

National Roads Authority

Archaeological Geophysical Survey Database 2001-2010: Archive Report

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Survey Event No. **171**

Survey Name **Site 2.9 Timolin N9/N10 KILCULLEN TO WATERFORD SCHEME, ARCHAEOLOGICAL SERVICES CONTRACT NO.2, MULLAMAST TO PRUMPLESTOWN, GEOPHYSICAL SURVEY**

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Survey funded by the National Roads Authority

Known problems with this report

There are no known archive issues with this report

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N9/N10 KILCULLEN TO WATERFORD SCHEME



ARCHAEOLOGICAL SERVICES CONTRACT NO.2 MULLAMAST TO PRUMPLESTOWN



GEOPHYSICAL SURVEY AT TIMOLIN, CO. KILDARE

SITE : 2.9

**MINISTERIAL DIRECTION NUMBER:
A021/121**



**DIRECTED BY
CÓILÍN Ó DRISCEOIL**

**ON BEHALF OF
KILDARE COUNTY COUNCIL**



NOVEMBER 2006

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1 SUMMARY

At the request of CRDS Ltd., Ian Elliott of IGAS Ltd. undertook a short programme of archaeo-geophysical survey at an identified site (2.9) on the N9/N10 Kilcullen - Powerstown road scheme (Contract 2) in Co. Kildare (Fig. 1). Previous testing/excavation in advance and during construction of an earlier N9 road realignment revealed archaeological remains in the vicinity of site 2.9 (Timolin). The Timolin site is in the vicinity of a deserted medieval settlement. The EIS report (Roughan & O'Donovan 2003, Site D9) included a recommendation that a programme of geophysical survey be carried out, followed by test trenching. On the basis of this information the project archaeologist for the NRA had specified that geophysical survey should take place in advance of any further work on the road scheme in order to better inform the subsequent programme of test trenching being undertaken by CRDS Ltd. This was due to be carried out in connection with the proposed roadworks at Timolin. Fluxgate gradiometry survey revealed periodic tillage, indicated by the apparent survival of furrows on at least two orientations. A linear anomaly may be a drainage feature, but its antiquity is indeterminate. A broad spread of isolated anomalies may indicate actual habitation, or may be related to periodic enhancement of the agricultural soils.

2 PROPOSED DEVELOPMENT

The proposed development is part of the N9/N10 Kilcullen to Waterford road scheme being conducted by the National Roads Authority. Contract 2 of the Kilcullen to Powerstown element of the scheme covers a distance of approximately 23.7km of dual carriageway comprising a section of the N9 mainline (from Mullamast in the north to Prumplestown in the south), along with 11.2 km of single carriageway creating a new Athy Link road (from Athy in the west to south of Ballitore in the east).

3 SOILS AND SOLID GEOLOGY

The Environmental Impact Statement (Roughan & O'Donovan 2003) characterised the ground conditions along the road route as being influenced by the last major glaciation. Typically, between 1 and 20m of glacial till overly the bedrock, which is Middle Carboniferous Limestone in the area of the present survey. Between 0.1 and 0.6m of topsoil was likely to be present in the generally flat to gently undulating agricultural land. The land has generally been intensively farmed. These conditions are suitable for magnetic survey.

4 SITE

4.1 LOCATION

Site 2.9 is located at Timolin td. [NGR 280170 195235], adjacent to the Ballitore existing bypass road, at its junction with the proposed Athy Link [ch 133+50 to 134+20] (eastern terminus). (Fig. 2)

4.2 SITE DESCRIPTION

The Timolin site was located in a north-south oriented strip of land between the old N9 through Timolin and its recent embanked by-pass road to the east. The survey area encompassed an area of approximately 80m west-east by 60m north-south. The site was subdivided by a mature hawthorn hedgerow running north-south, approximately 60m from the western boundary.

