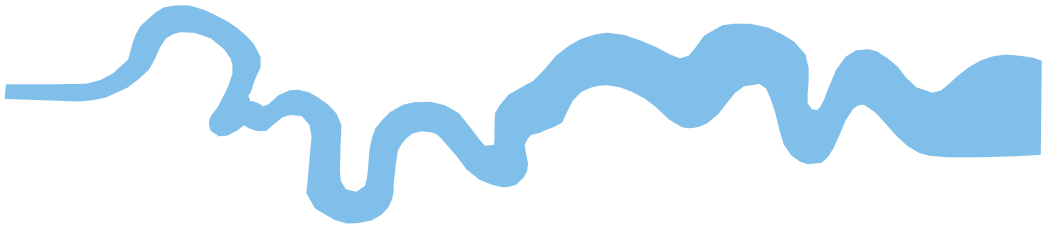
T V A S



SOUTH

Lord of the Manor, Cliffsend, Ramsgate, Kent

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: CER 21/141

(TR 3556 6514)

Lord of the Manor, Cliffsend, Ramsgate, Kent

Geophysical Survey (Magnetic) Report

For Burney Estates Limited

by Kyle Beaverstock

TVAS South

Site Code CER 20/141

June 2021

Summary

Site name: Lord of the Manor, Cliffsend, Ramsgate, Kent

Grid reference: TR 3556 6514

Site activity: Magnetometer survey

Date and duration of project: 20th May 2021

Project coordinator: Tim Dawson

Site supervisor: Kyle Beavesrtock

Site code: CER 20/141

Area of site: c. 0.8ha

Summary of results: The geophysical survey revealed a number of magnetic anomalies including a potential boundary ditch, a potential linear feature and a number of discrete features which may be grave cuts. These possible graves appear to be concentrated towards the eastern end of the survey area.

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✓ 21.06.21
	Tim Dawson✓ 21.06.21

Lord of the Manor, Cliffsend, Ramsgate, Kent
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 20/141b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Canterbury Road East, Cliffsend, Ramsgate, Kent (TR 3556 6514) (Fig. 1). The work was commissioned by Andrew Cooke of Dovetail Architects Ltd. Suite 4, Clocktower House, Horndon Industrial Park, West Horndon, Essex, CM13 3XL on behalf of Burney Estates Ltd.

An application is to be submitted to Thanet District Council for the construction of a new coffee shop and petrol filling station, associated access and parking on the site. The proposal site lies within a Scheduled Monument and as such an archaeological desk-based assessment and geophysical survey have been requested in order to inform the planning application. This is in accordance with the *National Planning Policy Framework* (NPPF 2019), and the District's policies on archaeology. The fieldwork was undertaken by Kyle Beaverstock and Beth Tucker on the 20th May 2021 and the site code is CER 20/141.

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 3km to the west of Ramsgate and 1km north-east of Cliffs End. Bounded between the A299 to the south and the Ramsgate to Canterbury railway to the north this triangular parcel of land slopes gently from 38m above Ordinance Datum (aOD) in the north down to 35m aOD in the south. The underlying geology is stated as Upper Chalk (BGS 1980). At the time of the survey the western half of the site was an area of unused land while the eastern half was a field with crop.

Site history and archaeological background

The site lies within Scheduled Monument 1004228, "Anglo-Saxon cemetery S of Ozengell Grange" (Fig 1). The Scheduling text describes the monument as an Anglo-Saxon inhumation cemetery which has been subject to partial excavation since its discovery in the mid-19th century during the construction of the railway line immediately to the north. These investigations have recoded over 100 burials lying on an east-west orientation,

many with grave goods and some covered with sandstone slabs. Post holes associated with seven of the graves suggested that they included some form of timber structure. The grave goods recovered from the burials that had avoided plundering in antiquity were found to largely be of 7th century date and included jewellery, glassware, pottery and weapons. To the east of the proposal site is a levelled barrow with potential for some prehistoric remains to be present.

