



**magnitude
surveys**

**Geophysical Survey Report
Danhill, West Chiltington: Rewilding**

**For
Orion Heritage Limited**

**On Behalf Of
Nyetimber Vineyard**

Magnitude Surveys Ref: MSTQ2259

HER Event Number: TBC

OASIS Number: TBC

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Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 7.1ha area of land at Danhill, West Chiltington, West Sussex. Anomalies related to drainage features have been detected throughout the survey area, as well as anomalies of an undetermined origin. Modern interference in the form of magnetic disturbance was limited to field boundaries and around buried services.

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1. Introduction

- 1.1. Magnitude Surveys Ltd (MS) was commissioned by Orion Heritage Ltd on behalf of Nyetimber Vineyard to undertake a geophysical survey over a c. 7.1ha area of land near Danhill Farm, West Chiltington, West Sussex (TQ 10626 19104).
- 1.2. The geophysical survey comprised a hand-carried GNSS-positioned fluxgate gradiometer survey. Magnetic survey is the standard primary geophysical method for archaeological applications in the UK due to its ability to detect a range of different features. The technique is particularly suited for detecting fired or magnetically enhanced features, such as ditches, pits, kilns, sunken featured buildings (SFBs) and industrial activity (David *et al.*, 2008).
- 1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David *et al.*, 2008), the Chartered Institute for Archaeologists (CIfA, 2020) and the European Archaeological Council (Schmidt *et al.*, 2015).
- 1.4. It was conducted in line with a Written Scheme of Investigation (WSI) produced by MS (Marr, 2025).
- 1.5. The survey commenced on the 6th of October 2025 and took two days to complete.

2. Quality Assurance

- 2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society for Archaeological Prospection).
- 2.2. The directors of MS are involved in cutting edge research and the development of guidance/policy. Specifically, Dr Chrys Harris has a PhD in archaeological geophysics from the University of Bradford, is a Member of CIfA and was the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter has an MSc in archaeological geophysics and is a Fellow of the London Geological Society, as well as a member of GeoSIG (CIfA Geophysics Special Interest Group); Dr Paul Johnson has a PhD in archaeology from the University of Southampton, is a Fellow of the Society of Antiquaries of London and a Member of CIfA, has been a member of the ISAP Management Committee since 2015, and is currently the Chair of the Archaeological Prospection Community of the European Archaeological Association.
- 2.3. All MS managers, field and office staff have degree qualifications relevant to archaeology or geophysics and/or field experience.

3. Objectives

- 3.1. The objective of this geophysical survey was to assess the subsurface archaeological potential of the survey area.

4. Geographic Background

4.1. The survey area was located c. 1.3km northeast of West Chiltington (Figure 1). A gradiometer survey was undertaken across two fields under pasture. The survey area is surrounded by other pasture fields with West Chiltington Road to the south (Figure 2).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	Flat pasture	The field was bordered to the north by a wire fence and to the south by a hedgerow with a ditch in the southwest corner. There was no physical boundary to the east.
2	Flat pasture	The field was bordered to the north and east by a hedgerow, with a ditch also present in the east. The south and west had no physical boundary.

4.3. The underlying geology comprises mudstone of the Weald Clay Formation. No superficial deposits have been recorded in the survey area (British Geological Survey, 2025).

4.4. The soils consist of slowly permeable, seasonally wet, slightly acidic, but base rich loamy and clayey soils (Soilscapes, 2025).

5. Archaeological Background

5.1. The following information is from the Historic Environmental Record (Heritage Gateway, 2025).

5.2. Multiple historical farmsteads are recorded near the area. Great Danhill Farm is c. 200m north of the survey area, which is recorded as being post medieval (MWS10948).

5.3. No known sites or finds have been identified in the available data within the survey area.

6. Methodology

6.1. Data Collection

6.1.1. Magnetometer surveys are generally the most cost effective and suitable geophysical technique for the detection of archaeology in England. Therefore, a magnetometer survey should be the preferred geophysical technique unless its use is precluded by any specific survey objectives or the site environment. For this site, no factors precluded the recommendation of a standard magnetometer survey. Geophysical survey therefore comprised the magnetic method as described in the following section.

Geophysical prospection comprised the magnetic method as described in the following table.

6.1.2. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

6.1.3. The magnetic data was collected using MS' bespoke hand-carried GNSS-positioned system.

6.1.3.1. MS' hand-carried system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multi-channel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.