5 INSTRUMENTATION

Fluxgate gradiometry survey- A Geoscan FM36 fluxgate gradiometer, controlled by a ST1 sample trigger, was employed in the present survey. Fluxgate gradiometry allows for relatively rapid ground cover over open pastureland (c. 0.8 - 1 ha. per day), while offering the further advantage over other methods of geophysical survey of being able to detect the broadest range of subsurface features, monuments and artefacts. These include ditches, hearths, kilns, pits, and more generalised soil disturbance, which are detected through the highly localised variations they generate in the earth's magnetic field. Given that these feature types generally match the archaeology already recorded in the locality, the use of magnetic survey was clearly advocated.

In addition the following techniques were specified and considered:

Magnetic Susceptibility survey- This technique is most frequently adopted as a reconnaissance technique, with the analysis of the low resolution survey data from broad areas being used to identify possible foci of enhanced magnetic activity, which may indicate concentrations of anthropogenic activity which could be subjected to more rigorous and detailed survey (most usually) by fluxgate gradiometry. Since the areas for detailed magnetometer survey were already delineated, and were relatively compact in extent, the expenditure of additional time, financial and personnel resources on magnetic susceptibility survey was considered to be unjustified.

Earth Resistance Survey- A follow-up survey could have been carried out, based on the results of the fluxgate gradiometer survey, dependent on consultation with the client. This survey would have been aimed at identifying and defining architectural remains or other excavated features. A Geoscan Research RM15, in twin probe configuration, would be used for the survey.

6 METHODOLOGY

6.1 SURVEY

The focus for the survey was the area adjacent to the Athy Link road intersection with the existing N9 at Timolin.

A differential GPS was used to establish a baseline and grid of survey pegs across the site. The survey was tied to the known NGR coordinates of established permanent ground markers, to be supplied by the consultant engineers. This allowed for a cohesive survey across the entire site. Standardised survey panels, or “grids”, of 20m x 20m were then set out as required for use during the magnetometer survey, which was carried out along successive 20m traverses, spaced 1m apart. Readings of the localised magnetic field gradient were recorded to the nearest tenth of a nanotesla (nT) at 25cm intervals along each traverse. Internally stored within the instrument, the data was regularly downloaded to PC for verification, assembly, and subsequent processing, using *Geoplot 3* software.

Survey was carried out in grids and partial grids lying within the CPO line/site boundary line for the project.

A total of approximately 0.5 hectare were covered at Timolin (2.9) [12 grids].

6.2 DATA PROCESSING

Data were regularly downloaded to a laptop computer during the course of the survey, for assembly and verification. The raw data are displayed as linear greyscale plots, clipped to ± 5 nanoTesla (nT), relative to a background datum of 0nT (representing the undisturbed Earth's magnetic field of c. 48,000nT) (Fig. 3).

Subsequent processing with Geoscan Research *Geoplot3* software was limited to despoising a small number of grids to correct for drift (using the **Zero Mean Traverse** function) and edge-matching the grids (using the **Edge Match** function). **Despike** was applied to reduce the obscuring effects of highly localised, typically ferrous-generated anomalies. The data plots were generated as bitmap images, were subsequently converted in *MS Paint* to jpeg format, and were cropped and assembled using Adobe *Photoshop* and *Illustrator*. The processed data are displayed as linear greyscale plots, clipped to ± 5 nT (Fig. 4).

7 RESULTS AND INTERPRETATION

The survey results, as represented by the processed data set, have been analysed in detail. Anomalous features contrasting with the background, surrounding data have been identified. They have been interpreted according to their relative strengths, morphology and data treatment history, and according to inferences drawn from experience and knowledge of local geological, topographical, historical, archaeological, agricultural and modern interference conditions. A descriptive illustration of the interpretation has been drawn for the data set (Fig. 5).

