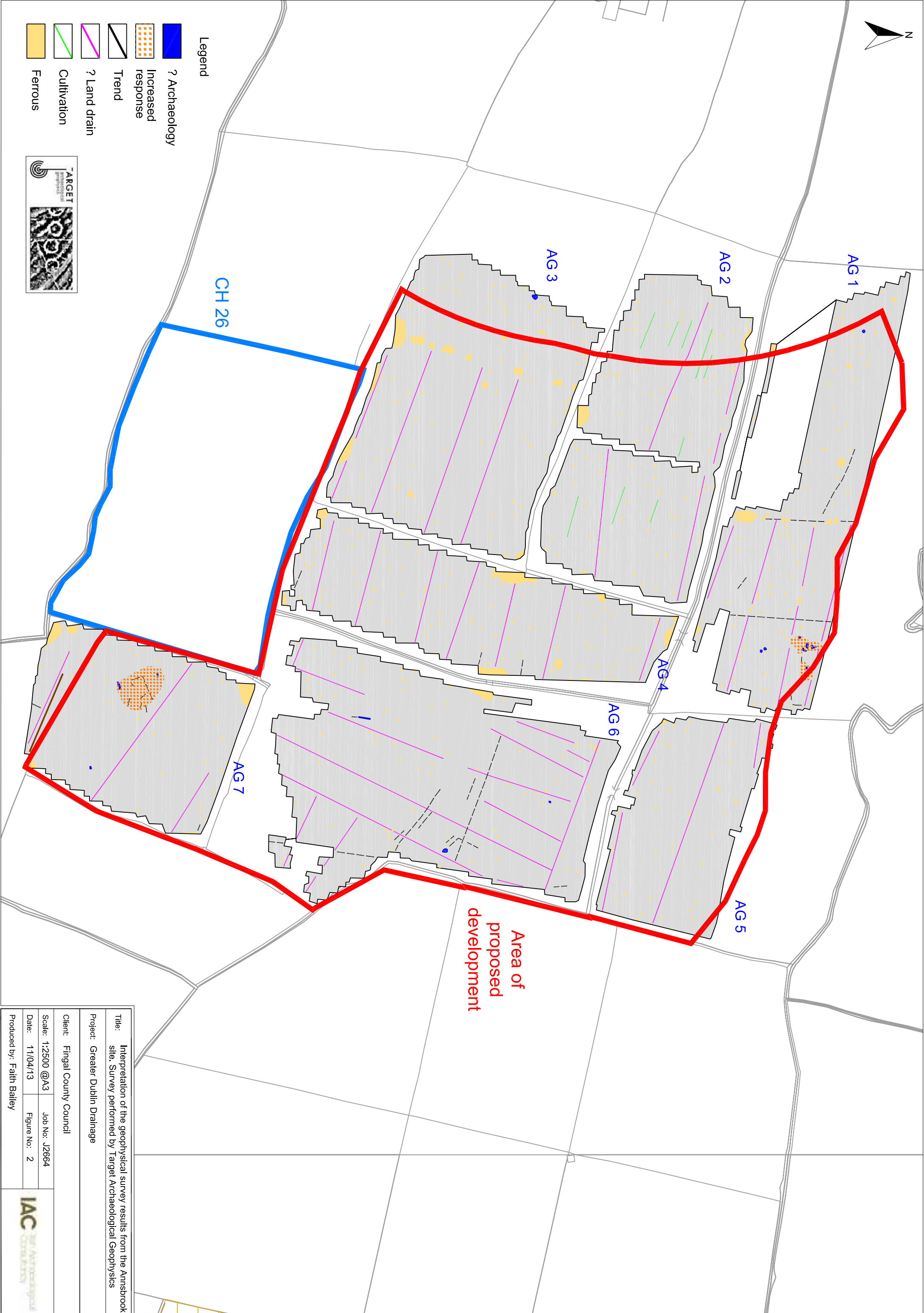
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Project:	Greater Dublin Drainage
Client:	Fingal County Council