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 zig-zag pattern along a north - south and an east - west orientation across the survey area. The western part of the survey area was unable to be surveyed due to a number of obstructions, whilst the eastern part of the survey area was reasonably clear it was under crop which had some adverse effects on the mobility of the magnetometer. 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 3.00 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 geophysical survey revealed a number of magnetic anomalies (Figs. 2 and 3), a large portion of the site is covered by magnetic disturbances (Figs. 4 and 5). Along the survey area in the west running north to south is an area of magnetic debris **[Fig. 6: 1]**, this is represented by an area of positive and negative responses of a high amplitude covering a large area, this was most likely caused by the former track which links the road to the south to the railway bridge to the north. Along the northern, western and southern boundary of the survey area is an area of strong magnetic disturbance **[2]**. This is represented by strong positive and negative responses of a high amplitude, and was most likely caused by ferrous materials such as fencing.

In the western part of the survey area is a positive linear anomaly **[3]** which is orientated south-east to the north-west and runs for c.53m, to the north of this is another positive linear anomaly **[4]** orientated south-west to north-east and running for c.46m, together these may form an enclosure boundary ditch. In the north-east of the survey area are a series of discrete oblong positive anomalies **[5]** that may represent the cut features for graves, although due to the significant interference this is not certain. The anomalies were recorded on both the N - S and the E - W traverses adding strength to the interpretation that they may represent graves.

In the southern part of the survey area is another small discrete positive anomaly, possibly a grave, as well a large circular positive anomaly **[6]**, which most likely represents a large cut feature such as a pit. To the north running for c.57m and orientated south-west to the north-east is a weak positive linear anomaly **[7]**. This has a very weak amplitude which may indicate a shallow cut or redeposited natural geology.

Conclusion

The survey area covers part of a scheduled monument described as a Saxon cemetery, detection of graves using geophysical techniques is difficult and often depends on the background 'noise' caused by the geology and any interference from later activity. It can also be dependent on the grave fill as a single backfilling event using materials similar to the natural geology can create a signal that is indistinguishable from the surrounding geology. However, a few potential discrete positive anomalies that may represent graves were detected in the eastern part of the survey area. Also, a potential boundary ditch was also detected although this is unlikely to be related as it does not appear to respect the discrete features. A weak positive linear anomaly was also detected, which appears to match that seen from aerial photography and may be related to levelled Bronze Age barrows to the east.

References

BGS, 1980, *British Geological Survey*, 1:50,000, Sheet 274, Solid alongside Drift Edition, Keyworth

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, 2019, *National Planning Policy Framework (revised)*, Ministry for Housing, Communities and Local Government, London

Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.37.3

Raw data
E-W Traverses

Filename: Ramsgate E - W.xcp
Description: Imported as Composite from: Ramsgate E - W.xyz
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 635557.586264891, 165214.296768379 m
Southeast corner: 635630.256264891, 165113.416768379 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 72.7 m x 101 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 19623, Recorded: 19623

Stats
Max: 96.70
Min: -99.90
Std Dev: 22.63
Mean: -4.98
Median: -0.20

N-S Traverses

Filename: Ramsgate N - S.xcp
Description: Imported as Composite from: Ramsgate N - S.xyz
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 635554.070673157, 165211.448222376 m
Southeast corner: 635631.810673157, 165113.298222376 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 77.7 m x 98.1 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 20951, Recorded: 20951

Stats
Max: 96.70
Min: -99.90
Std Dev: 24.97
Mean: -5.34
Median: -0.15

Processed data
E-W Traverses

Stats
Max: 5.00
Min: -5.00
Std Dev: 2.66
Mean: -0.48
Median: 0.01
Composite Area: 0.73309 ha
Surveyed Area: 0.57237 ha

