

**T H A M E S      V A L L E Y**

**ARCHAEOLOGICAL**

**S E R V I C E S**

**Land at Grange Road, Netley  
Hampshire**

**Geophysical Survey**

**by Kyle Beaverstock**

**Site Code: GRN19/36**

**(SU 4580 0919)**

# **Land at Grange Road, Netley, Hampshire**

## **Geophysical Survey (Magnetic) Report**

**For Rivendale Homes Ltd**

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code GRN 19/36

**April 2019**

## Summary

**Site name:** Land at Grange Road, Netley, Hampshire

**Grid reference:** SU 4580 0919

**Site activity:** Magnetometer survey

**Date and duration of project:** 29<sup>th</sup> of March 2019

**Project coordinator:** Tim Dawson

**Site supervisor:** Kyle Beaverstock

**Site code:** GRN 19/36

**Area of site:** c. 0.3ha

**Summary of results:** No anomalies of archaeological interest were detected over the course of the survey however there was significant magnetic disturbance across the site.

**Location of archive:** The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

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Report edited/checked by: Steve Ford ✓ 05.04.19 Tim Dawson ✓ 05.04.19
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# Land at Grange Road, Netley, Hampshire A Geophysical Survey (Magnetic)

by Kyle Beaverstock

**Report 19/36**

## **Introduction**

This report documents the results of a geophysical survey (magnetic) carried out at Grange Road, Netley, Hampshire (SU 4580 0919) (Fig. 1). The work was commissioned by Ms Becci Brisland on behalf of Rivendale Homes Ltd, 15 Pirelli Way, Eastleigh, Hampshire, SO50 5GE.

Planning permission (F/18/84235) has been gained from Eastleigh Borough Council for the erection of 9 dwellings with associated garages and landscaping. The consent has been issued with two conditions (3 and 4) concerning archaeology. These require an archaeological survey and a subsequent programme of mitigation based on the results of the initial investigations.

This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012), and the Borough's policies on archaeology. The field investigation was carried out to a specification approved by Neil Adam, Senior Archaeologist for Hampshire County Council. The fieldwork was undertaken by Kyle Beaverstock and Dan Neal on the 29<sup>th</sup> of March 2019 and the site code is GRN19/36.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

## **Location, topography and geology**

The site is located to the north of the village of Netley, which lies between Weston and Hamble-le-Rice along the north-eastern shore of Southampton Water (Fig. 1). The site itself is a subangular parcel of land and is relatively flat, sitting at a height of c.25m above Ordinance Datum (aOD) and is currently not being utilised. The underlying geology is stated as River Terrace 3 gravel (BGS 1987).

## **Site history and archaeological background**

The site history has been described in detail in a desk-based assessment (Russel 2018). To summarise, the site's archaeological potential derives from the its location in an area thought to be part of the monastic grange of

Netley Abbey. Whilst there is no specific mention of the site itself there it does list the adjacent Netley Grange as an 18<sup>th</sup>-19<sup>th</sup> century farm.

## **Methodology**

### Sample interval

Data collection involved the traversing of the survey area along straight and parallel lines using two cart-mounted Bartington Grad601-2 fluxgate gradiometers with sensors spaced 0.5m apart. Even coverage was achieved with the use of regularly spaced markers at the ends of traverses and the real-time positional trace plot. Readings were taken at 0.25m intervals along traverses 2m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating northwest to southeast zig-zag orientation across the survey area. Other than slight overgrowth around the periphery and a rubble pile on the north-eastern boundary, there were no significant obstructions across the surveyed area.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to  $10^{-9}$  Tesla, the SI unit of magnetic flux density.

### Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both European Archaeological Council (EAC 2015) and the Chartered Institute *for* Archaeologists (2002, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using two dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometers mounted upon a Bartington non-magnetic cart. A two-wheeled lightweight structure pushed by hand, the cart consisted a bank of four vertically-mounted Bartington Grad601-2 magnetic sensor

tubes at 1m apart and a Trimble Geo 7x centimetre edition GPS. Readings were collected by two Bartington Grad601-2 loggers and collated using MLgrad601 software on a Linx 12x64 tablet running Windows 10 mounted at the rear of the cart. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

The Trimble Geo7x centimetre edition GPS system with centimetre real-time accuracy was used to tie the cart traverses into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

<b>Process</b>	<b>Effect</b>
Clip from -22.00 to 22.10 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by interference of metal objects within the survey area.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 2) with the processed data then presented as a second figure (Fig. 3), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 3.6.1 and exported again in .PNG format in order to present them in figure templates in

Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised, they are exported in .PDF format for inclusion within the finished report.

