THAMES VALLEY

ARCHAEOLOGICAL

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Land at Winchester Road, Wickham, Hampshire

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: WRW18/191
(SU 5697 1193)

Land at Winchester Road, Wickham, Hampshire

Geophysical Survey (Magnetic) Report

For Bewley Homes

By Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code WRW 18/191

March 2021

Summary

Site name: Land at Winchester Road, Wickham, Hampshire

Grid reference: SU 5697 1193

Site activity: Magnetometer survey

Date and duration of project: 8th March 2021

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: WRW18/191

Area of site: c. 2.3ha

Summary of results: The results show some areas of magnetic debris in the southwestern field but no features of archaeological interest were uncovered.

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

Report edited/checked by:	Steve Ford✓ 19.03.21
	Tim Dawson✓ 19.03.21

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Land at Winchester Road, Wickham, Hampshire
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 18/191

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Winchester Road, Wickham, Hampshire (SU 5697 1193) (Fig. 1). The work was commissioned by Adam Osborne, on behalf of Bewley Homes, Inhurst House, Brimpton Road, Baughurst, RG26 5JJ.

Planning permission (17/02615/FUL) has been gained from Winchester City Council to construct new housing on a 4.5ha parcel of land at Winchester Rd, Wickham, Winchester, Hampshire (SU 5697 1193). The consent is subject to a condition (6) relating to archaeology. This is in accordance with the *National Planning Policy Framework* (NPPF 2012), and the Councils policies on archaeology. The field investigation was carried out to a specification approved by Tracy Matthews, Archaeologist for Winchester City Council. The fieldwork was undertaken by Kyle Beaverstock and Luciano Cicu on the 8th of March 2021 and the site code is WRW18/191.

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 on the northern edge of Wickham, 5km north of Fareham (Fig. 1). The site is bounded by Winchester Road to the southwest, residential buildings to the south, woodland to the northwest and southeast and farmland to the northwest. The site is comprised of two fields that slope from 51m above Ordinance Datum in the northeast to 44m in the southwest. The underlying geology is stated as sand, silt and clay Wittering Formation (BGS 1998).

Site history and archaeological background

The archaeological potential of the sites has been highlighted in a briefing document prepared by Ms Tracy Matthews of Winchester City Council drawing on a desk-based assessment (Preston 2011). In summary this potential stems from it's location on the outskirts of Wickham, whose place name, whilst of Saxon origin

recognises the presence of a Roman settlement. Wickham lies on the Roman road from Chichester to Bitterne (Southampton) and recent excavations on the southern margins of the town have revealed a part of the roadside settlement and road itself (Bray and McNicoll-Norbury 2017). Various other archaeological investigations have revealed components of the Roman settlement with further recent fieldwork having revealed further components of the Roman settlement on the east side of the town (Whelan, 2014)

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. 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 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating northeast to southwest zig-zag orientation across the survey area. There were a number of obstructions Including a small area near the centre of the southwestern field. In the northeastern field there were areas near the edge of the field where overgrowth prevented the survey. Conditions were dry and bright.

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.

Process	**Effect**
Clip from -3.00 to 4.30 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.
De-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

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 2.18.15 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

The results show that the southwestern field has a significant amount of magnetic debris including small patches and a large area along the southeastern boundary. These are represented by bipolar areas of positive and negative responses with a high amplitude. These may indicate the presence of disturbed ground or buried ferrous objects. There was also a number of magnetic spikes across the site, these are represented by bipolar points with a high amplitude which may indicate ferrous material. In the south of the site are some areas of magnetic disturbance that was most likely caused by fencing.

Conclusion

The geophysical survey showed the site contained a large amount of magnetic debris with a particularly concentrated area along the southeastern boundary of the southwestern field. This may indicate an area of severe disturbance such as quarrying or disturbed natural geology. No anomalies of archaeological interest were uncovered.