6.1.3.2. Magnetic and GPS data was stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.

6.1.3.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data was collected by traversing the survey area along the longest possible lines, ensuring efficient collection and processing.

6.2.Data Processing

6.2.1. Magnetic data was processed in bespoke in-house software produced by MS. Processing steps conform to the EAC and Historic England guidelines for 'minimally enhanced data' (see Section 3.8 in Schmidt *et al.*, 2015: 33 and Section IV.2 in David *et al.*, 2008: 11).

Sensor Calibration – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen *et al.* (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3.Data Visualisation and Interpretation

- 6.3.1. This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the lower sensors (Figure 3). The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images of the gradient and total field at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figure 6). XY trace plots visualise the magnitude and form of the geophysical response, aiding anomaly interpretation.
- 6.3.2. Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historical maps, LiDAR data, and soil and geology maps. Google Earth (2025) was also consulted to compare the results with recent land use.
- 6.3.3. Geodetic position of results – All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF), respectively. Figures are provided with raster and vector data projected against OS Open Data.

7. Results

7.1.Qualification

- 7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible, an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports, as well as reports from further work, in order to constantly improve our knowledge and service.

7.2.Discussion

- 7.2.1. The geophysical results are presented in combination with satellite imagery and historical maps (Figure 7).
- 7.2.2. The fluxgate gradiometer survey has responded well to the environment of the survey area. The survey has identified anomalies of agricultural activity in the form of drainage systems. Linear and curvilinear anomalies were detected and interpreted as undetermined in origin due to a lack of morphology or contextual evidence. Magnetic disturbance was limited to nearby field boundaries and buried services.

7.3. Interpretation

7.3.1. General Statements

- 7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.
- 7.3.1.2. **Data Artefact** – Data artefacts usually occur in conjunction with anomalies with strong magnetic signals due to the way in which the sensors respond to very strong point sources. They are usually visible as minor ‘streaking’ following the line of data collection. While these artefacts can be reduced in post-processing through data filtering, this would risk removing ‘real’ anomalies. These artefacts are therefore indicated as necessary in order to preserve the data as ‘minimally processed’.
- 7.3.1.3. **Ferrous (Spike)** – Discrete dipolar anomalies are likely to be the result of isolated pieces of modern ferrous debris on or near the ground surface.
- 7.3.1.4. **Magnetic Disturbance** – The strong anomalies produced by extant metallic structures, typically including fencing, pylons, vehicles and service pipes, have been classified as ‘Magnetic Disturbance’. These magnetic ‘haloes’ will obscure weaker anomalies relating to nearby features, should they be present, often over a greater footprint than the structure causing them.
- 7.3.1.5. **Undetermined** – Anomalies are classified as Undetermined when the origin of the geophysical anomaly is ambiguous and there is no supporting contextual evidence to justify a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally distinct from those caused by ferrous sources.

7.3.2. Magnetic Results - Specific Anomalies

- 7.3.2.1. **Drainage Feature (Trends)** – Within both survey areas, weak positive linear anomalies were detected. These anomalies, which have a separation of c. 6-12m, are characteristic of field drainage systems (Figure 5).

8. Conclusions

- 8.1. A fluxgate gradiometer survey was successfully completed across c. 7.1ha of land at Danhill, West Chiltington, West Sussex. Magnetic disturbance was limited to field boundaries and around buried services.
- 8.2. Anomalies associated with field drainage systems have been identified within the survey.
- 8.3. Linear and curvilinear anomalies were detected across the site and have been classified as undetermined due to a lack of definitive characteristics.

9. Archiving

- 9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report.
- 9.2. MS contributes reports to the ADS Grey Literature Library upon permission from the client, subject to any dictated time embargoes.

