Geophysical Survey Report

Lands At Scholarstown Road, South Co. Dublin

Detection License
18R0112

Client
Archer Heritage Planning
on behalf of Ardstone Homes

Date
July 2018

Project
TAG1800IE22

TARGET
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TARGET REPORT 1800IE22

LANDS AT SCHOLARSTOWN ROAD, SOUTH CO. DUBLIN

PROJECT BACKGROUND

Geophysical survey was undertaken in connection with the proposed development of c.5ha of land located immediately N of Scholarstown Road, in Knocklyon, South County Dublin. The survey was undertaken as part of a pre-planning investigation in connection with proposed residential development at the site. The site of proposed development is situated N of St. Colmcille's Community School, and comprises 2 adjacent pasture fields situated between existing housing along Dargle Wood to the N and Scholarstown Park to the E.

The geophysical survey of this site was commissioned by Archer Heritage Planning on behalf of Ardstone Homes. The survey aims were to identify the location, form and extent of buried archaeological remains, where present within the site boundary, and to advise further archaeological works, prior to proposed development of the site.

Coordinates 712477 726861 (ITM–central coordinate)

Townland Scholarstown

County South County Dublin

Landuse Pasture land

Landscape, soils geology The site is located within an urban environment and comprises well-maintained level pasture land occupied by fine loamy drift with siliceous stones of the Clonroche (1100a) and Straffan (700d) associations. Bedrock geology comprises dark limestone and shale to the N and dark slate-schist, quartzite and coticule to the S (Irish National Soils Map, 1:100,000k, V1b, 2014; Geological Survey Ireland Spatial Resources, Public Data Viewer Series).

Archaeology No recorded monuments are situated within the proposed development boundary, nor in the immediate vicinity of the site. Recorded monuments DU022-019 (castle – tower house) and DU022-020 (ringfort - unclassified) are the closest monuments in proximity to the proposed development, and are located c.0.6km-0.8km NW and SW of the site boundary. Further RMPs are located within a 1.4km radius. Details of the above monuments and those within 1.4km proximity are provided below:

SMR NO.	CLASS	TOWNLAND	ITM
DU022-019----	Castle - tower house	Knocklyon	711406, 727222
DU022-020----	Ringfort - unclassified	Scholarstown	711744, 726570
DU022-103----	House - 18th/19th century	Tymon South	711181, 727474
DU022-111----	Fulacht fia	Scholarstown	711517, 726545
DU022-114----	Weir - regulating	Templeogue	711301, 727830

Fieldwork 25th June 2018

Report issue 3rd July 2018

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Client Archer Heritage Planning on behalf of Ardstone Homes

Technique High resolution magnetic gradiometry

1 TECHNICAL SURVEY INFORMATION

1.1 Data collection

1.1.1 High resolution magnetic gradiometer survey was conducted across all available portions of the proposed development undertaking a total 3.5 hectares of survey in 2 areas (M1 & M2), examining 2 fields. The survey employed an advanced multichannel fluxgate gradiometer system combined with real time kinematic (RTK) GPS. Magnetic gradiometer and GPS data were recorded simultaneously at rates of 75Hz and 1Hz respectively, conducting parallel instrument traverses 3.5m in width across the site with the instrumentation towed using an ATV.

1.2 Geophysical instrumentation

1.2.1 Details of the instrumentation employed for this project are provided below:

Technique(s)	Sensor spacing	Sample rate	Instrumentation	Sensitivity / precision
Fluxgate gradiometry (magnetometry)	0.5m	75Hz	Foerster Ferex CON650 archaeology probes & 10-channel data logger	<35pT/√Hz at 1Hz (650mm baseline)
RTK GPS	4.0m	1Hz	Trimble R10 GNSS GPS operating in VRS mode	<0.1m (vertical & horizontal)

1.3 Data processing

1.3.1 Survey data was processed using in-house, open-source and commercial software. Following GPS and fluxgate gradiometer measurements on site all data was processed as follows:

Process	Description
1	Drift & zero median correction to balance data from entire sensor array
2	Gridding of corrected data via nearest neighbour interpolation
3	Greyscale generation at optimum range & export to tiff-format (.tiff & .wld)

1.3.2 To assure integrity of the processed data, and maintain close correlation with the original raw on-site measurements no additional smoothing, low or high pass filters were applied proceeding steps 1-3.

2 GENERAL CONSIDERATIONS & COMPLICATING FACTORS

2.1 Access & ground conditions

2.1.1 Ground conditions for survey were generally good, the investigation area comprising 2 well-maintained pasture fields (M1-M2) accessed via a driveway and private dwelling at the approximate centre of the site.

2.1.2 Survey was made difficult by numerous hay bales present across the terrain at the time of fieldwork, as well as several mature trees in M1 E of survey centre.