References

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Bray, D and McNicoll-Norbury, J, 2017, 'Evidence for Margary's route 421, with Late Iron Age and Roman roadside occupation at Broad Ha'Penny, Tanfield Lane, Wickham' in D Bray, J McNicoll-Norbury, J, Pine, D Platt, D Sanchez, and S Wallis, Archaeological Excavations in Hampshire: Sites in Bedhampton, Hilsea, Southampton, Whitchurch and Wickham, TVAS Occas Pap 20, Reading, 14–31

CI*f*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
Preston, S, 2011, Land at Winchester Road, Wickham, Hampshire, Archaeological Desk-Based Assessment, Thames Valley Archaeological Services report 11/45, Reading
Whelan, J, 2014, Land south of Southwick Road, Wickham, Hampshire, Archaeological Evaluation, Cotswold Archaeology, report 1445, Andover

Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

Raw data
Filename: Wickham A RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 456825.310410583, 111952.540441433 m
Southeast corner: 456995.350410583, 111775.090441433 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 170 m x 177 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 46831, Recorded: 46831

Stats
Max: 96.80
Min: -99.90
Std Dev: 12.08
Mean: 1.32
Median: 0.58
Composite Area: 3.0174 ha
Surveyed Area: 1.6741 ha

Filename: Wickham B RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 456967.803348869, 112075.270793913 m
Southeast corner: 457114.443348869, 111916.670793913 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 147 m x 159 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 25375, Recorded: 25375

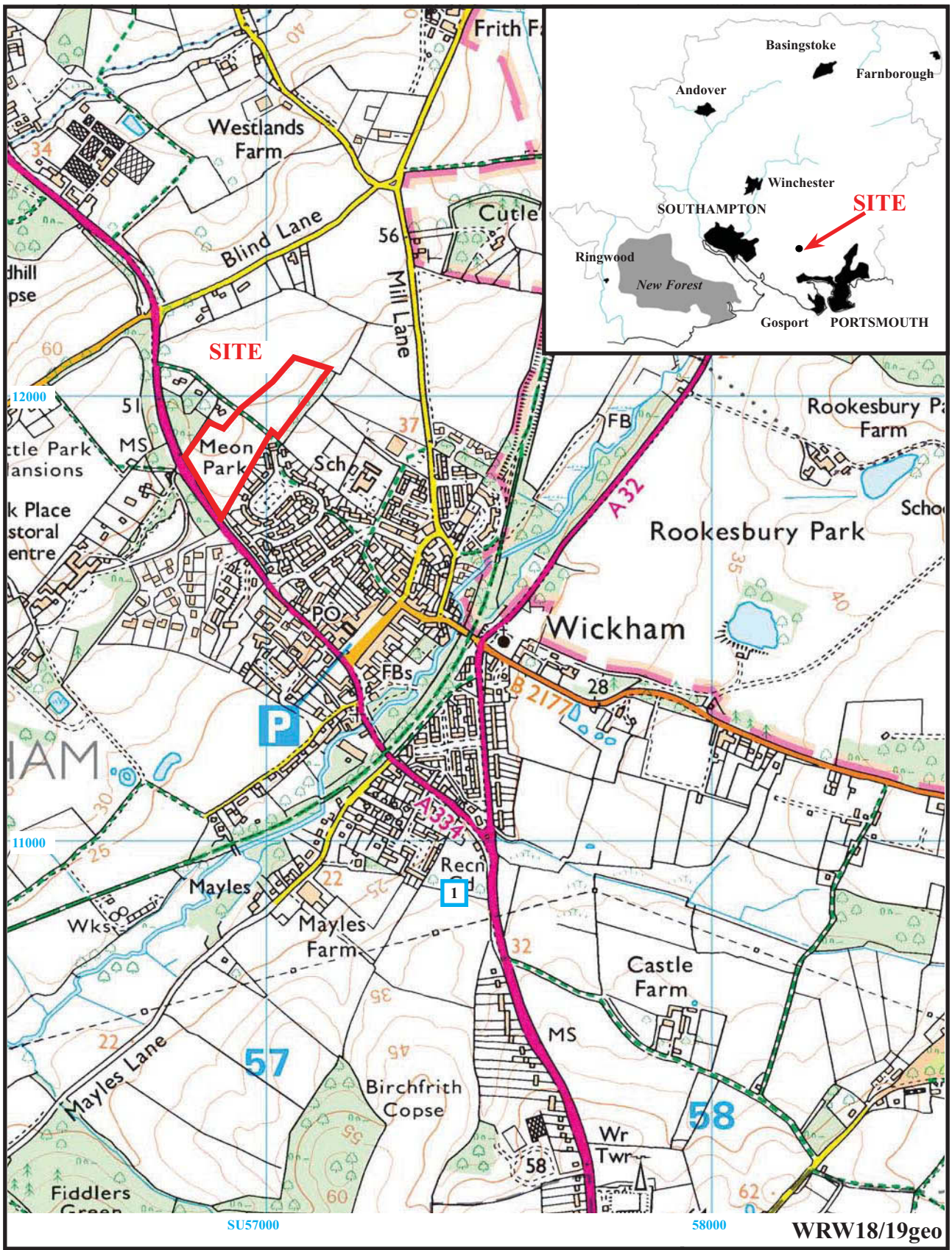
Stats
Max: 57.60
Min: -99.90
Std Dev: 3.87
Mean: 0.24
Median: 0.83
Composite Area: 2.3257 ha
Surveyed Area: 0.75283 ha