10. Copyright

- 10.1. Copyright and intellectual property pertaining to all reports, figures and datasets produced by Magnitude Services Ltd is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

11. References

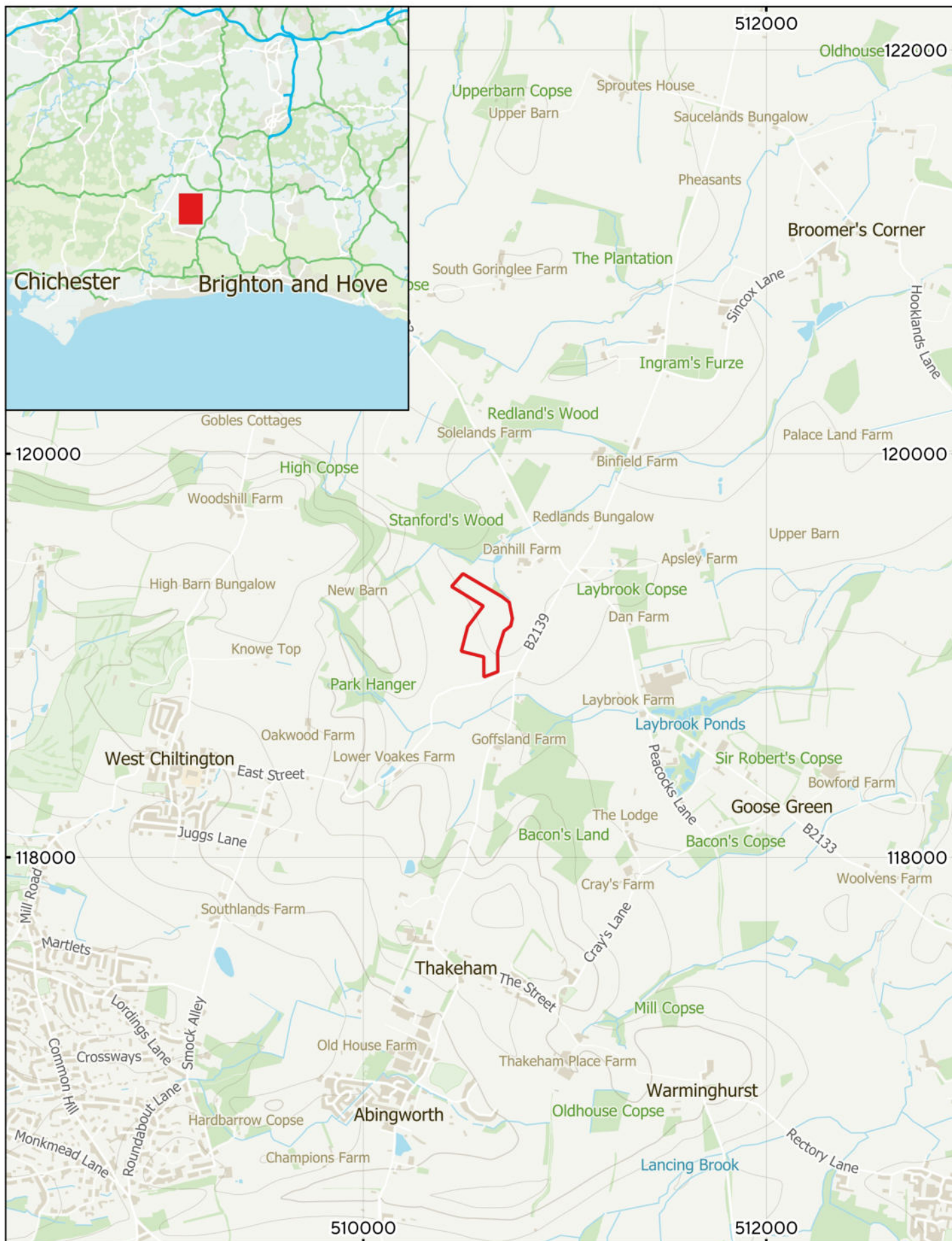
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12. Project Metadata

MS Job Code	MSTQ2259
Project Name	Rewilding Land at Danhill, West Chiltington, West Sussex
Client	Orion Heritage Ltd
Grid Reference	TQ 10626 19104
Survey Techniques	Magnetometry
Survey Size (ha)	5.5ha (Magnetometry)
Survey Dates	06/11/2025 – 7/11/2025
Project Lead	Sean Parker BSc (Hons) ACIfA
Project Officer	Sean Parker BSc (Hons) ACIfA
HER Event No	TBC
OASIS No	TBC
S42 Licence No	N/A
Report Version	0.2

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	SP	HR	10 November 2025
0.2	Sign off	SP	LAG	11 November 2025