Processes: 1
1 Base Layer

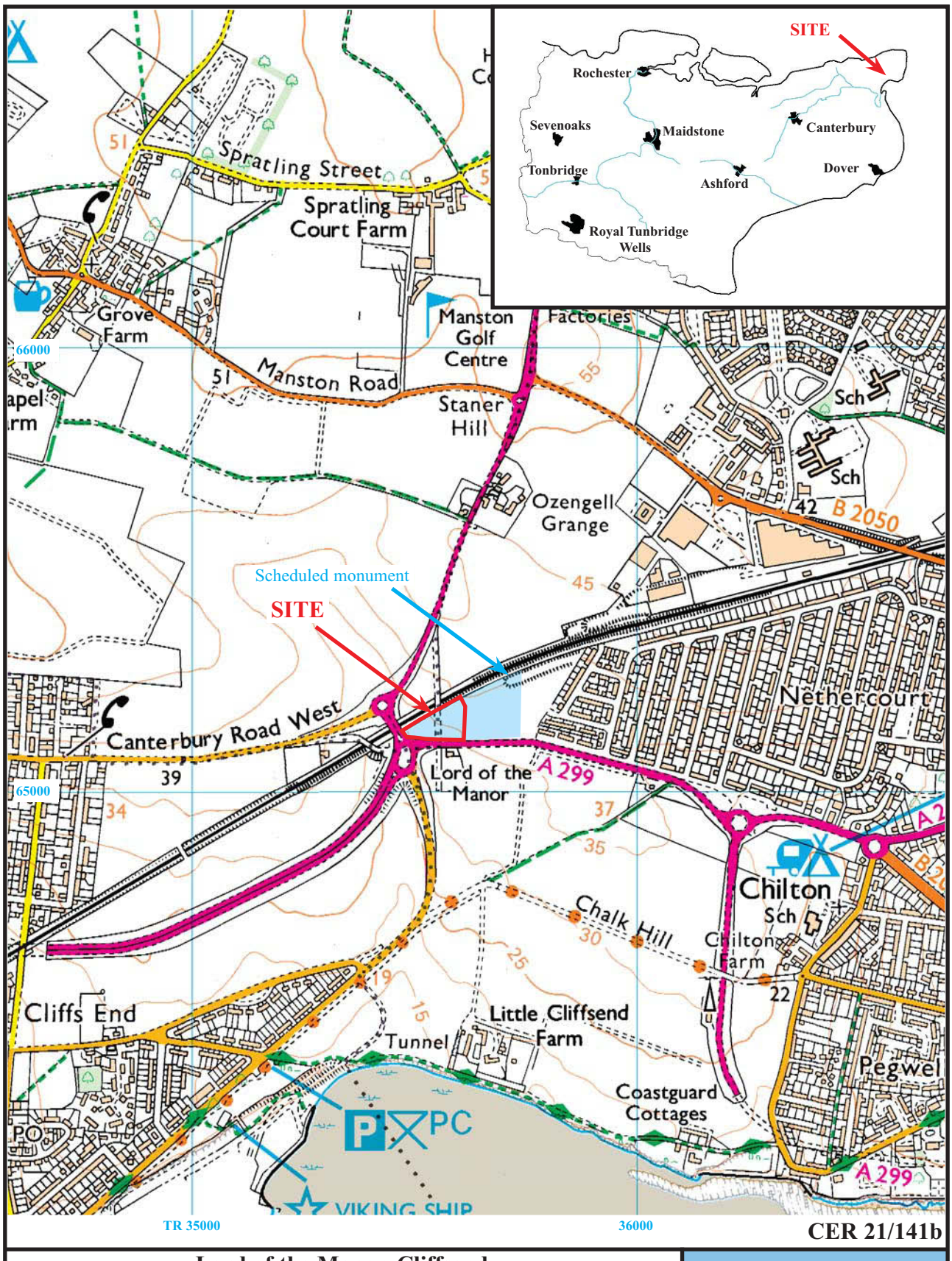
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00

N-S Traverses

Stats
Max: 5.00
Min: -5.00
Std Dev: 2.97
Mean: -0.30
Median: 0.00
Composite Area: 0.76302 ha
Surveyed Area: 0.59312 ha

Processes: 1
1 Base Layer

GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00



CER 21/141b

Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)

Figure 1. Location of site within Ramsgate and Kent.