## **Results**

Results from across the site show a significant amount of magnetic disturbance (Fig. 3). Part of this disturbance can be attributed to the metal fencing around the periphery of the site however the majority of this magnetic disturbance is most likely the result of buried ferrous material (Fig. 4). Surface evidence did suggest that the land had been utilised for the disposal of rubble and other waste, which may cause magnetic disturbance, however these readings may also be caused by services such as pipes and monitoring wells which were seen on site. This magnetic disturbance which is represented by high bipolar readings could mask or distort subtle discrete variations which indicate the presence of buried archaeological features. Magnetic spikes were also detected but again these bipolar responses are most likely the result of ferrous objects.

## **Conclusion**

No anomalies of archaeological interest were detected over the course of the survey however there was significant magnetic disturbance recorded across the site.

## **References**

- BGS, 1987, *British Geological Survey*, 1:50,000, Sheet 315, Solid and Drift Edition, Keyworth
- CI/A, 2014, 'Standard and Guidance for archaeological geophysical survey', Reading
- EAC, 2015, *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*, EAC Guidelines 2, Namur
- IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading
- NPPF, 2012, *National Planning Policy Framework*, Dept Communities and Local Government, London
- Russel, A D, 2018, 'Archaeological Heritage Statement for land at Netley Grange, Hampshire', Southampton Archaeology Unit unpublished report 1341, Southampton

## Appendix 1. Survey and data information

### Programme:

Name: TerraSurveyor  
Version: 3.0.25.0

### Raw data

Filename: Netley RAW.xcp  
Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30  
Survey corner coordinates (X/Y):  
Northwest corner: 445778.871363774, 109240.049393262 m  
Southeast corner: 445833.471363774, 109168.029393262 m  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 0.50 m spacing.  
Dummy Value: 32702

### Dimensions

Survey Size (meters): 54.6 m x 72 m  
X&Y Interval: 0.13 m  
Source GPS Points: Active: 13927, Recorded: 13927

### Stats

Max: 107.23  
Min: -109.74  
Std Dev: 34.26  
Mean: -13.97  
Median: -5.61  
Composite Area: 0.39323 ha  
Surveyed Area: 0.22695 ha

### Processed data

Filename: Netley.xcp

#### GPS based Proce5

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Despike Threshold: 1 Window dia: 3
- 5 Clip from -20.00 to 20.00

### Stats

Max: 22.10  
Min: -22.00  
Std Dev: 10.34  
Mean: -2.52  
Median: -0.28  
Composite Area: 0.39323 ha  
Surveyed Area: 0.22695 ha