MSTQ2259 - Danhill, West Chiltington: Rewilding

Figure 1 - Geophysical Survey Location

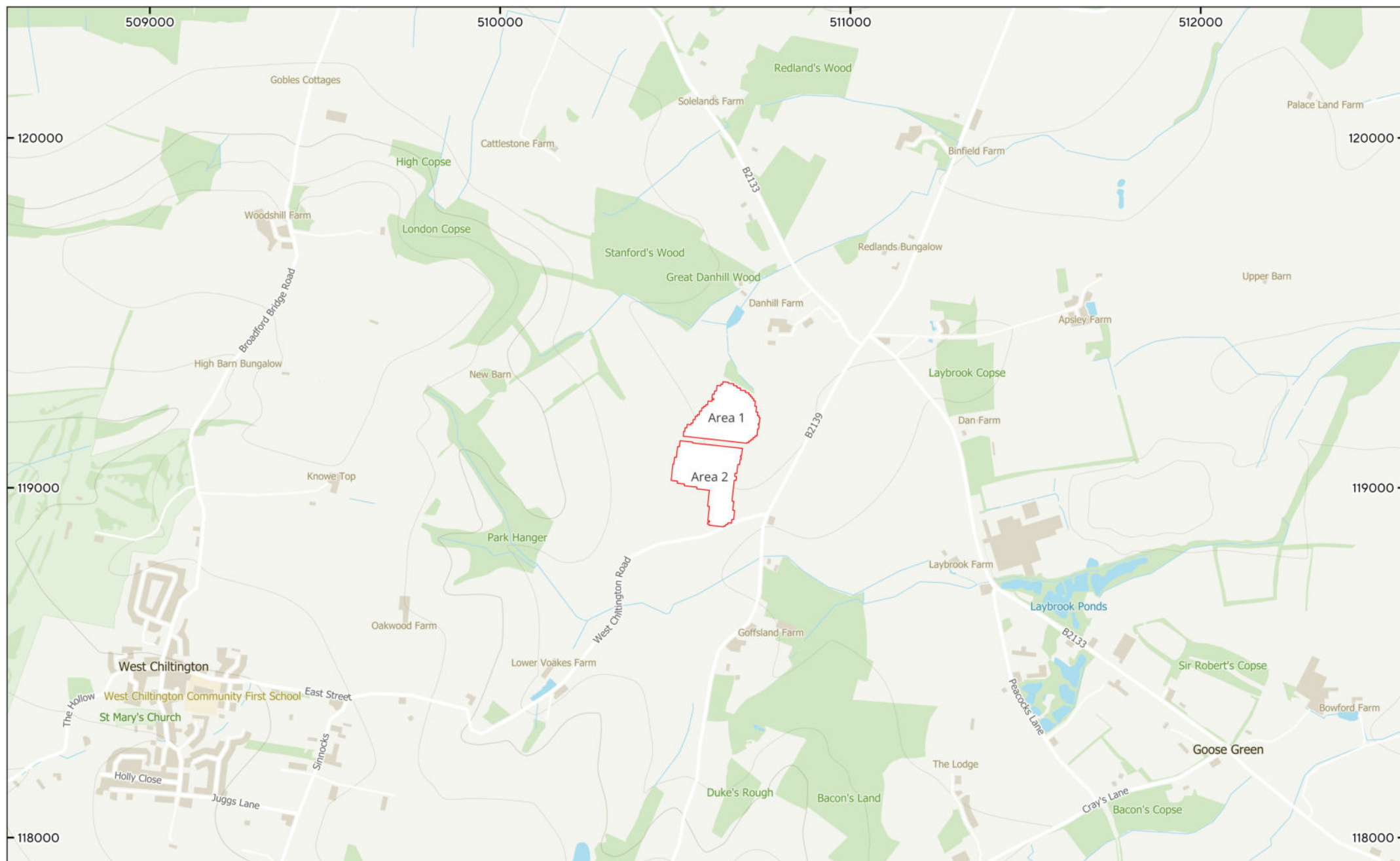
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