2.2 Modern interference

2.2.1 Numerous small-scale ferrous anomalies are evident throughout the results from M1-M2. Ferrous responses are a common occurrence in magnetic survey data, and in most cases represent modern metal debris contained within the topsoil.

2.2.2 Large-scale modern ferrous disturbance evident in the survey results from M1-M2 derives from existing housing to the N and E, the private dwelling at the approximate site centre in M1, a buried water main traversing M1 roughly NE-SW, and another buried service of N-S orientation to the SE also in M1.

2.2.3 Overhead electricity pylons have also contributed magnetic disturbance along the south-western site edge in M1.

2.3 Modern interference

2.3.1 Remains of former cultivation are apparent as closely spaced parallel linear responses in M1, to the W on NW-SE orientation, and to the E on NE-SW orientation.

3 MAGNETOMETRY RESULTS

3.1 M1

3.1.1 Potential pit/linear features are indicated in M1 by a group of positive responses (1) at the north-western survey edge. A concentration of small-scale magnetically strong anomalies (2) c.20m SE of 1 may also be of interest, although a modern ferrous origin for these should not be dismissed.

3.1.2 Linear responses 3-4 N of survey centre and to the SE in M1 are deemed to be of potentially significance, although interpretation remains uncertain as these anomalies area barely visible above background variation (+/-1.5 nT).

3.1.3 Weak positive linear trends indicated to the NE, SE and S in M1 are deemed mostly to be of limited archaeological potential, and likely derive from a combination of former landuse and natural soil/geological variation. Trend 5 to the NE in M1 likely represents linear remains associated anomalies of likely archaeological significance recorded in M2 to the NE.

3.2 M2

3.2.1 Remains of probable archaeological significance are indicated by a group of poorly defined linear/curvilinear responses (6). These anomalies suggest the location of a potential enclosure site, roughly oval in form, with an estimated diameter of c. 50m N-S by 45m E-W. More precise interpretation of these responses has not been possible due to large-scale ferrous disturbance immediately to the N and E.

3.2.2 Poorly defined positive response 7 recorded at survey centre in M2 may potentially represent outlying remains associated with the probable enclosure recorded to the E in M2. A modern ferrous, recent landuse or natural soil/geological source for response 7 should, however, not be ignored.

4 CONCLUSION

4.1 This geophysical survey has recorded a probable enclosure site in the north-eastern portion of the proposed development, in M2. The results suggest this probable enclosure is roughly oval in form, and measures c. 50m N-S by 45m E-W. Extensive ferrous disturbance immediately to the N and E has prevented a more precise archaeological interpretation of the responses recorded from survey in this location.

4.2 A weak linear trend extending NE-SW across the north-eastern portion of M1 likely represents outlying remains associated with the probable enclosure recorded in M2.

4.3 Further potential pit/linear remains are indicated in M1 to the NW, at survey centre and to the SE.

4.4 Elsewhere the results from geophysical survey at the site highlight patterns of former cultivation, recent buried service installations, and disturbance from modern sources of interference.

*** This conclusion must be read in conjunction with the detailed discussion of the results included in the main section of this report.**

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LIST OF FIGURES

APPENDIX

MAGNETOMETRY

Introduction

Magnetometry represents one of a suite of geophysical techniques employed in archaeological prospection to inform invasive investigations such as trial trenching and excavation.
Frequently used to determine the often non-visible boundaries of archaeological remains, magnetometer surveys enable archaeologists to identify the location, form and extent of a diverse array of archaeological features no longer visible at the surface.

1. Advanced multi-channel magnetometer (fluxgate gradiometer) survey at the site of a 14th century castle (towed configuration with ATV).

Buried archaeological remains successfully identified using magnetometry include sites such as enclosure systems and deserted villages, hillforts and military encampments, henges and tumuli, villa/castle foundations, and ecclesiastical settlements.

Background to application

The basis for use of magnetometry in archaeological prospection derives from the abundance of natural iron oxides in most soils, and our ability to measure subtle variations in the magnetic properties of these iron oxides caused by human activity.
Discrete variations in soil magnetism associated with buried archaeological remains derive typically from in situ burning and organic enrichment of the soil, through activities such as cooking and heating; pottery manufacture and metal working; as well as use of fired building materials such as ceramic tiles and brick. These burnt, fired and organic rich deposits create subtle magnetic contrasts visible as discrete magnetic anomalies superimposed on the earth's geomagnetic field.

2. Results from magnetometer survey presented in greyscale format highlighting pit remains bordering an enclosure site and Roman villa.

3. Burnt & fired debris revealed following excavation of pit remains bordering an enclosure site and Roman villa.

Magnetometer surveys conducted in both commercial and research archaeological investigations enable determination of the location, form and extent of buried archaeological remains. Data acquired from these surveys can be quickly generated into georeferenced images and interpretation layers to inform subsequent trial trenching and excavation.