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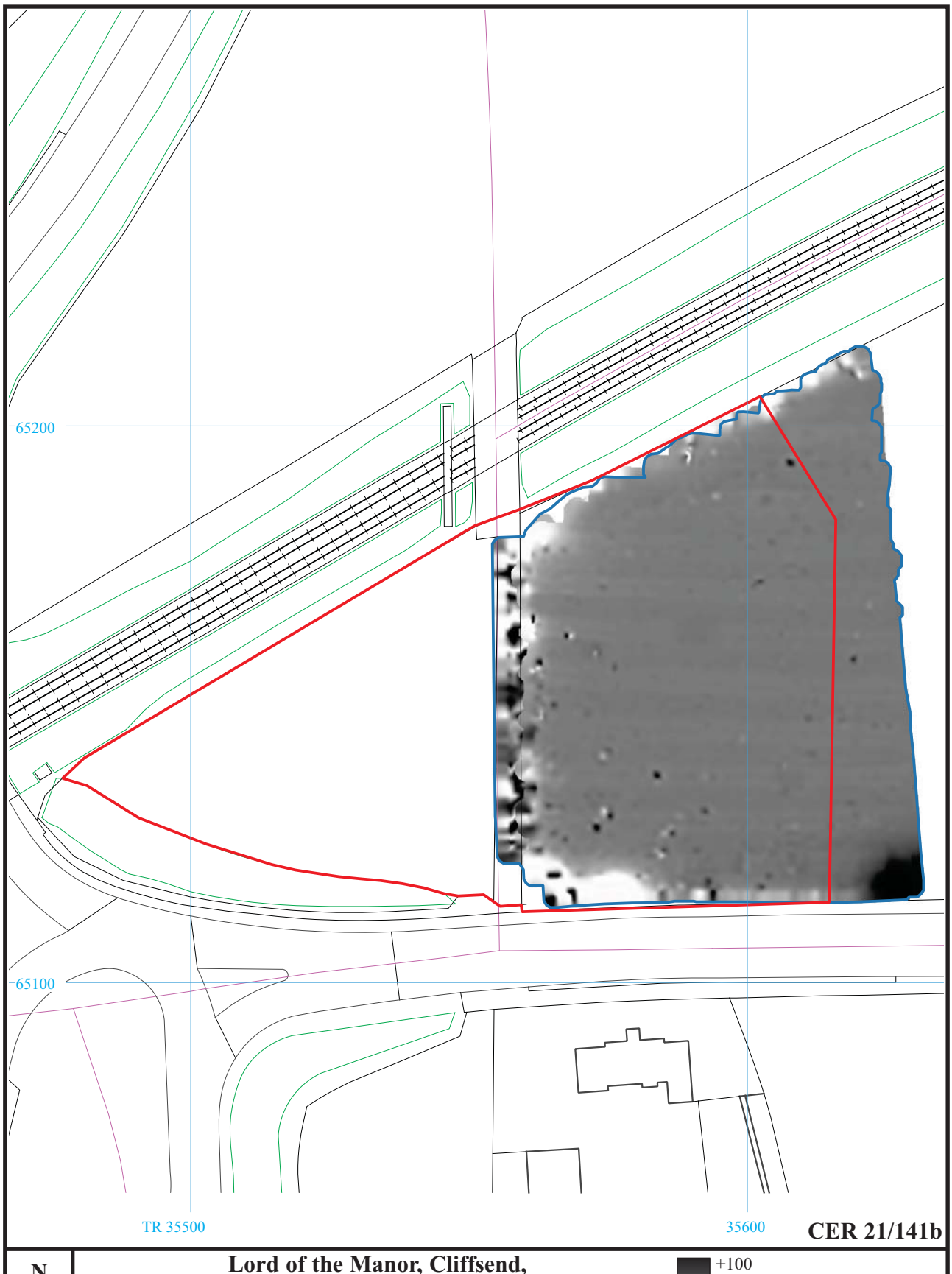