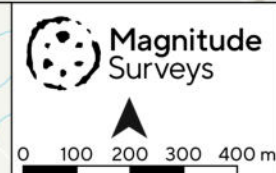
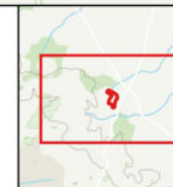
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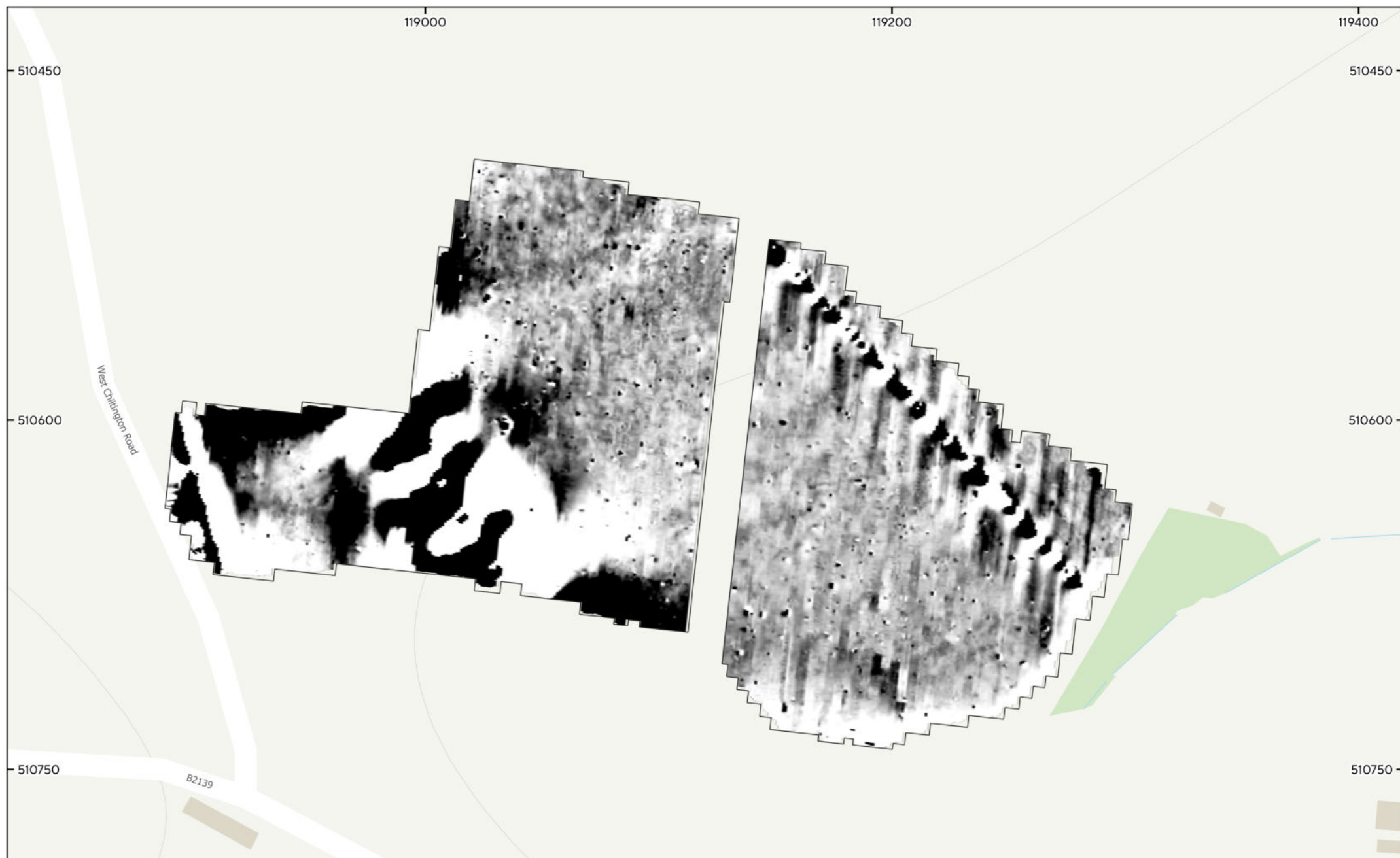