Technology

TARGET provides precise mapping and characterization of buried archaeological remains by employing an array of highly stable and sensitive fluxgate gradiometers, combined with an advanced data logging system and cm precision GPS. This state-of-the-art geophysical instrumentation, which is capable of collecting extremely dense data sets, permits high resolution survey of archaeological sites from as small as 1ha in size, to larger scale investigation of sites up to 150ha or more.

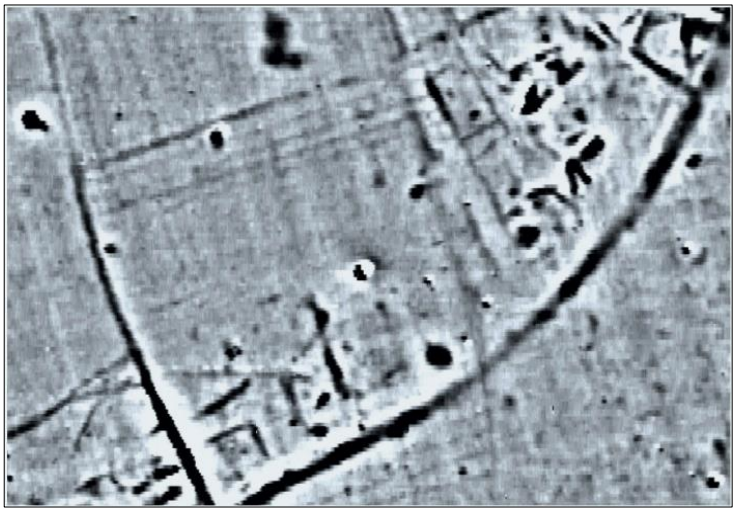
4. Advanced multi-channel magnetometer (fluxgate gradiometer) system (manual configuration).

5. GPS tracks (red) highlighting lines of data collection & results from magnetometer fieldwork at a suspected burial ground.

TARGET undertakes high resolution magnetometer surveys as standard, recording data at c.5cm intervals with probe separations of 0.28m or 0.5m, for precise measurement and characterization of buried archaeological remains.

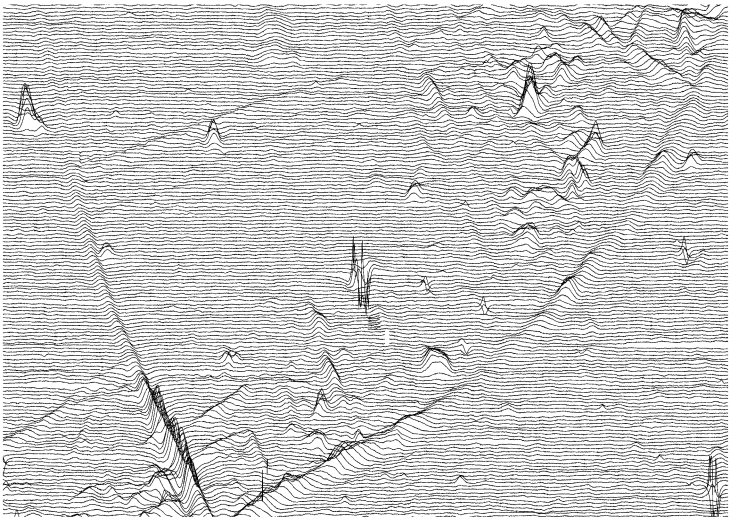
Data Display

Greyscale plots are the most common format for displaying magnetometer data. This display format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within a given data set. This display method also enables the identification of discrete responses barely visible above natural 'background' magnetic variation on site.

