GEOPHYSICAL SURVEY REPORT 2012/80

The Glebe, Tregony
Cornwall

Client:

Archaeological Services & Historic Building Recording
SOUTHWEST ARCHAEOLOGY

On behalf of:

Devon & Cornwall Housing

GSB Prospection

Celebrating over 25 years at the forefront of Archaeological Geophysics

GSB Survey Report No. 2012/80

The Glebe, Tregony

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Survey Personnel

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Dates

Fieldwork: 13 November 2012
Report: 21 November 2012

Report Approved: Dr John Gater MIfA FSA

Background Project Details

NGR	SW 929 452
Location	Immediately south of The Glebe, off the B3287 on the eastern outskirts of Tregony.
HER/SMR	Cornwall
Parish	Cuby CP
Topography	Sloping down from northeast to southwest.
Current Land Use	Pasture.
Soils	Denbigh 2 (541k) association: well drained fine loamy soils over slate or slate rubble. Some fine loamy soils variably affected by groundwater (SSEW 1983).
Geology	Portscatho Formation – interbedded sandstone and argillaceous rocks (BGS 2012).
Archaeology	Approximately 300m to the south west a partial rectilinear enclosure and pits have been revealed through geophysical survey and have been interpreted as a possible cemetery / shrine / temple of Roman date; a medieval well lies 100m to the west of the site (SWA 2012).
Survey Methods	Detailed magnetometer survey (fluxgate gradiometer).
Study Area	0.5ha

Aims

To locate and characterise any anomalies of possible archaeological interest within the study area. The work forms part of a wider archaeological assessment being carried out by **South West Archaeology Ltd** on behalf of **Devon and Cornwall Housing**.

Summary of Results

The magnetic survey has detected a number of anomalies that may be of interest given that Roman activity is known within the vicinity. However, the responses have been classed as *Uncertain* as no clear cut archaeological patterns can be made. A pipe runs alongside the hedge that divides the site in two, whilst other ferrous responses can be attributed to metal fencing.

Method

All survey grid positioning was set out using tapes and then georeferenced relative to the Ordnance Survey National Grid by tying in to local detail using Trimble R8 Real Time Kinematic (RTK) VRS Now dGPS equipment. These tie-ins are presented in Figure T1. Please refer to this diagram when re-establishing the grid or positioning trenches.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

Data Processing

Data processing was performed as appropriate using in-house software packages (GeoSuB) as outlined below.

Magnetic Data
Zero Mean Traverse, Step Correction (De-stagger) and Interpolation (on the Y axis).

Interpretation

When interpreting the results several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to very specific known features documented in other sources, this is done so (for example: *Abbey Wall*, *Roman Road*). For the generic categories levels of confidence are indicated, for example: *Archaeology – ?Archaeology*. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification *?Archaeology*. Details of the data plot formats and interpretation categories used are given in the Appendix: Technical Information at the end of the report.

General Considerations

Conditions for survey were good as the ground cover consisted of short pasture.

1.0 Survey Results - Magnetometer Survey

1.1 A curvilinear band of anomalies [**1**] has been given the category of *Uncertain;* whilst an archaeological origin is possible, the presence of a pipe (see 1.3 below) confuses matters. The lack of any similar responses to the west of the boundary perhaps lessens an archaeological interpretation suggesting that a pedological / geological is also possible. Other anomalies with a similar magnetic response have been given the same category.

1.2 The interpretation of a strong magnetic response [**2**] at the south eastern limits of the application area is perplexing; it is difficult to ascertain an origin due to its limited extent within the survey area, and as such it has been categorised as *Uncertain*.

1.3 Trends within the eastern section are likely to relate to former ploughing ruts. Ferrous disturbance can be seen along the edges of the survey area; this is from metal fencing and a pipe. A handful of small scale ferrous responses can be seen (best viewed on the XY trace plot found on the archive CD); these are most commonly from iron debris within the topsoil or on the surface and are of a modern origin.

2.0 Conclusions

2.1 A number of anomalies have the potential of being of an archaeological interest; however, due to the noisy dataset and the lack of a definite pattern any interpretation is cautious. A pipe has also been detected running alongside the hedge.

References

BGS 2012	British Geological Survey, Geology of Britain Viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html 1:50,000 scale geology, centred on Tregony, accessed 13/11/2012
SSEW 1983	*Soils of England and Wales. Sheet 5, South West England*. Soil Survey of England and Wales. 1983.
SWA 2012	*Information received* 07/11/2012

Appendix - Technical Information: Magnetometer Survey

Instrumentation: Geoscan FM36/256 and Bartington *Grad*601-2

Both the Geoscan and Bartington instruments operate in a gradiometer configuration which comprises two fluxgate sensors mounted vertically a set distance apart; on the Geoscan instruments this is 0.5m, on the Bartington, 1m. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried by hand, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method. Having two gradiometer units mounted laterally with a separation of 1000mm, the Bartington instrument can collect two lines of data per traverse.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (Destagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.
Interpolation	When geophysical data are presented as a greyscale, each data point is represented as a small square. The resulting plot can sometimes have a 'blocky' appearance. The interpolation process calculates and inserts additional values between existing data points. The process can be carried out with points along a traverse (the x axis) and/or between traverses (the y axis) and results in a smoother greyscale image.

Display

XY Trace Plot	This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane.
Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.
3D Surface Plot	This is similar to the XY trace, but in 3 dimensions. Each data point of a survey is represented in its relative position on the x and y axes and the data value is represented in the z axis. This gives a digital terrain, or topographic effect.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Archaeology	This term is used when the form, nature and pattern of the response are clearly or very probably archaeological and /or if corroborative evidence is available These anomalies, whilst considered anthropogenic, could be of any age.
?Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Increased Magnetic Response	An area where increased fluctuations attest to greater magnetic enhancement of the soils, but no specific patterns can be discerned in the data and no visual indications on the ground surface hint at a cause. They may have some archaeological potential, suggesting damaged archaeological deposits.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Old Field Boundary	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases the response may be the result of more recent agricultural activity.
Ploughing	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions. Smaller, isolated responses which do not form such obviously 'natural' patterns but which are, nonetheless, likely to be natural in origin may be classified as *?Natural*.
Uncertain Origin	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *? Archaeology* and *?Natural* or (in the case of linear responses) *?Archaeology* and *?Ploughing*; occasionally they are simply of an unusual form.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. They are presumed to be modern.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

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