Processed data
Filename: Wickham A.xcp
Stats
Max: 4.00
Min: -3.00
Std Dev: 1.47
Mean: 0.16
Median: 0.01
Composite Area: 3.0174 ha
Surveyed Area: 1.6741 ha

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStagger by: 100.00cm, Shift Values
4 DeStripe Median Traverse:
5 Clip from -3.00 to 4.00

Filename: Wickham B.xcp
Stats
Max: 4.00
Min: -4.13
Std Dev: 0.85
Mean: 0.02
Median: 0.01
Composite Area: 2.3257 ha
Surveyed Area: 0.75283 ha

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 DeStagger by: 100.00cm, Shift Values
5 Clip at 1.00 SD



WRW18/19geo

Land at Winchester Road, Wickham, Hampshire, 2021
Geophysical Survey (Magnetic)
Figure 1. Location of site within Wickham and Hampshire.

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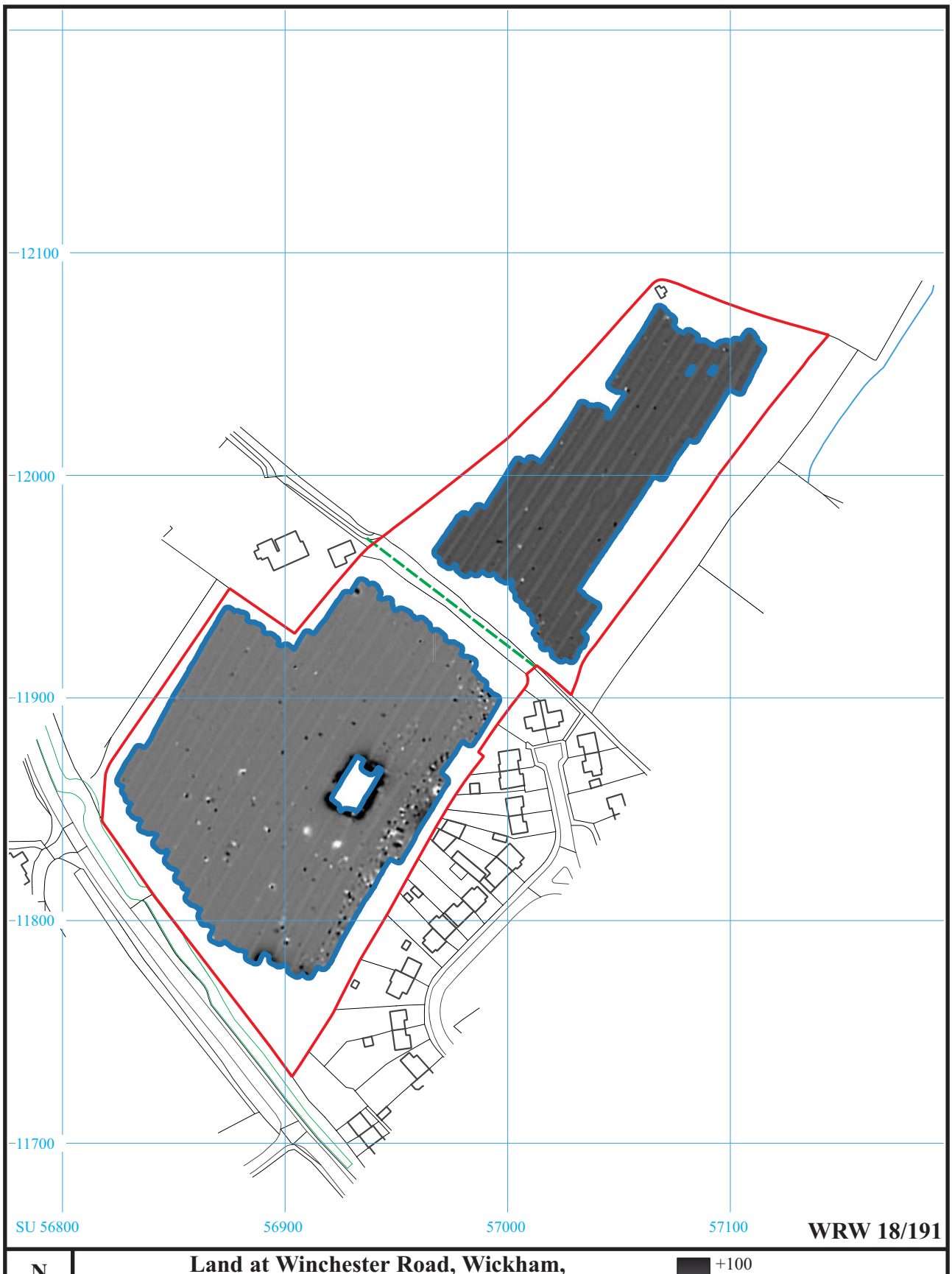
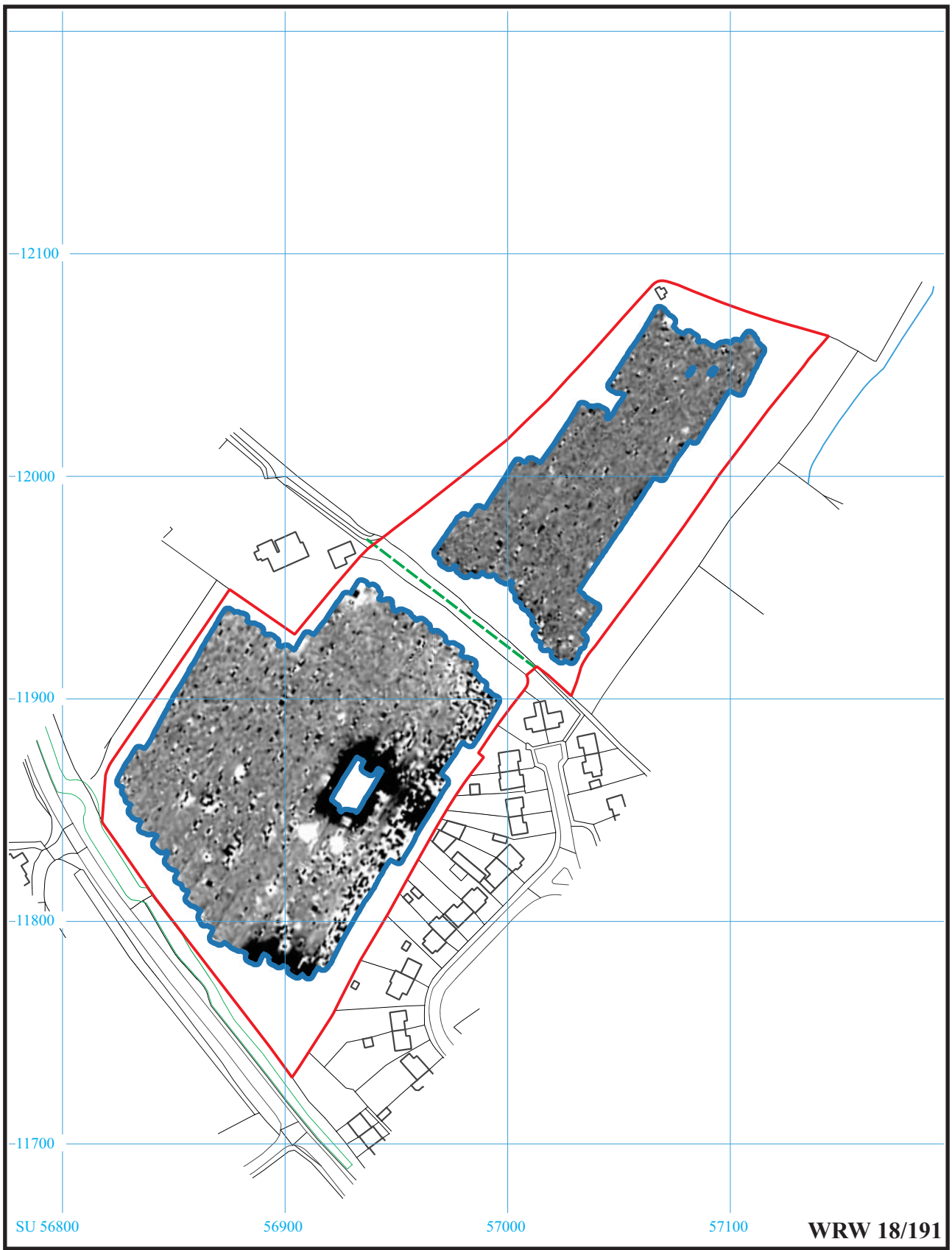