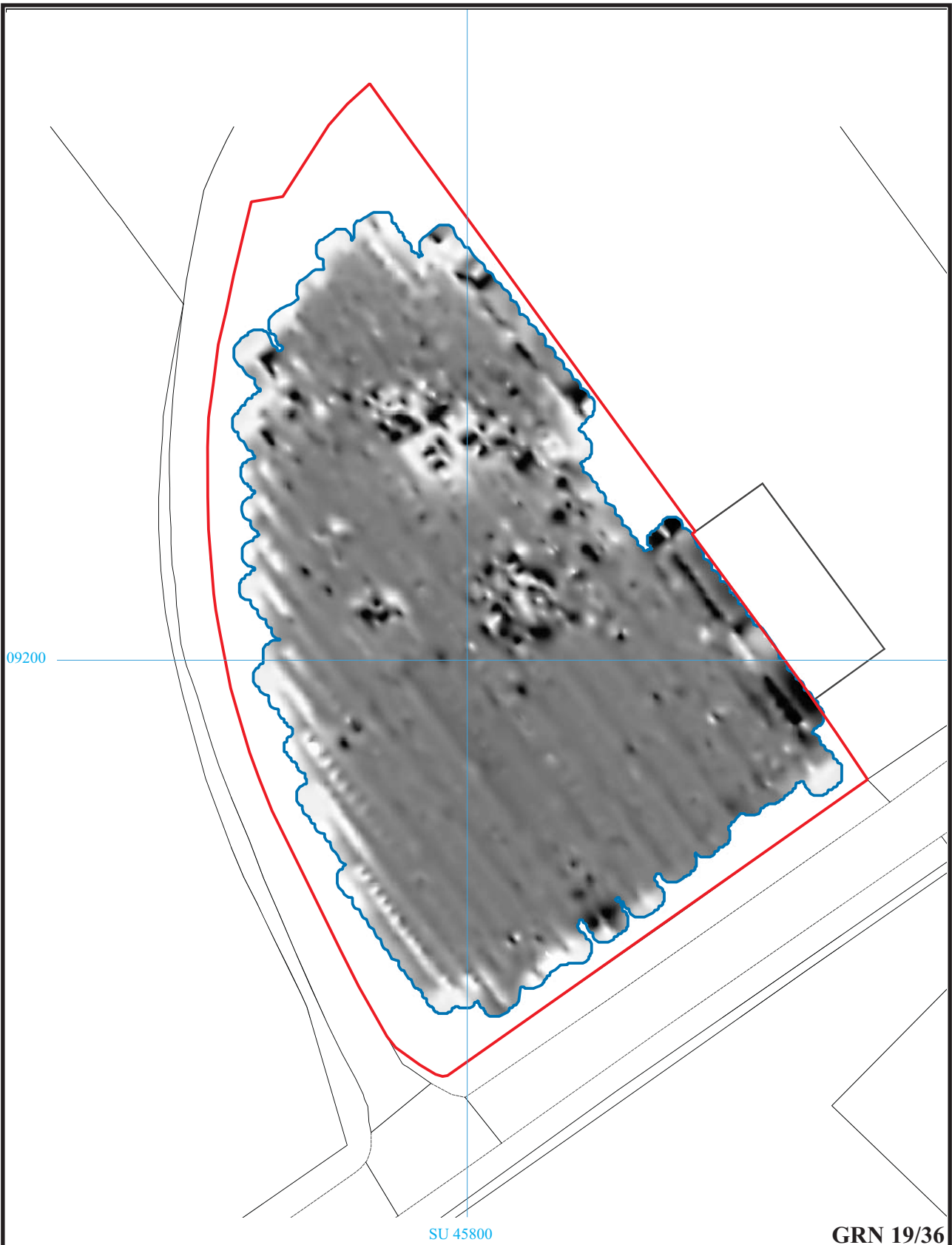




Land at Grange Road, Netley,  
 Hampshire, 2019  
 Geophysical Survey  
 Figure 1. Location of site within Hampshire.



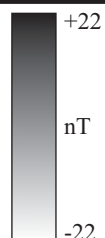
Reproduced under licence from Ordnance Survey Explorer Digital mapping at 1:12500  
 Crown Copyright reserved