- a) there is ferrous interference from wire fences to west and east of survey area

- b) there is evidence for probable ridge and furrow on two different orientations, both of which appear to predate the road alignment on the western boundary of the site. Also Set 2 (W-E, pitch 2.5m) may be earlier than Set 1 (N-S, pitch 4m). They may respect the present hedgerow alignment, which is likely to pre-date the road.
- c) a further discontinuous curvilinear anomaly (3), length ~40m, which is not obviously structural, may be a drainage feature (ditch?), and also appears to be cut by, and therefore is earlier again than the E-W furrows (1).
- d) while a more ancient, buried feature may cause the central anomaly in the western "half" of the site, a modern explanation is available in that the survey traversed a pile of felled tree branches. A similar accumulation caused interference in the survey of the eastern part of the site, and the patch of apparent burning (30m to the S of the latter) may or may not be related to this modern clearance activity.
- e) the N-S anomalies at the top of the plot are of "archaeological" strength (~2-10nT), but hard to interpret. They may be structural, but the site generally appears to be agricultural, and so these could be related to drainage activity.
- f) there is a general broad spread of ferrous-like anomalies, typically common in agricultural soils, but may be related to pre-modern activity
- g) the cause of weaker isolated anomalies of archaeological strength (indicated as purple dots) could also be of significance, possibly indicating the presence of small pits.

8 CONCLUSIONS

There is no direct evidence for habitation at the Timolin site, other than perhaps generalised soil disturbance in the northern area of the site, but there could be many causes for this. It is suggested that any test excavation be specifically monitored to determine the nature of activity at the site. Excavation may also indicate the exact inter-relationship of the periodic tillage activity and its antiquity.

Earth Resistance survey excels in defining the extents of solid architectural remains, ie building foundations, etc. The only possible structural remains at the Timolin site [N-S anomalies (Interpretation item "e")] were well enough resolved by the magnetic survey to inform any subsequent programme of test excavation. It was clear from the results of the Fluxgate Gradiometer survey that there were no structural remains elsewhere at the site. Further work with Earth Resistance survey at this location would have yielded no additional archaeological information.

REFERENCES

- Keeley, V. J., 2003. *Archaeological Assessment for Environmental Impact Statement N9/N10 Kilcullen to Waterford Scheme*, Roughan and O'Donovan, Consulting Engineers

Appendix 1. Outline of Geoplot® Processing Functions

Deslope

The Deslope function is used to remove a linear trend within a grid of data. It is typically used to correct for drift in gradiometer data where use of the Zero Mean Traverse function is inappropriate.

Despike

The Despike function can be used to automatically (a) locate and remove random, spurious readings often present in resistance data and (b) locate and remove random “iron spikes” often present in gradiometer and magnetometer data.

Edge Match

The Edge Match function may be used to remove grid edge discontinuities. These are often present in Twin Electrode resistance surveys as a result of improper placement of the remote electrodes.

Interpolate

The Interpolate Function may be used to increase or decrease the number of data points in a survey. Increasing the number of data points can be used to create a smoother appearance to the data. Interpolate can also be used to make the sample and traverse intervals of differently sampled composites match; this is essential, for example, prior to combining them into one composite or prior to generating a correlation plot.