Scale:	NTS @ A4
Date:	15/04/13
Produced by:	F Bailey
Job No:	J2664
Figure No:	1



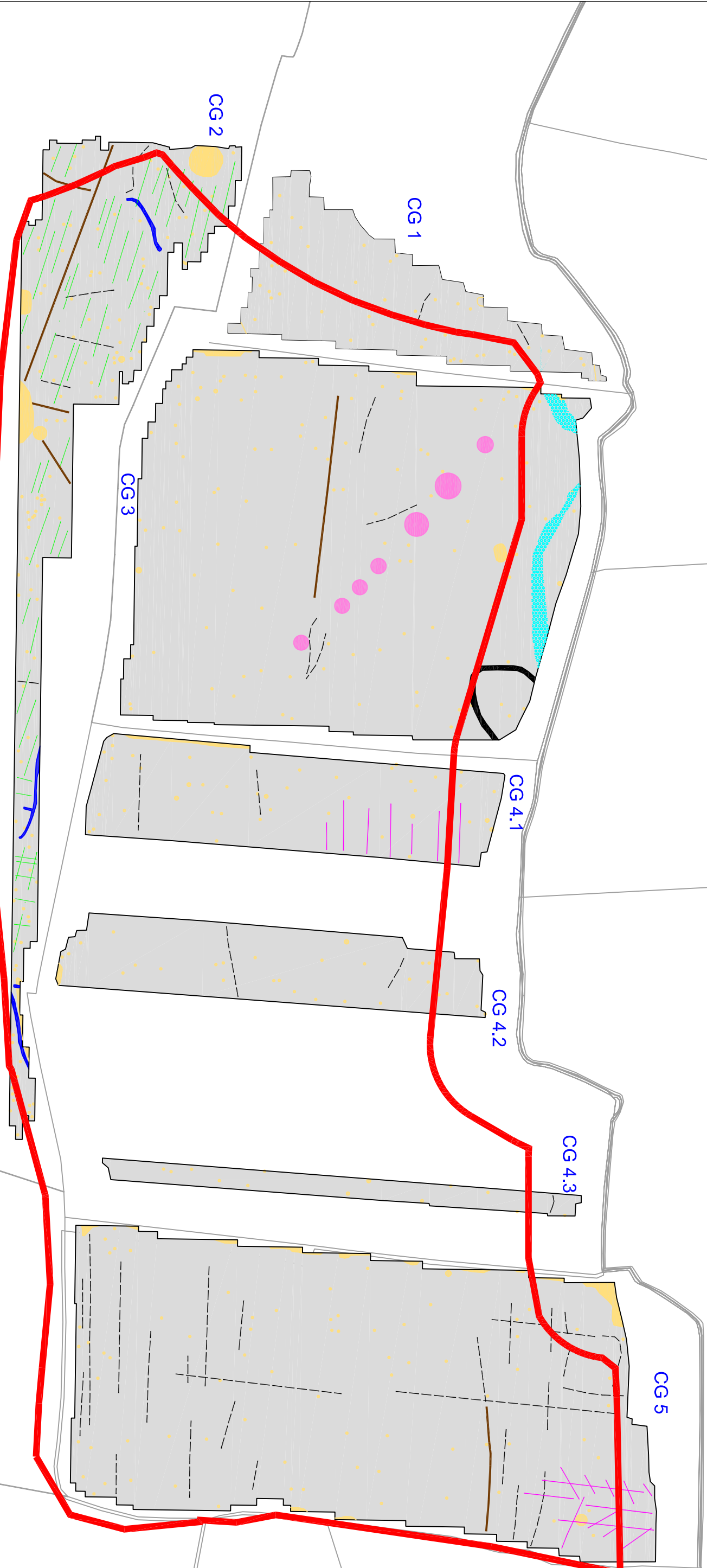
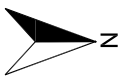


- Legend**
- ? Archaeology
  - Increased response
  - Trend
  - ? Land drain
  - Cultivation
  - Ferrous











Area of  
proposed  
development

<b>Title:</b> Interpretation of the geophysical survey results from the Amnsbrook site. Survey performed by Target Archaeological Geophysics	
<b>Project:</b> Greater Dublin Drainage	
<b>Client:</b> Fingal County Council	<b>Job No:</b> J2664
<b>Scale:</b> 1:2500 @A3	<b>Figure No.:</b> 2
<b>Date:</b> 11/04/13	<b>Produced by:</b> Fathn Bailey
<b>IAC</b> <small>Inter Archaeological Consultants</small>	



Legend

-  Archaeology
-  ? Archaeology
-  Trend
-  Possible former boundary
-  Cultivation
-  Magnetic disturbance
-  ? Natural
-  Ferrous

Area of  
proposed  
development

Title: Interpretation of the geophysical survey results from the Clonsheagh site. Survey performed by Target Archaeological Geophysics