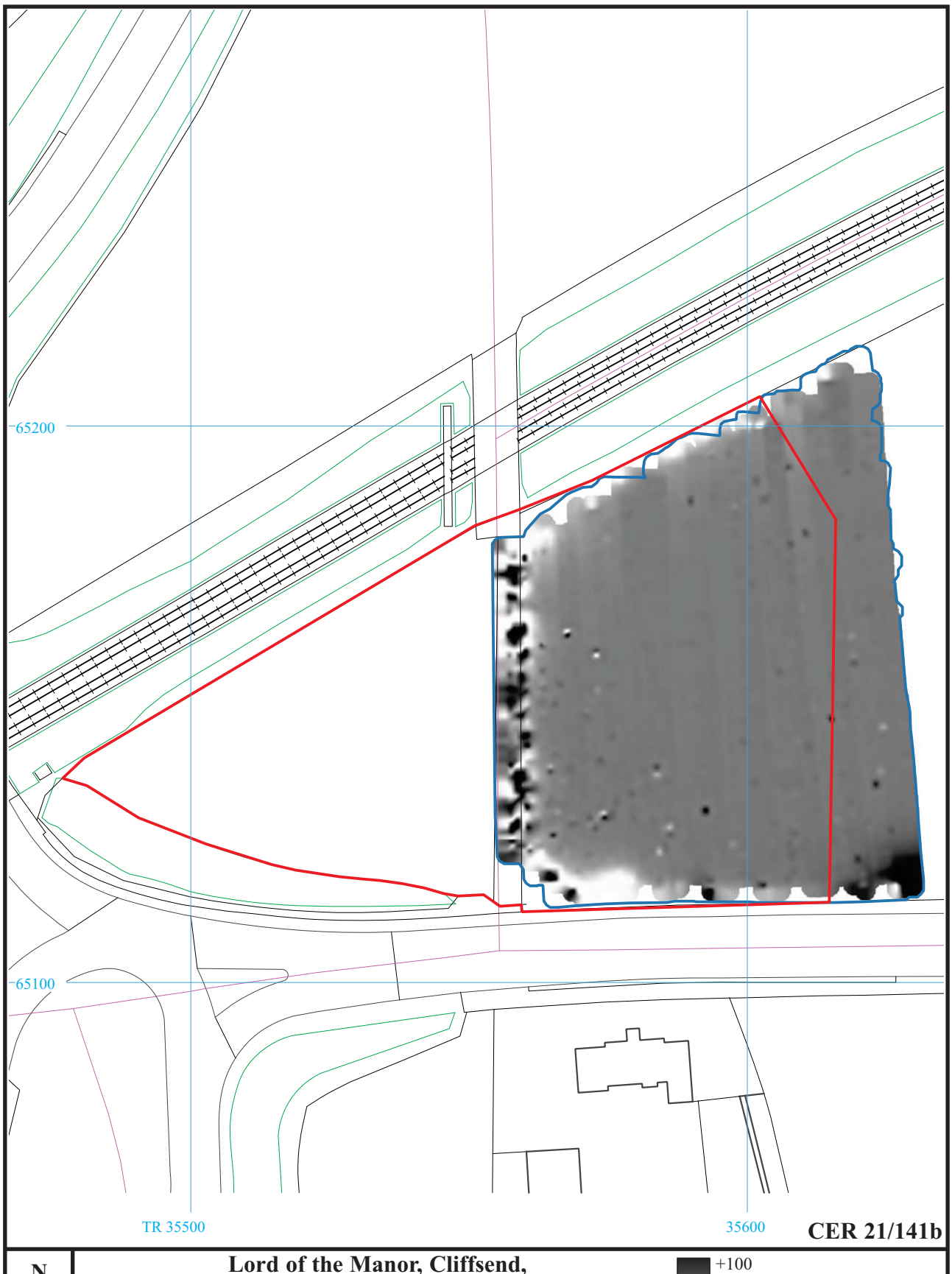
N

Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.
E - W traverses

0m 50m

+100
nT
-100

TVAS SOUTH