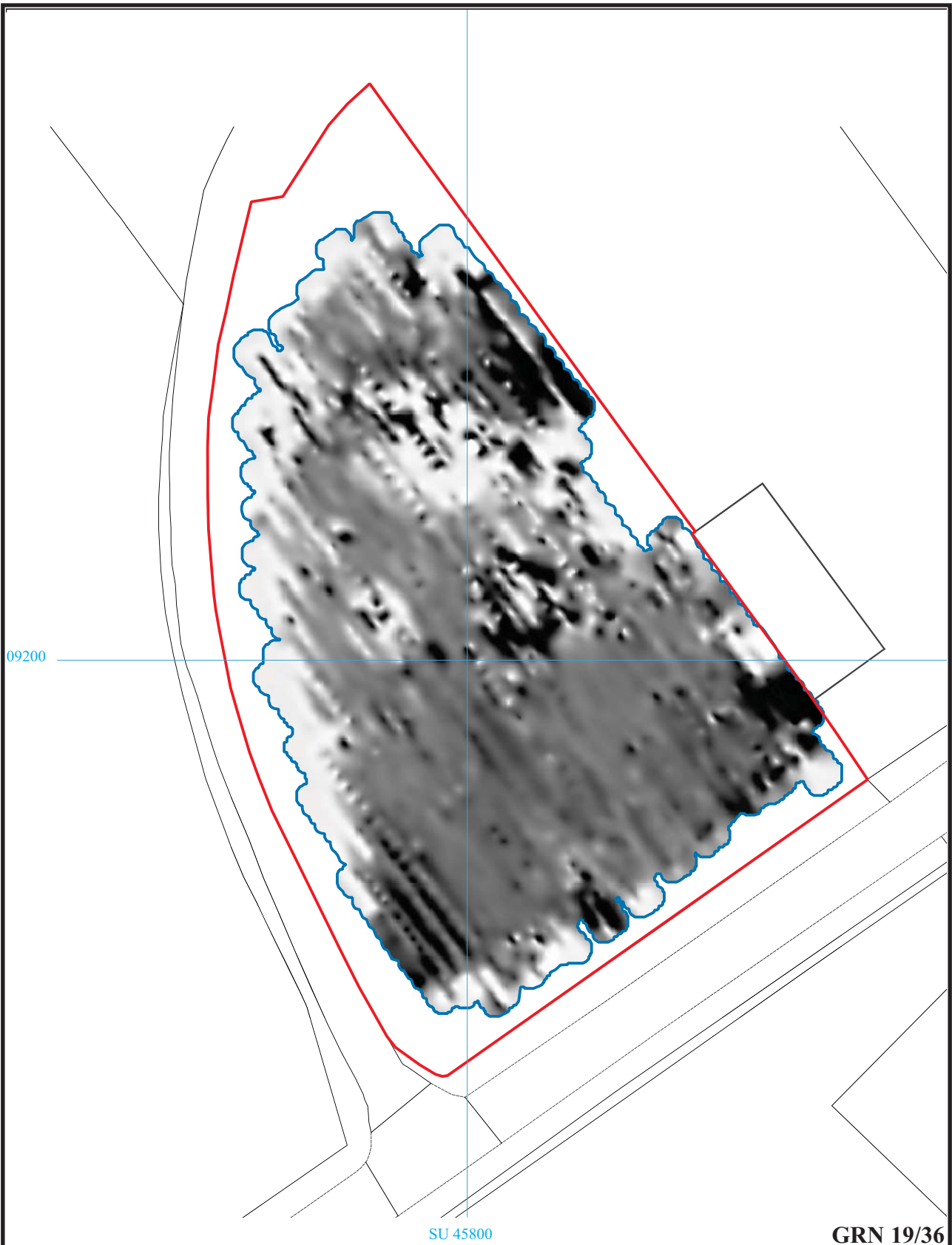


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**Land at Grange Road, Netley,  
Hampshire, 2019**  
**Geophysical Survey (Magnetic)**  
Figure 2. Plot of raw gradiometer data.



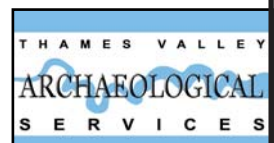
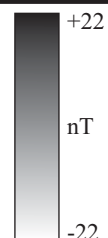