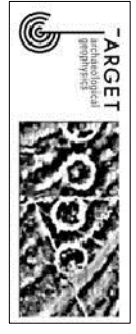
Project: Greater Dublin Drainage

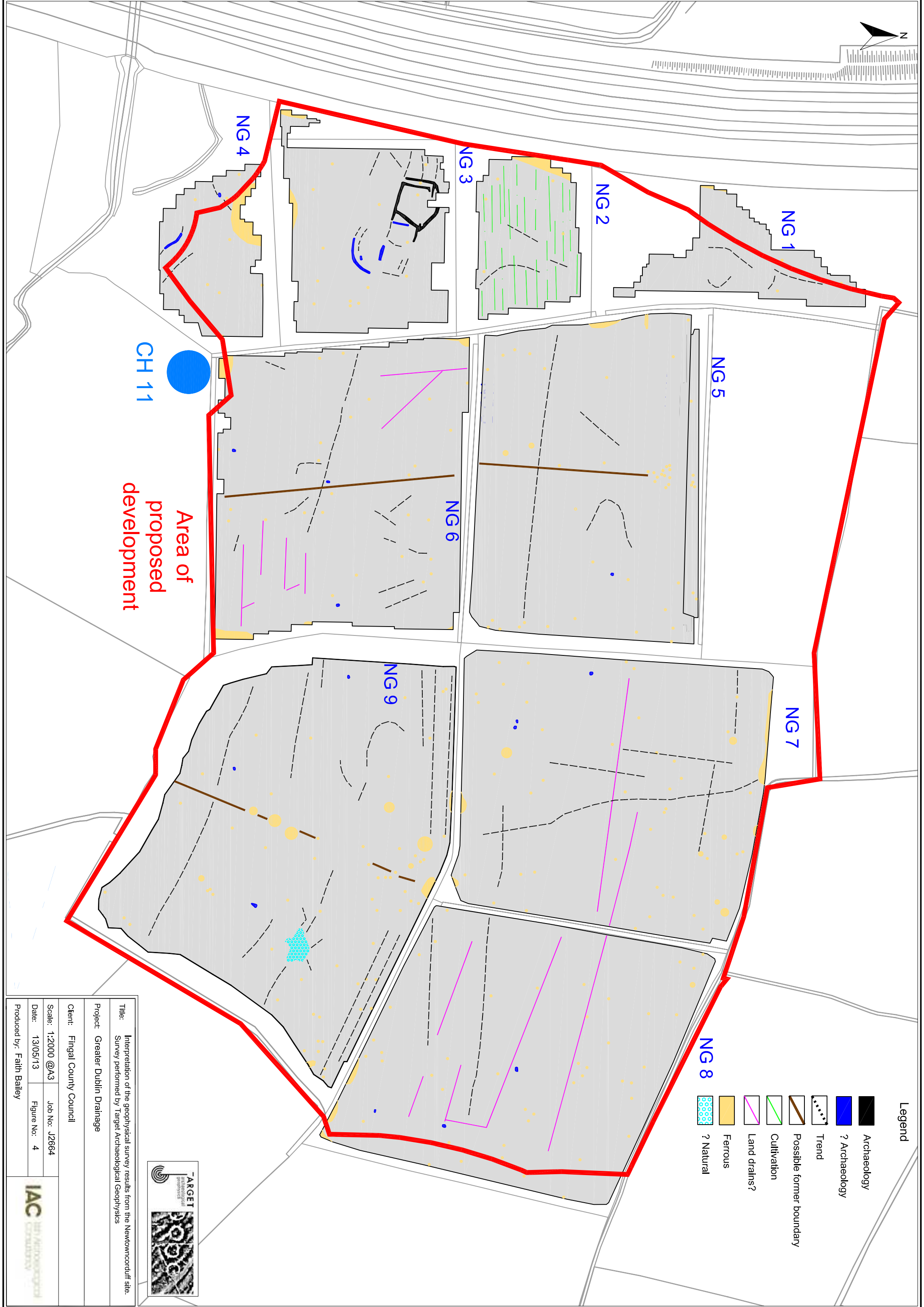
Client: Fingal County Council

Scale: 1:2500 @A3 Job No: J2664









Date: 11/04/13 Figure No: 3

Produced by: Faith Bailey





Legend

-  Archaeology
-  ? Archaeology
-  Trend
-  Possible former boundary
-  Cultivation
-  Land drains?
-  Ferrous
-  ? Natural

Area of proposed development

CH 11

NG 4

NG 3

NG 2

NG 1

NG 5

NG 6

NG 9

NG 7

NG 8

Title: Interpretation of the geophysical survey results from the Newmowncorduff site.  
 Survey performed by Target Archaeological Geophysicists  
 Project: Greater Dublin Drainage  
 Client: Fingal County Council  
 Scale: 1:2000 @A3 Job No: J2664  
 Date: 13/05/13 Figure No: 4  
 Produced by: Faith Bailey



**Geophysical Survey Report**

**Proposed Regional Wastewater Treatment Plant (WwTP)  
Greater Dublin Drainage  
Clonshagh, Annsbrook & Newtowncorduff Townlands  
North County Dublin**

**TAG Project 13003**

**Detection Licenses**

Newtowncorduff 13R23

Annsbrook 13R24

Clonshagh 13R25

Client:

**Fingal County Council**



**TAG PROJECT 13003, REGIONAL WASTEWATER TREATMENT PLANT  
(APPENDIX 1 TECHNICAL REPORT), GREATER DUBLIN DRAINAGE, NORTH  
COUNTY DUBLIN**