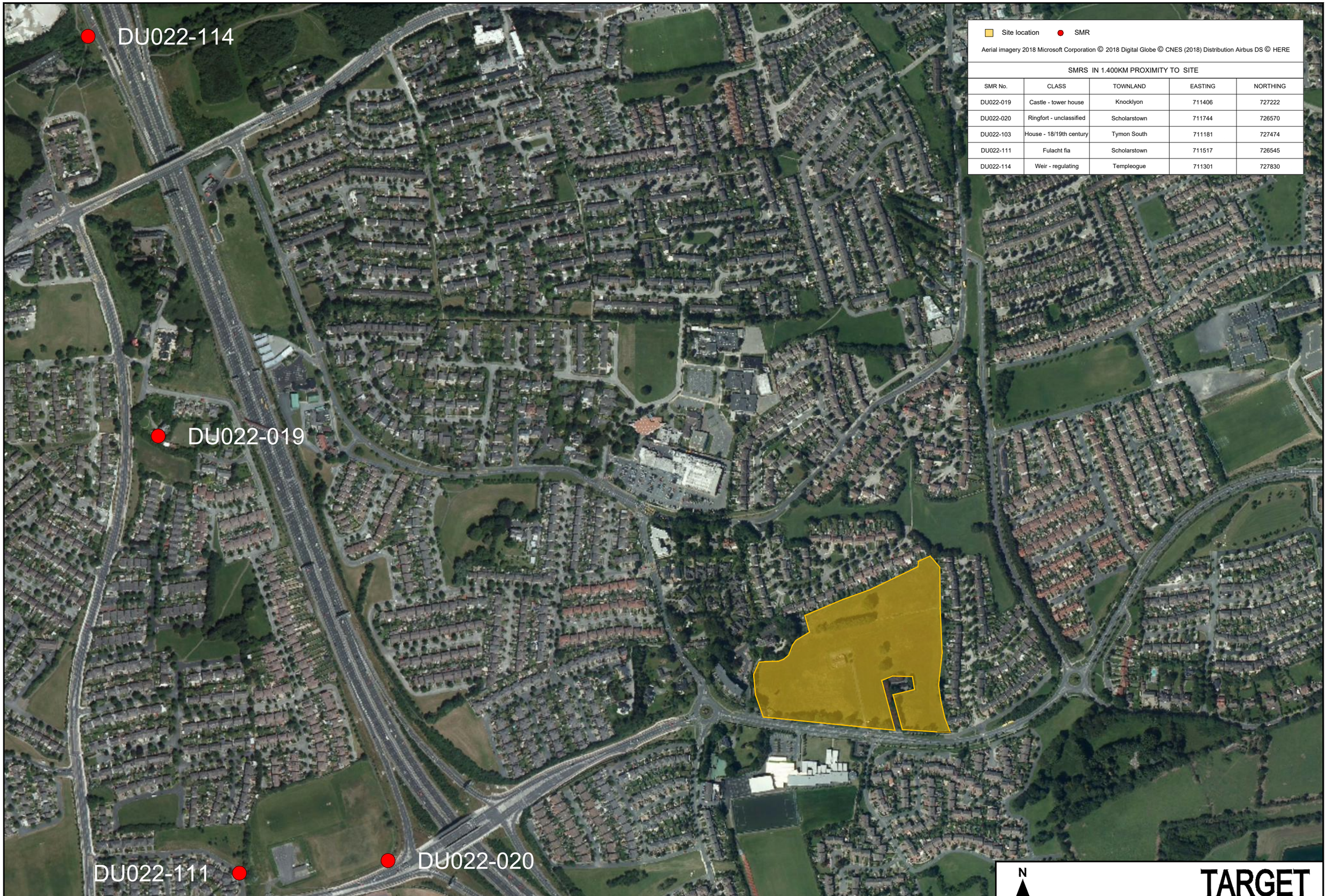


6. Greyscale from magnetometer survey at the site of a deserted medieval village.

XY trace plots provide a near-perspective representation of measurements along individual lines of data recorded from each of the magnetometer sensors. The XY trace format is used as a conventional method for identifying responses which derive from modern ferrous debris. The XY trace display is particularly when identifying magnetically strong anomalies indicative of buried hearths, kilns and furnaces.



7. XY trace from magnetometer survey at the site of a deserted medieval village.



Site location SMR

SMRS IN 1.400KM PROXIMITY TO SITE

SMR No.	CLASS	TOWNLAND	EASTING	NORTHING
DU022-019	Castle - tower house	Knocklyon	711406	727222
DU022-020	Ringfort - unclassified	Scholarstown	711744	726570
DU022-103	House - 18/19th century	Tymon South	711181	727474
DU022-111	Fulacht fia	Scholarstown	711517	726545
DU022-114	Weir - regulating	Templeogue	711301	727830

N

0 m 200

TARGET archaeological geophysics

Drawing	Site location	**Project**	Lands at Scholarstown Road, South Co. Dublin	**Client**	Archer Heritage Planning on behalf of Ardstone Homes	**Fig.**	1	**Scale**	1:5000 @ A3	**TAG.**	1800IE22

Drawing	Greyscales, M1-M2	**Project**	Lands at Scholarstown Road, South Co. Dublin	**Client**	Archer Heritage Planning Ltd.	**Fig.**	2	**Scale**	1:1000 @ A3	**TAG.**	1800IE22

N

-1.5 nT 2

0 m 40

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? Archaeology
?? Archaeology
Trend
Former boundary
Buried service
Cultivation
Magnetic disturbance
Ferrous

M1
M2
Trees
1
2
3
4
5
6
7

Drawing	Interpretations, M1-M2	**Project**	Lands at Scholarstown Road, South Co. Dublin	**Client**	Archer Heritage Planning on behalf of Ardstone Homes	**Fig.** 3	**Scale** 1:1000 @ A3	**TAG.** 1800IE22	

N

0 m 40

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