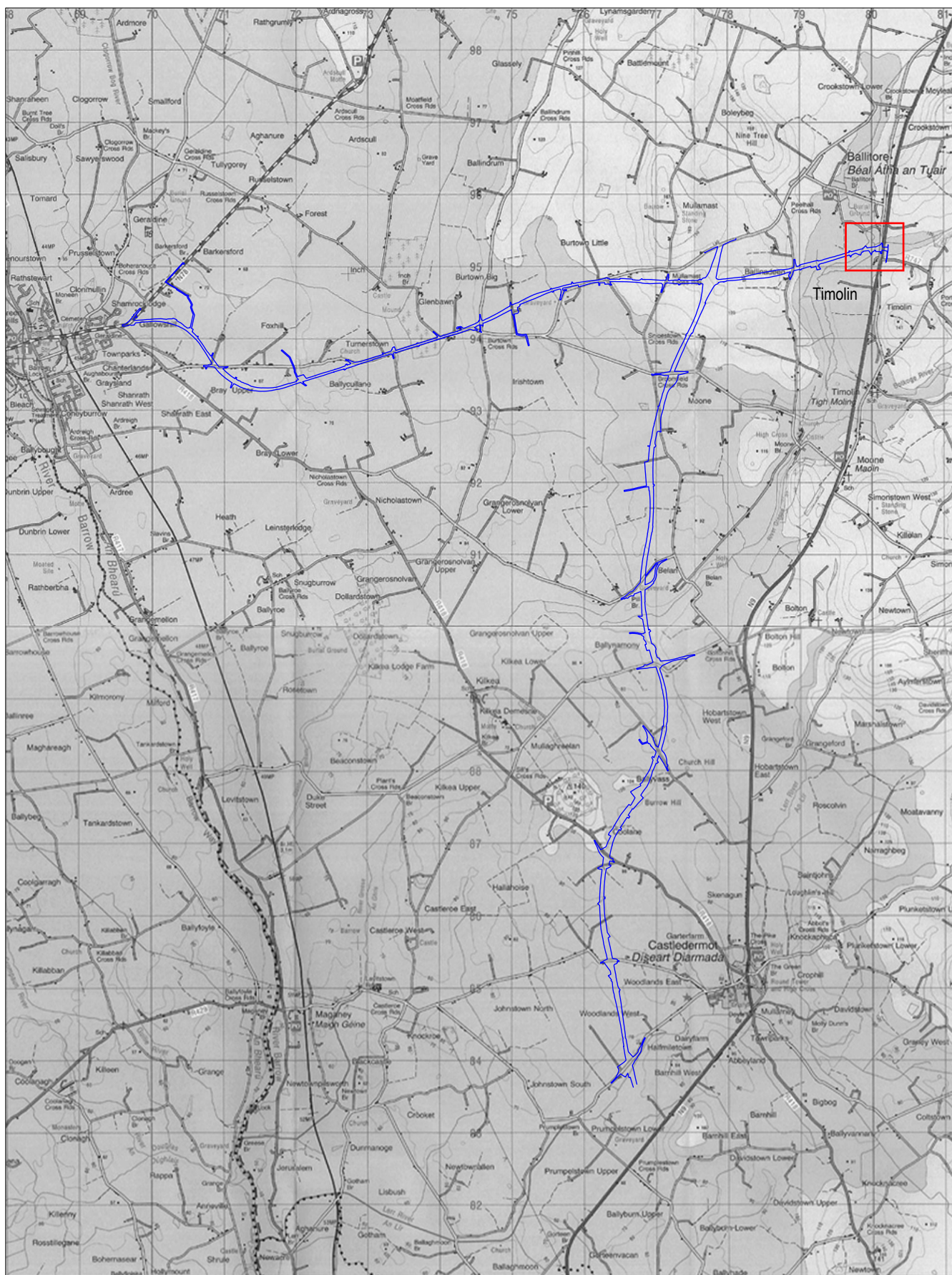
Zero Mean Grid

The Zero Mean Grid function sets the background mean of each grid to zero. It is useful for removing grid edge discontinuities often found in gradiometer or similar bipolar data.

Zero Mean Traverse

The Zero Mean Traverse function sets the background mean of each traverse within a grid to zero. It is useful for removing striping effects in the traverse direction which often occur in Fluxgate gradiometer data. This also has the effect of removing grid edge discontinuities at the same time.

(Reproduced from Geoplot 2.02® Operating Manual, section 9-3.1. © Geoscan Research)



NOT TO SCALE



N9/N10 Kilcullen to Waterford Scheme:
Kilcullen to Powerstown.
Archaeological Services
Contract No. 2 - Test excavations,
Mullamast to Prumplestown
Job No.: 665
Date: September 2006