<b>Site Location</b>	As part of the selection process for the site of a proposed Regional Wastewater Treatment Plant (WwTP) for the Greater Dublin Drainage scheme geophysical surveys were conducted across 3 land parcels in North County Dublin, in Clonshagh, Annsbrook and Newtowncorduff townlands. The Clonshagh site traverses 23ha of agricultural located at the northern perimeter of Dublin City, 2km north-east of the M1 interchange with the M50 and N32. Belcamp College lies 0.7km to the south-east, and Dublin Airport 2km to the north-west. The Annsbrook and Newtowncorduff sites comprise 2 land parcels, respectively 20 and 23ha in size, 11.8km north of Clonshagh, situated east and west of the M1 Motorway, 3.3km and 1.4km west of Lusk, 7km north of Swords.
<b>NGR (Irish National Grid)</b>	Clonshagh 319535 241916; Annsbrook 317580 254180; Newtowncorduff 319368 254224.
<b>Topography &amp; Landuse</b>	Flat to undulating arable and pasture lowland.
<b>Soils<sup>1</sup> &amp; Geology<sup>2</sup></b>	Grey brown podzolics and gley soils overlying till of Irish Sea origin with limestone and shale.
<b>Archaeology<sup>3</sup></b>	<p>Recorded monuments (RMPs) within 1km of the Clonshagh land parcel include enclosure sites DU015-008, DU015-057, DU015-095; ringforts DU015-033 and DU015-056; Saint Doolaghs church and graveyard DU015-00901-06; 16<sup>th</sup>/17<sup>th</sup> century house DU014-056; and Belcamp House DU015-061. The cultural heritage assessment undertaken for the scheme (Alternative Sites Assessment and Route Selection Report (Phase 2); Emerging Preferred Sites and Routes Appendix 6 Cultural Heritage Assessment) identified a further 3 probable ringfort/ringditch sites (CH58, CH64, and CH66), and a possible enclosure (CH62) within 1km of the Clonshagh land parcel.</p> <p>6 RMPs lie within 1km of the Annsbrook and Newtowncorduff sites, including field system DU008-066; pit burial DU007-034; burnt pit DU007-035; windmill DU008-007; moated site DU008-016; and fulacht fiadh DU008-069. Cultural heritage sites identified within 1km include 2 mounds (CH11); possible ring ditch CH12; possible mill and castle CH23; possible medieval settlement CH25; a possible earthwork associated with the site of Annsbrook House (CH26); part of mill race CH89; and Woodpark House and corn mill CH90 &amp; CH62.</p>
<b>Method</b>	Fluxgate gradiometry

### **SURVEY OBJECTIVE**

The purpose of the geophysical surveys in Clonshagh, Annsbrook and Newtowncorduff was to define the nature and extent of archaeological remains where present at each site. The results from this work will be used to inform on the identification of a preferred site for the proposed regional WwTP.

### **SUMMARY OF RESULTS**

One concentration of archaeological remains has been recorded to the south-west within the Newtowncorduff land parcel, in NG3. This comprises a magnetically strong sub-rectangular ditched enclosure, with adjoining linear/curvilinear responses suggesting the presence of further enclosure remains. Combined the remains identified in NG3 extend over an area c.50m north/south by c.77m east/west.



One circular ditched enclosure, measuring c.40m in diameter, has also been located at the northern edge of the Clonshagh land parcel, in CG3. No further concentrations of definite archaeological response have been recorded from survey within the investigation boundaries at Clonshagh, Annsbrook and Newtowncorduff.

Two concentrations of response, which may represent a levelled enclosure or structural remains, have been recorded within the investigation boundary at Annsbrook, to the north-west (AG1), and south-east (AG7). The remains of a possible early field system have also been recorded to the south within the investigation boundary at Clonshagh in CG2 a possible rectangular enclosure also indicated the south-eastern edge of CG2.

The results from survey demonstrate patterns of former landuse, including remains of possible early field systems, alignments of more recent disused boundaries, past cultivation and recent land drains.

Numerous weak trends are also present throughout the survey results. The potential that some of these may represent plough damaged/shallow remains of archaeological interest should not be dismissed. However, the majority are expected to derive from natural soil/geological variations.

One area of natural soil/geological variation has been recorded to the south-east in the Newtowncorduff land parcel, in NG9.

#### PROJECT DETAILS

<b>Client</b>	Fingal County Council
<b>Project Engineering Consultants</b>	Jacobs/Tobin
<b>Project Archaeologists</b>	IAC Ltd.
<b>Detection Licenses</b>	13R23 (Newtowncorduff); 13R24 (Annsbrook); 13R25 (Clonshagh)
<b>Author</b>	John Nicholls MSc
<b>Fieldwork</b>	18th February - 8 <sup>th</sup> March & 22-23 <sup>rd</sup> April 2013
<b>Report</b>	16 <sup>th</sup> May 2013

<sup>1,2</sup> National Soil Survey of Ireland (1980), General Soil Map 2<sup>nd</sup> Edition, 1:575000, An Foras Taluntais

<sup>3</sup> Archaeological Survey of Ireland (ASI), Archaeological Survey Database.