Land at Winchester Road, Wickham, Hampshire, 2021
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.



Land at Winchester Road, Wickham, Hampshire, 2021
Geophysical Survey (Magnetic)
Figure 3. Plot of processed gradiometer data.

N

0m 100m

+4.00
nT
-3.00

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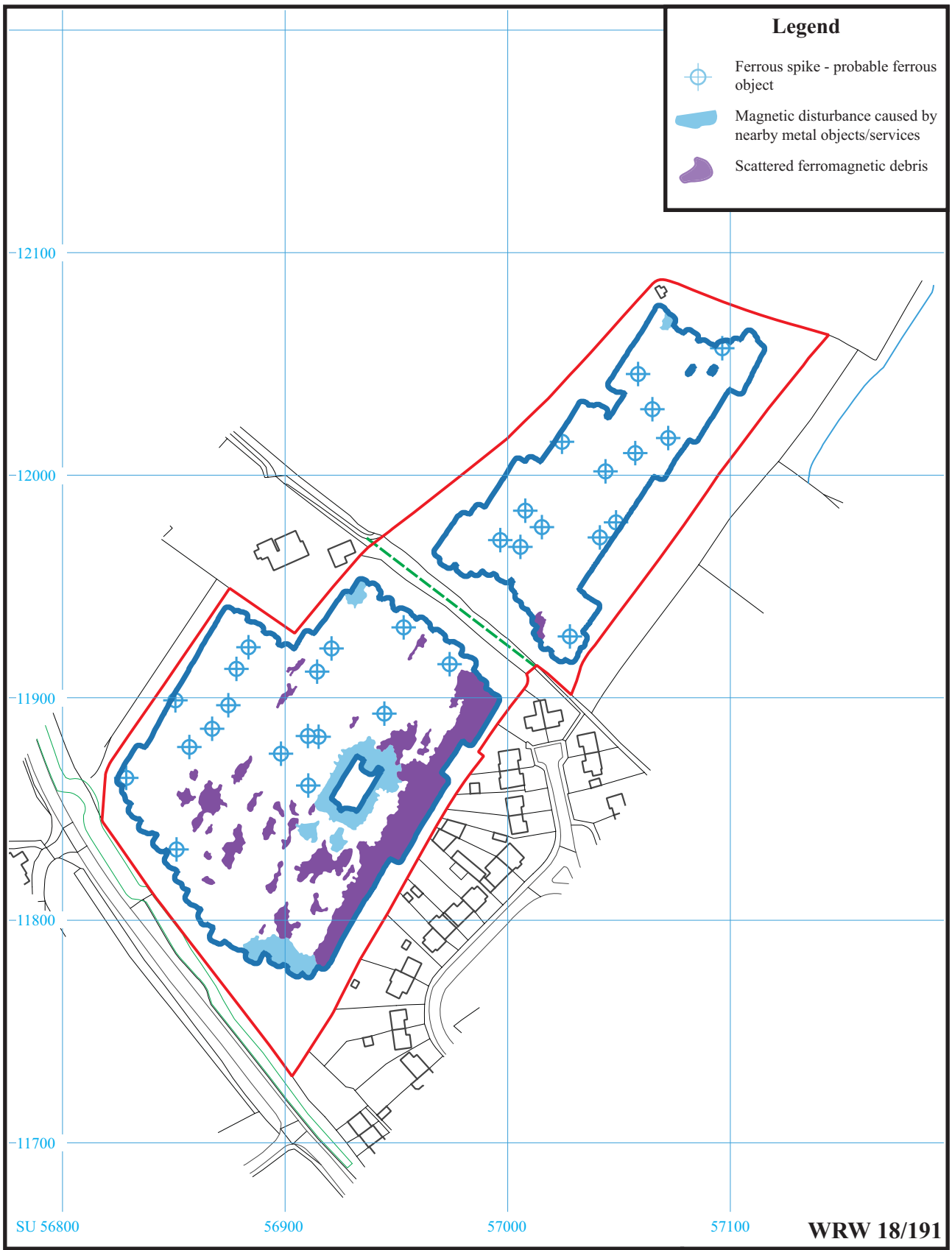

N

Land at Winchester Road, Wickham, Hampshire, 2021
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Figure 4. Interpretation plot.

0m 100m

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Plate 1. Southern area of the southwest field looking south.

Plate 2. Northeastern boundary of southeastern field looking northwest.

Plate 3. Southwestern boundary of the northeastern field. looking northwest.

Plate 4. Northwestern boundary of northeastern field looking southwest.

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Land at Winchester Road, Wickham, Hampshire, 2021
Geophysical Survey (magnetic)
Plates 1 to 4.

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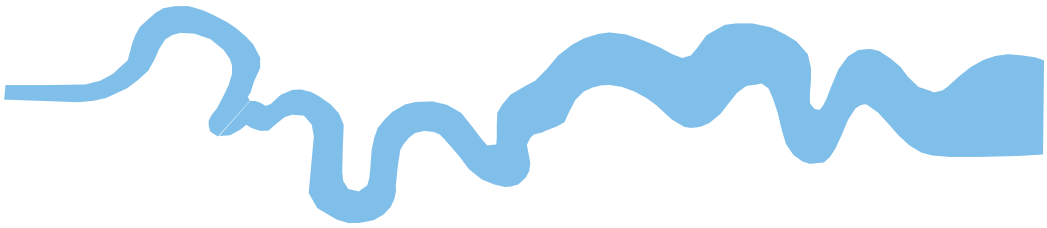
TIME CHART

	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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