Client: KCC
Drawn by: CB

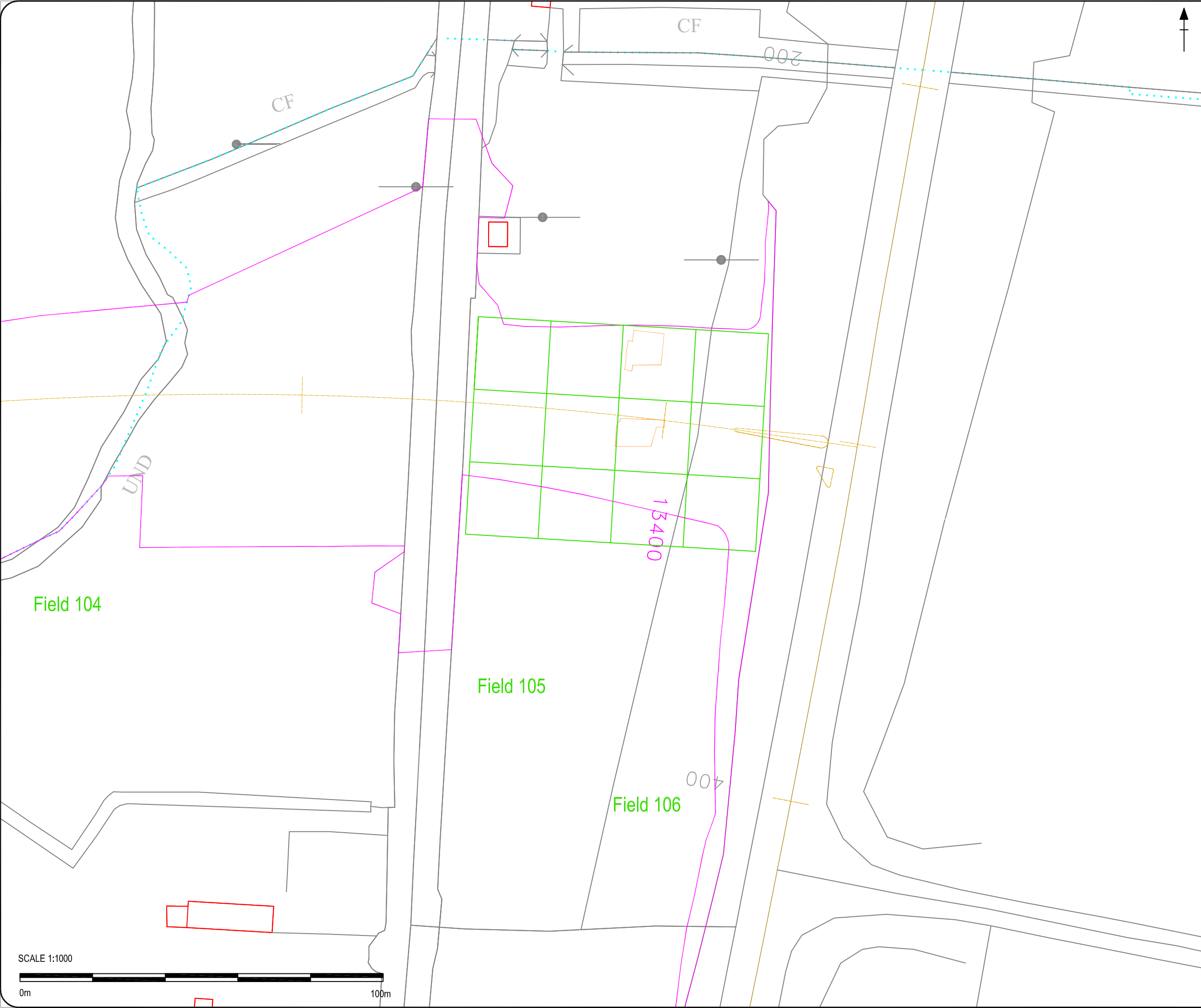
Key

CPO —



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Figure 1 : Extract from Discovery Series Maps 55 & 61, showing the location of Timolin



KEY

CPO

Centreline

Townland boundary

Field boundary

River

Building

Road

Grid

Site outline

Geo survey results

Magnetic disturbance-possibly modern

Burning - probable

Possible archaeology - positively magnetic ~3 to 20nT

Ferrous interference - bi-polar

N9/N10 Kilcullen to Waterford Scheme:
Kilcullen to Powerstown.
Archaeological Services Contract No. 2
Geophysics results,
Mullamast to Prumplestown: Timolin td.