**\*\* This summary forms only a brief and short description of the survey results. The presentation, discussion and interpretation of the survey results are included in the main text of the report.**

## 1 SURVEY METHODOLOGY

### 1.1 METHODOLOGY

This geophysical investigation employed fluxgate gradiometry to investigate all available lands within the Clonshagh, Annsbrook and Newtowncorduff land parcels. The survey covered a total of 21 areas at Clonshagh (CG1-CG5), Annsbrook (AG1-AG7) and Newtowncorduff (NG1-NG9). The following gradiometer instrumentation and sampling strategy was used for this survey:

Instrumentation	Traverse Interval	Sample Interval	Ha
Bartington Grad601 4 sensor gradiometer cart system combined with GPS	1m	8-10 per m (10Hz)	49

### 1.2 POSITIONING OF SURVEY DATA

A Trimble VRS Now GPS was used to record GPS locations to a precision of 20-40mm (horizontal and vertical) at a rate of 1Hz along each instrument traverse. These coordinates were subsequently used for positioning of the gradiometer data. Further alignment to Irish National Grid was facilitated by tie-in coordinates at the start and/or end of each survey block.

### 1.3 DATA PROCESSING

Processing of survey data was undertaken using in-house software and GRASS GIS as follows:

Data Processing
Positioning of gradiometer data according to GPS measurements (in-house)
Gradiometer data de-drift, zero median traverse & clip (in-house)
Gradiometer data gridding by inverse distance weighted surface interpolation (GRASS GIS)
Bicubic spline surface interpolation of gradiometer data (GRASS GIS)
Extraction of ferrous anomalies via SQL query of GIS database table (GRASS GIS)

### 1.4 DATA DISPLAY AND FIGURES

This report includes location, greyscale and interpretation diagrams for all fieldwork completed within the Clonshagh, Annsbrook and Newtowncorduff sites in the following display formats:

Figure No.	Figure Title	Scale
1-4	Site locations: Clonshagh, Annsbrook & Newtowncorduff	1/25000 & 1/10000
5-16	Interpolated greyscales: Clonshagh CG1-CG5, Annsbrook AG1-AG7, Newtowncorduff NG1-NG9	1/1500
17-28	Raw (drift/median correction) greyscales: Clonshagh CG1-CG5, Annsbrook AG1-AG7, Newtowncorduff NG1-NG9	1/1500
29-40	Interpretations: Clonshagh CG1-CG5, Annsbrook AG1-AG7, Newtowncorduff NG1-NG9	1/1500

Figures 29-40 present annotated Interpretations of the survey results. Anomalies recorded from survey are highlighted numerically and referred to in the results section of the report.

## 2 GENERAL CONSIDERATIONS

### 2.1 ACCESS

Ground conditions within the Annsbrook and Clonshagh land parcels were generally good, both locations being mainly available for survey. Waterlogged and difficult ground precluded fieldwork to the north and south-east at the Annsbrook land parcel, and also within one cultivated field at the centre of the Clonshagh land parcel.

Fieldwork within the Newtowncorduff land parcel was completed in two stages: stage 1 across the relatively dry, pasture to the west; stage 2 resuming in the eastern portion of the site after a drying out period of c.3 weeks. Two small areas containing a dense cover of trees at the northern Newtowncorduff survey perimeter remained unavailable for investigation throughout.

Survey to the limits of each field at the Clonshagh, Annsbrook and Newtowncorduff sites was not always possible due to ground disturbance from machine access during geotechnical investigations.

## **2.2 SOURCES OF MODERN INTERFERENCE**

The survey results contain numerous small-scale and larger concentrations of ferrous response. These are frequently recorded in gradiometer surveys and often caused by modern metallic debris contained within the topsoil or at the ground surface. Large-scale ferrous responses in the data derive from survey in proximity to adjacent fences, boundaries and modern surfaces. Interference from one electricity pylon bordering Newtowncorduff survey locations NG3 and NG4 was noted. The potential that the interference from this electricity pylon may have masked responses of archaeological significance should not be dismissed.

Ferrous anomalies from each block of survey data have been extracted by highlighting all readings beyond the +/-15nT range and exporting these values in shapefile format. This has been achieved via a SQL query of the attribute table in the GIS. This data has subsequently been manually edited in AutoCAD with reference to the greyscale displays for each survey block.

Ferrous responses recorded from this survey are not referred to in the results section of this report unless deemed relevant.