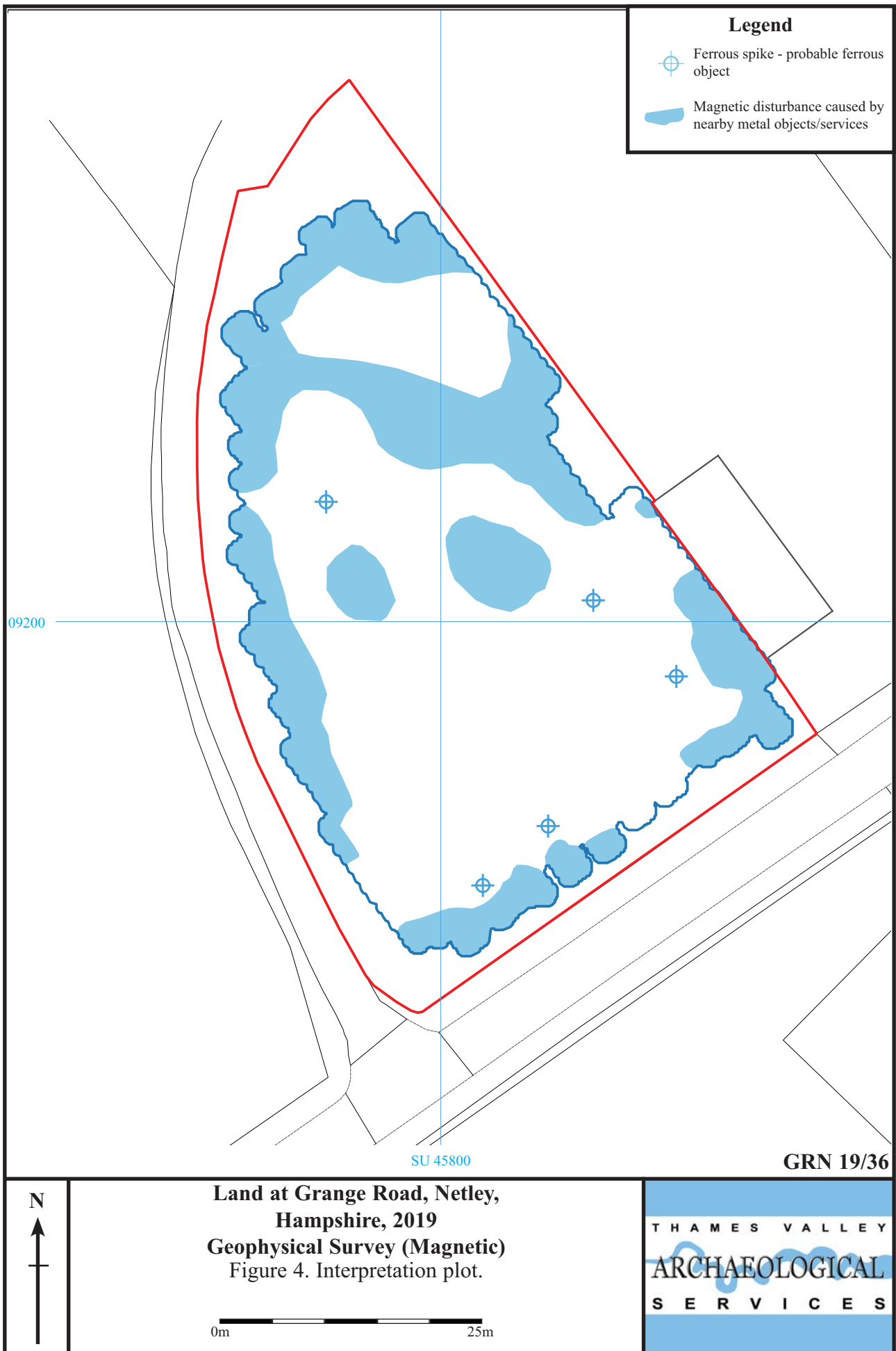
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Hampshire, 2019**  
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Figure 3. Plot of processed gradiometer data.

0m 25m





**Legend**

-  Ferrous spike - probable ferrous object
-  Magnetic disturbance caused by nearby metal objects/services

09200

SU 45800

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**Land at Grange Road, Netley,  
Hampshire, 2019**  
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Figure 4. Interpretation plot.

0m  25m

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Plate 1. Survey area looking north.



Plate 2. Southern site boundary including site entrance looking north-east

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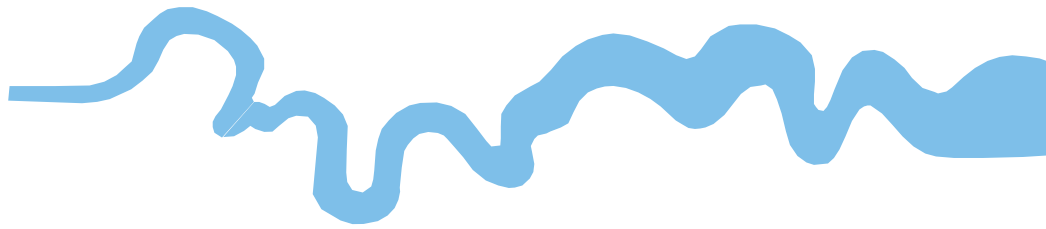
**Land at Grange Road, Netley,  
Hampshire, 2019  
Geophysical Survey (Magnetic)  
Plates 1 and 2.**

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## TIME CHART

	Calendar Years
Modern _____	AD 1901
Victorian _____	AD 1837
Post Medieval _____	AD 1500
Medieval _____	AD 1066
Saxon _____	AD 410
Roman _____	AD 43 AD 0 BC
Iron Age _____	750 BC
Bronze Age: Late _____	1300 BC
Bronze Age: Middle _____	1700 BC
Bronze Age: Early _____	2100 BC
Neolithic: Late .....	3300 BC
Neolithic: Early .....	4300 BC
Mesolithic: Late .....	6000 BC
Mesolithic: Early .....	10000 BC
Palaeolithic: Upper .....	30000 BC
Palaeolithic: Middle .....	70000 BC
Palaeolithic: Lower .....	2,000,000 BC





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