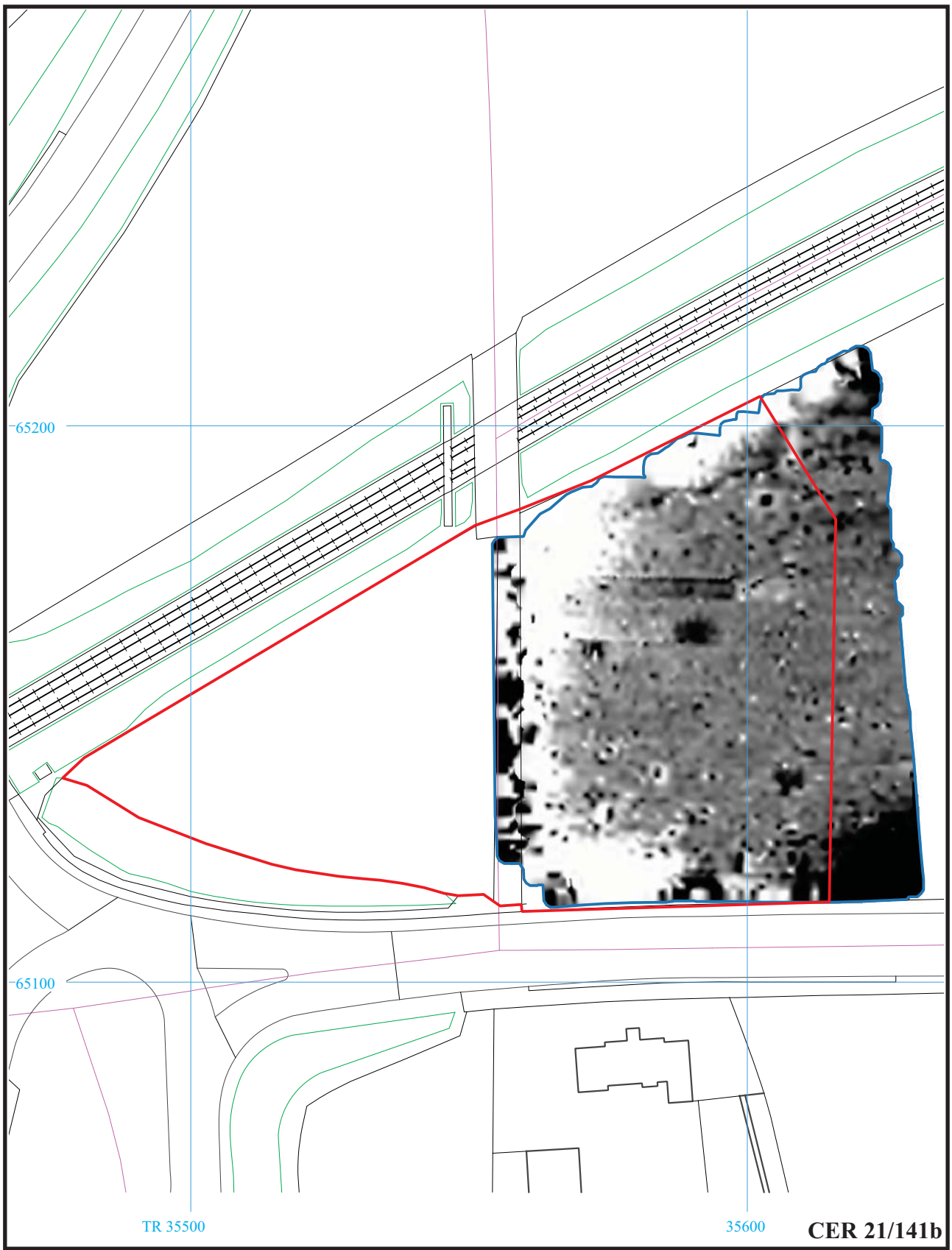
N

Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)
Figure 3. Plot of raw gradiometer data.
N - S traverses