### **3 FLUXGATE GRADIOMETRY RESULTS**

#### **3.1 CLONSAGH SITE**

##### **3.1.1 CG1**

The results from CG1 display a relatively quiet magnetic background with no characteristic archaeological type responses evident. Several weak linear trends extend across the survey centre and to the north, notably anomalies 1 which are oriented north-east/south-west and north-west/south-east. These anomalies could represent plough damaged responses of archaeological interest. However, they are located at the edge of the investigation perimeter, and the absence of any definitive archaeological patterns in CG1 suggests they derive mainly from natural sources of variation and/or more recent landuse.

A band of elevated positive response in CG1 to the north of the survey perimeter represents natural soil/geological variation in proximity to a stream.

No anomalies of definite archaeological character have been identified in CG1.

##### **3.1.2 CG2**

The results from CG2 display a series of curvilinear positive anomalies and connecting trends to the north-west (2) and east of survey centre (3). Responses 2 and 3 may represent the remains of an early field system. Part of a possible ditched enclosure (4) is indicated at the south-eastern survey edge.

Remains of disused boundaries (5) extend from survey centre to the north-east and north-west, with north-west/south-east and north-east/south-west former cultivation also indicated.

Further weak trends apparent throughout CG2 are expected to derive from patterns of former cultivation, natural soil/geological variation and possible former land divisions. The potential that a number of these could represent eroded or magnetically weak archaeological remains should not be dismissed.

No further anomalies of note have been recorded in CG2.

##### **3.1.3 CG3**

Part of a sub-circular enclosure (6), measuring c.40m in diameter, has been recorded at the north-eastern limit of CG3. This intersects with the northern site edge by c.2.5m. No responses of archaeological significance have been recorded within the site boundary in association with anomaly 6.

One weak trend (7) traversing the approximate centre of CG3 roughly east/west may represent the remains of a former boundary. Further weak trends have been recorded, notably anomalies 8 to the east of survey centre. These may be significant, although the absence of any definite archaeological patterns in this location suggests a natural or more recent landuse origin is more likely.

A series of circular fluctuations in response traversing CG3 north-west/south-east represent magnetic disturbance from overhead electricity cables.

Natural variation in proximity to the stream bordering the northern site edge continues beyond the site boundary.

No further responses of interest have been recorded from survey in CG3.

##### **3.1.4 CG4.1, CG4.2, CG4.3**

The results from CG4.1 indicate a series of possible land drains (9) aligned east/west to the north, and weak linear trends, notably anomaly 10, to the south of survey centre. Similar weak trends extend through CG4.2, notably anomaly 11 to the south of survey centre, and in CG4.3 to the north of the

survey limit. These weak linear trends may be archaeologically significant. However, the absence of any characteristic archaeological patterns suggests they most derive likely from further drainage features, cultivation or natural soil/geological variation.

No responses of archaeological character have been recorded in CG4.1, CG4.2 and CG4.3.

### **3.1.5 CG5**

The remains of a possible former boundary (12) are indicated by weak trends extending roughly east to west across the northern portion of CG5. Intersecting land drains (13) have been recorded to the north-east and numerous weak linear trends (14 & 15) are also apparent, mainly to the north-west. Anomalies 14 may be significant, potentially representing plough damaged enclosure or magnetically weak linear remains, which extend partly beyond the north-western survey limit in CG5.

Further possible boundaries are indicated by weak trends 15 extending north to south and east to west across CG5. Weak trends indicated elsewhere through CG5 are expected to derive from patterns of former cultivation and or natural soil/geological variation.

Remains of former cultivation aligned east to west are indicated to the south in CG5.

## **3.2 ANNSBROOK SITE**

### **3.2.1 AG1**

The results from AG1 display a low level of response throughout. One isolated positive anomaly (16), potentially a pit, has been recorded to the west. One former boundary and a possible former boundary are indicated on a north/south alignment at survey centre and to the east (17 and 18).

The remains of a possible plough damaged enclosure or levelled structure are indicated to the north-east in AG1 by zones of increased response, positive anomalies and weak trends (19). These traverse an area c.30m east/west and are located close to the northern site limit. Two potential pits (20) are indicated c.20m south of 19. Interpretation of anomalies 20 is tentative as they are small-scale, and could derive from natural sources of interference, recent landuse or modern ferrous.

A network of land drains (21) aligned roughly north-west/south-east extends across the eastern portion of AG1. Further weak trends in the results are deemed of limited significance, likely the result of recent landuse and/or natural soil/geological variation.

No further anomalies of interest have been recorded within AG1.

### **3.2.2 AG2**

No responses of archaeological significance have been recorded from survey in AG2. Land drains highlighted as anomalies 22 extend east/west and north-west/south-east throughout the survey block. Remains of former cultivation are also visible in the results mainly on the similar alignment.

### **3.2.3 AG3**

Further north-west/south-east land drains (23) are apparent in AG3, intersecting with the remains of a former boundary indicated by a series of north-east/south-west oriented ferrous responses (24).