CRDS Job No.: 665
Client: Kildare CC

Drawn by: NL
Date: September 2006

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Figure 2

Figure 2 : Grid layout of Timolin

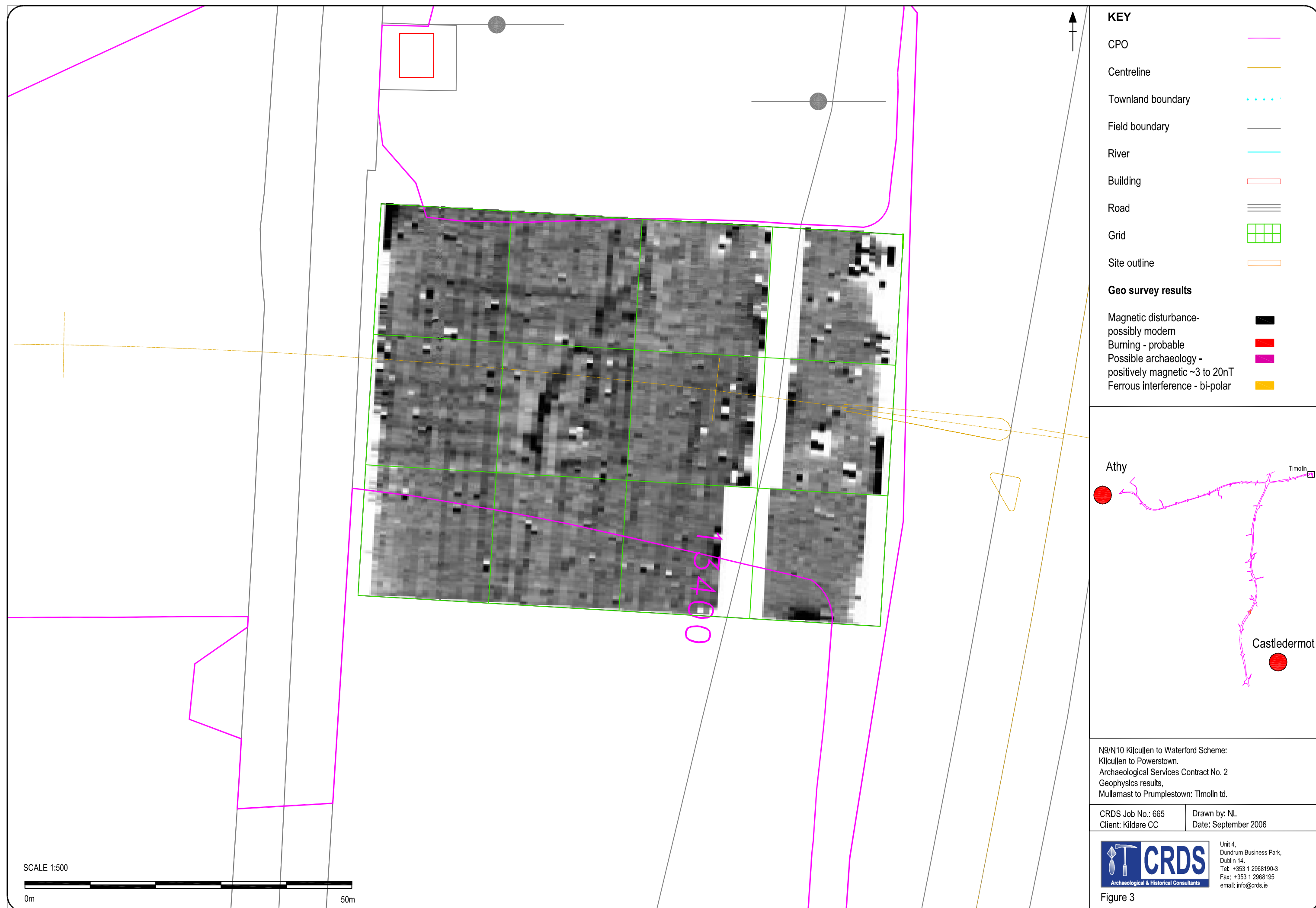




Figure 4 : Processed data Timolin



Figure 5 : Interpretation Timolin