0m 50m

+100
nT
-100

TVAS SOUTH



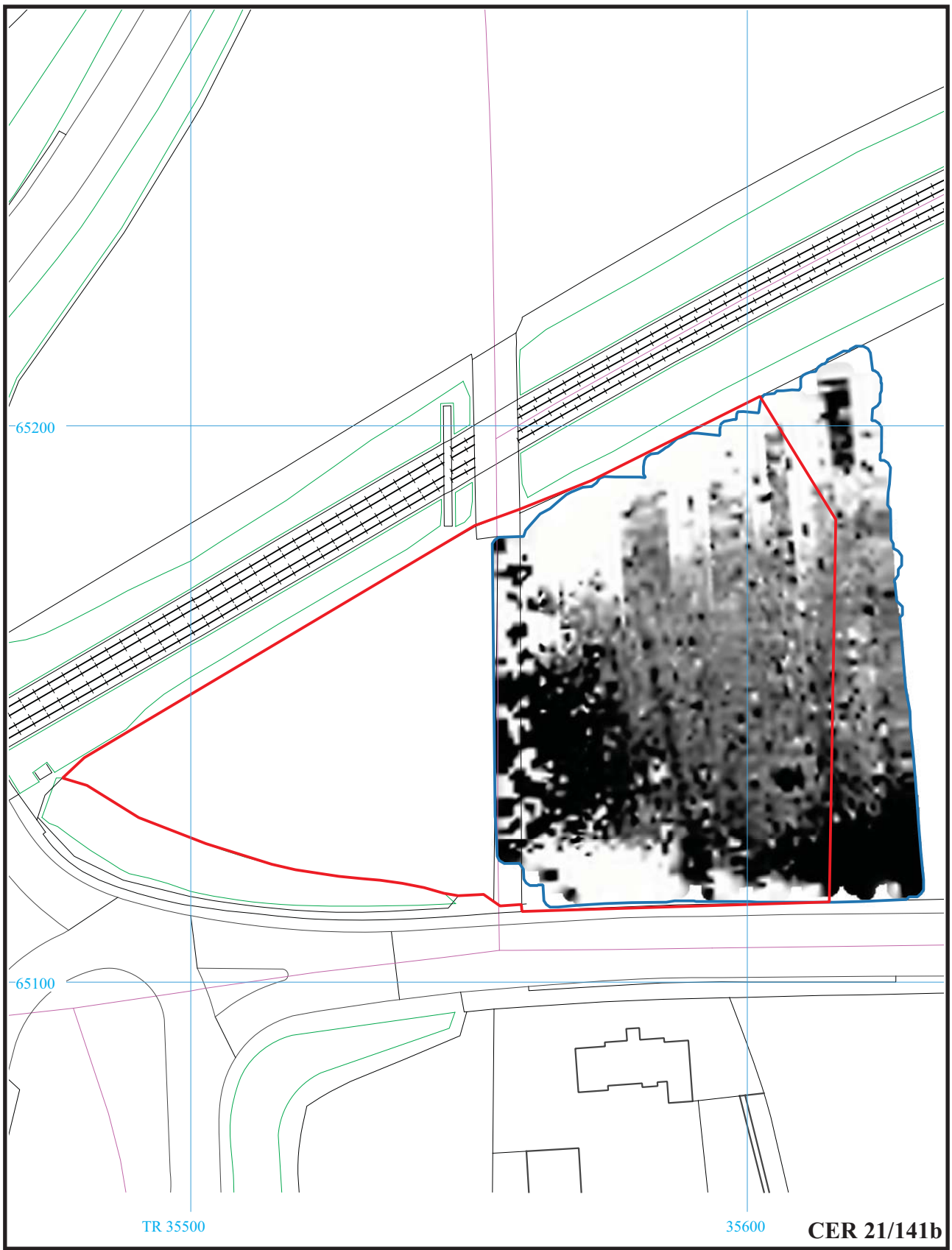
N

Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)
Figure 4. Plot of processed gradiometer data.
E - W traverses