One single positive response (25) at the north-western edge of AG3 may be significant, potentially representing the location of an isolated pit. Interpretation of anomaly 24 remains cautious as there are no clear representations of archaeological features in the data set and it is possible that this response could derive from modern ferrous material contained within the topsoil.

No further responses of note are visible in the results from AG3.

### **3.2.4 AG4**

Land drains aligned north-west/south-east extend throughout AG4 and are indicated as anomalies 26. Three weak linear trends, notably 27, are apparent on the same alignment to the east, north-east, and south-east of survey centre. These are deemed to be of limited archaeological interest, and are likely representative of recent patterns of landuse.

No anomalies of archaeological significance are indicated by the results from AG4.

### **3.2.5 AG5**

Land drains highlighted as anomaly 28 are visible on north-west/south-east alignment in AG5.

No further responses of note have been recorded in AG5.

### **3.2.6 AG6**

Land drains highlighted as anomalies 29 on north-west/south-east and north-east/south-west alignments extend throughout AG6.

Three isolated positive anomalies (30, 31 & 32), occasionally bound by weak trends, are evident in the results from AG6 to the north, east and south-west of survey. These may represent isolated linear/sub-angular features of interest. Interpretation remains cautious as the results from AG6 display no definite archaeological patterns.

The remains of a possible former boundary (33) are indicated north of survey centre by a weak linear trend aligned north-west/south-east. A further possible former boundary aligned approximately north/south is indicated by two weak trends extending through the south-eastern portion of AG6.

Weak parallel linear trends (34) east of survey centre in AG6 are thought to represent machine tracks from recent geotechnical studies.

No further responses of note have been recorded in AG6.

### **3.2.7 AG7**

One area of increased response (35) to the west of survey centre in AG7 may represent a possible levelled structure or concentration of plough damaged linear/pit remains. This area of response contains numerous overlapping weak linear trends and two isolated positive responses and may represent remains associated with the site of Annsbrook House (CH26).

One possible former boundary (36) is indicated by a weak trend on north-west/south-east alignment traversing the southern edge of AG7.

Land drains aligned north-west/south-east extend throughout AG6 as anomalies 37.

No further responses of note are indicated by the results from survey in this location.

## **3.3 NEWTOWNCORDUFF SITE**

### **3.3.1 NG1**

The results from NG1 display a low level of background variation. Weak linear trends (38) extend from the centre of survey to the north and east. These are at the limits of instrument detection, and likely the result of variations from natural soil/geological variation.

No further anomalies of interest have been recorded in NG1.

### 3.3.2 NG2

Remains of former cultivation aligned roughly east/west extend throughout NG2. Weak linear trends are also apparent at survey centre, to the north-east and east (39). The potential that these may be significant should not be dismissed, although a natural/cultivation origin is more likely.

No further anomalies of interest have been recorded in NG2.

### 3.3.3 NG3

The results from NG3 indicate an enclosure complex defined by a sub-rectangular arrangement of magnetically strong linear ditch remains (40), with peripheral curvilinear anomalies to the south-east (41), and weak trends to the east, south-east, west, and south-west. Combined these anomalies extend c.50m north/south by c.77m east/west. There are no clear indications in the data of pit type anomalies or hearth remains in proximity to anomalies 40 and 41, suggesting that the remains identified could potentially possess a ceremonial rather than settlement context.

No further anomalies of interest have been recorded in NG3.

### 3.3.4 NG4

Two positive anomalies and peripheral weak trends extend through NG4 to the south (42) and west (43) of survey centre. These may be of interest. They are located more than 75m to the south of the enclosure complex identified in NG3 and situated on sloping uneven ground. A potential soil/geological origin for these anomalies should not be dismissed.

No further anomalies of interest are apparent in the results from survey in NG4.

### 3.3.5 NG5

One isolated positive anomaly (44) is apparent to the north-east of survey centre in NG5. This response is very small-scale and expected to represent deeply buried ferrous contained within the topsoil.

Weak linear/curvilinear trends are visible to the east and west of survey centre (45). These anomalies correspond to shallow variations in topography noted at the time of fieldwork.

A former boundary is indicated by linear anomaly (46) traversing the centre of NG5 approximately north/south.

A possible further boundary indicated by weak trend 47 is apparent on approximate east/west alignment to the south of survey centre, and this intersects with anomaly 46.

No further responses of note are visible in the results from survey in NG5.

### 3.3.6 NG6

Small-scale positive anomalies, such as 48, are visible to the east, at survey centre, and to the south-west in NG6. These are very insubstantial and expected to derive from ferrous debris contained within the topsoil.

A former boundary (49) on approximate north/south alignment traverses the centre of NG6.

Weak linear and rectilinear trends are visible throughout NG6, notably to the west (50) and north-east (51). These are at the limits of instrument detection. Anomaly 50 may indicate part of an early field system or drainage. The remaining weak trends in the data are largely expected to derive from natural variations in the underlying soils and/or geology.