0m 50m

+3
nT
-3

TVAS SOUTH



N

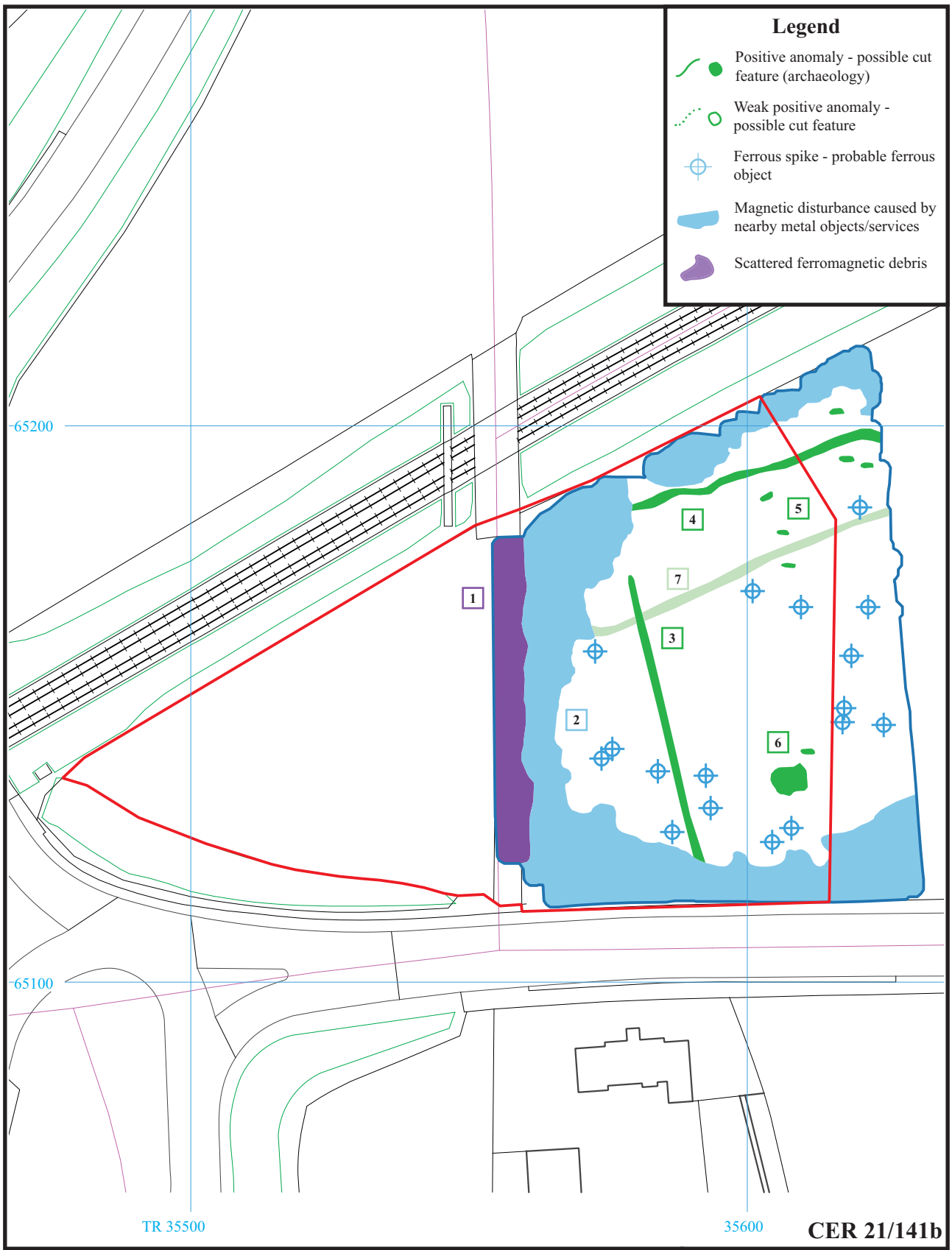
Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)

Figure 5. Plot of processed gradiometer data.
N - S traverses

0m 50m

+3
nT
-3

TVAS SOUTH



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Lord of the Manor, Cliffsend, Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)
Figure 6. Interpretation plot.

0m 50m

TVAS SOUTH

Plate 1. Western boundry of surveyed area looking north along former roadway.

Plate 2. Surveyed area looking east

Plate 3. Western unsurveyed area looking west.

Plate 4. Western unsurveyed area looking north-west.

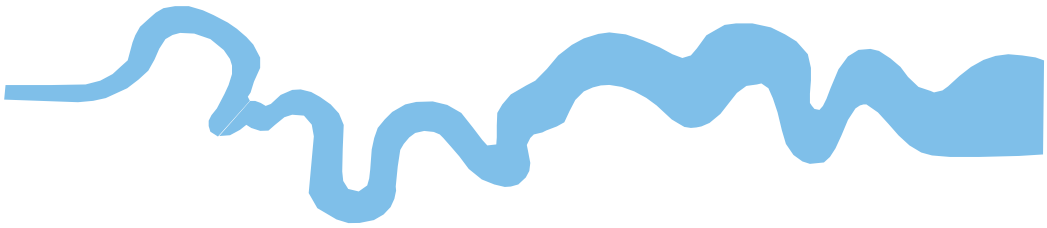
CER 21/141b

Lord of the Manor, Cliffsend,
Ramsgate, Kent, 2021
Geophysical Survey (Magnetic)
Plates 1 to 4.

TVAS SOUTH

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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