Land drains (52) are visible in NG6 to the south-east and north-west.

No further responses of archaeological significance are apparent in the results from NG6.

### **3.3.7 NG7**

The remains of a probable early field system are indicated by intersecting linear trends 53, which traverse NG7 north-east/south-west and east/west. Further weak linear trends extend through NG7, mainly to the north-west and west (54), and these may be remains of recent land use or cultivation.

Several poorly defined small-scale positive anomalies are indicated to the west (55) and south-west. These may be of interest. However, they display no sufficient range of response or character to warrant an archaeological interpretation. These anomalies are thought to derive from modern ferrous or natural soil/geological variation.

Land drains (56) aligned approximately north-west/south-east extend through the central portion of NG7.

No further responses of note are evident in the results from survey in NG7.

### **3.3.8 NG8**

Part of a probable early field system (53) extends east to west through the southern portion of NG8. Further small-scale positive anomalies, such as 57, are visible to the east and south-east. These are small-scale, poorly defined and expected to derive from natural variation and/or modern ferrous.

Land drains (58) extend mainly north-west/south-east through NG8.

Interpretation of weak linear trend 59 to the south is uncertain. This anomaly is not expected to be of archaeological significance, rather a result of more recent land use, potentially a former drain or disused boundary.

No further responses of interest are visible in the results from survey in NG8.

### **3.3.9 NG9**

Three isolated positive anomalies (60) have been recorded in NG9 to the south-east, south-west and west of survey centre. No definitive archaeological features are indicated by the results from survey in NG9. Anomalies 60 are expected to derive from modern ferrous and/or soil/geological variation.

A cluster of irregular positive/negative responses and weak trends (61) north-east of survey centre is expected to derive from natural soil/geological variation. Further weak trends such as 62 to the north-west are indicative of low level interference from soil/geological sources. The potential that some of these anomalies may represent remains of former land divisions and effects from previous land use should not be dismissed.

Remains of a former boundary (63) and part of a possible early field system (64) are evident traversing NG9 north-east/south-west and north-west/south-east through the southern portion of survey.

Weak linear trends 65 border the northern limit of NG9 and correspond to the present pattern of cultivation in this field. A slight instrument drift from zero during fieldwork is suggested by these anomalies during fieldwork in this location.

No further responses of note are indicated in the results from NG9.



## 4 CONCLUSIONS

- 4.1 The gradiometer surveys conducted in connection with the selection process for the site of the proposed Regional WwTP have recorded the location of one enclosure complex in the south-western portion of the Newtowncorduff land parcel. These remains extend through NG3, are highlighted as anomalies 40-41, and cover an area c.50m north/south by 77m east/west. A circular ditched enclosure, which just intersects with the northern limit of the Clonshagh land parcel, has also been identified in CG3, and is highlighted as anomaly 6. No archaeological responses associated with anomaly 6 are visible within the Clonshagh investigation boundary. One possible field system (anomalies 2 and 3) has been recorded to the south within the Clonshagh investigation boundary, and a possible rectangular enclosure associated with this is also visible to the south-east.
- 4.2 Two further anomaly concentrations, which may represent levelled enclosure or structural remains, have been identified within the Annsbrook land parcel. These are located to the north-west in AG1 (anomalies 19), and to the south-east in AG6 (35). The responses are poorly defined; display no clear pattern or symmetry, and their interpretation remains uncertain. The potential that anomaly 35 may be associated with the site of Annsbrook House (CH26) should not be dismissed.
- 4.3 Isolated positive responses have been recorded within the Annsbrook and Newtowncorduff (NG4-NG9) land parcels, notably anomalies 16, 20, 25, 31 and 32 in AG1, AG3, AG6 & AG7, and 42, 43, 44, 48, 55, 57 and 60 in NG4-NG9. These are generally small-scale and display no specific range of response or character to warrant a definite archaeological interpretation. The majority of these are expected to derive from natural soil/geological variation, modern ferrous and patterns of former landuse.
- 4.4 Remains of possible early field systems are indicated by the results from survey within the Clonshagh land parcel, in CG1 (anomalies 2, 3 4), and at Newtowncorduff in NG5-9 (anomalies 47, 50, 53, 64). These are poorly defined, visible mainly as weak trends slightly above background variation, and their interpretation therefore remains tentative. The potential that anomaly 4 to the south-east in CG1 represents part of a settlement enclosure should not be dismissed.
- 4.5 The results from survey contain numerous linear responses and weak trends deriving from patterns of recent landuse, including remains of disused boundaries, former cultivation and land drains.
- 4.6 One area of natural soil/geological variation has been recorded to south-east within the Newtowncorduff land parcel, in NG9. Numerous weak trends of likely natural soil/geological origin are also present throughout the results from survey at Clonshagh, Annsbrook, and Newtowncorduff. The potential that some of these may represent plough damaged or shallow archaeological remains should not be dismissed.

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