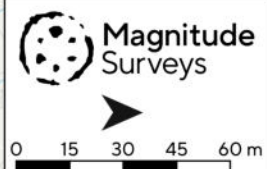
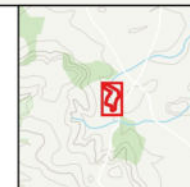
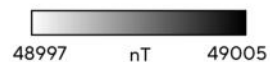
MSTQ2259 - Danhill, West Chilton: Rewilding
 Figure 2 - Geophysical Survey Areas
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Survey Extent



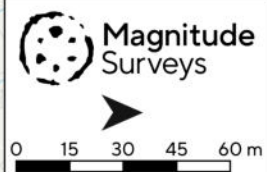
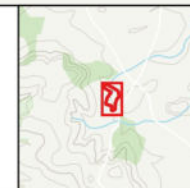
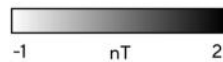


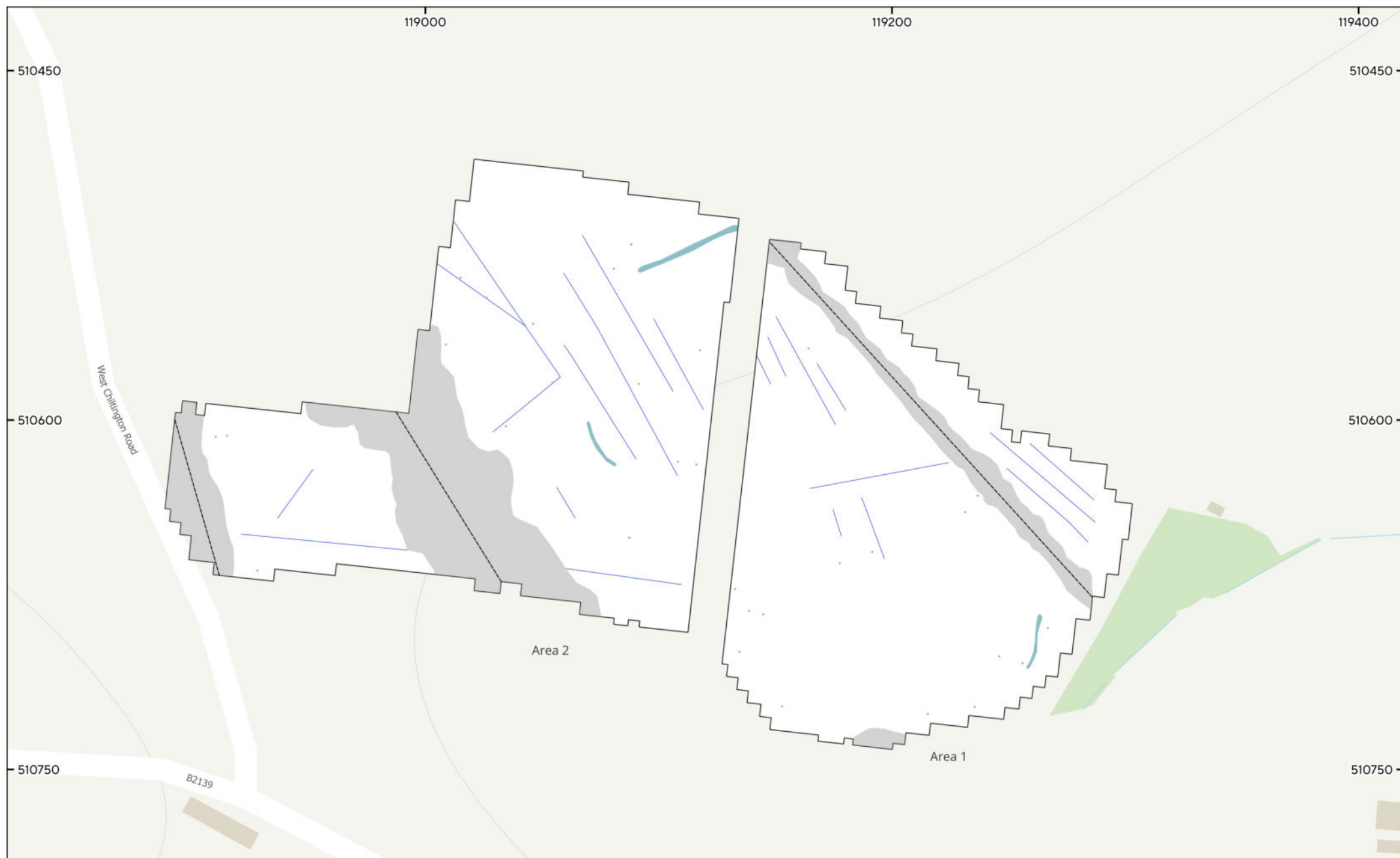
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Figure 3 - Magnetic Total Field (Lower Sensor)
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Figure 4 - Magnetic Gradient
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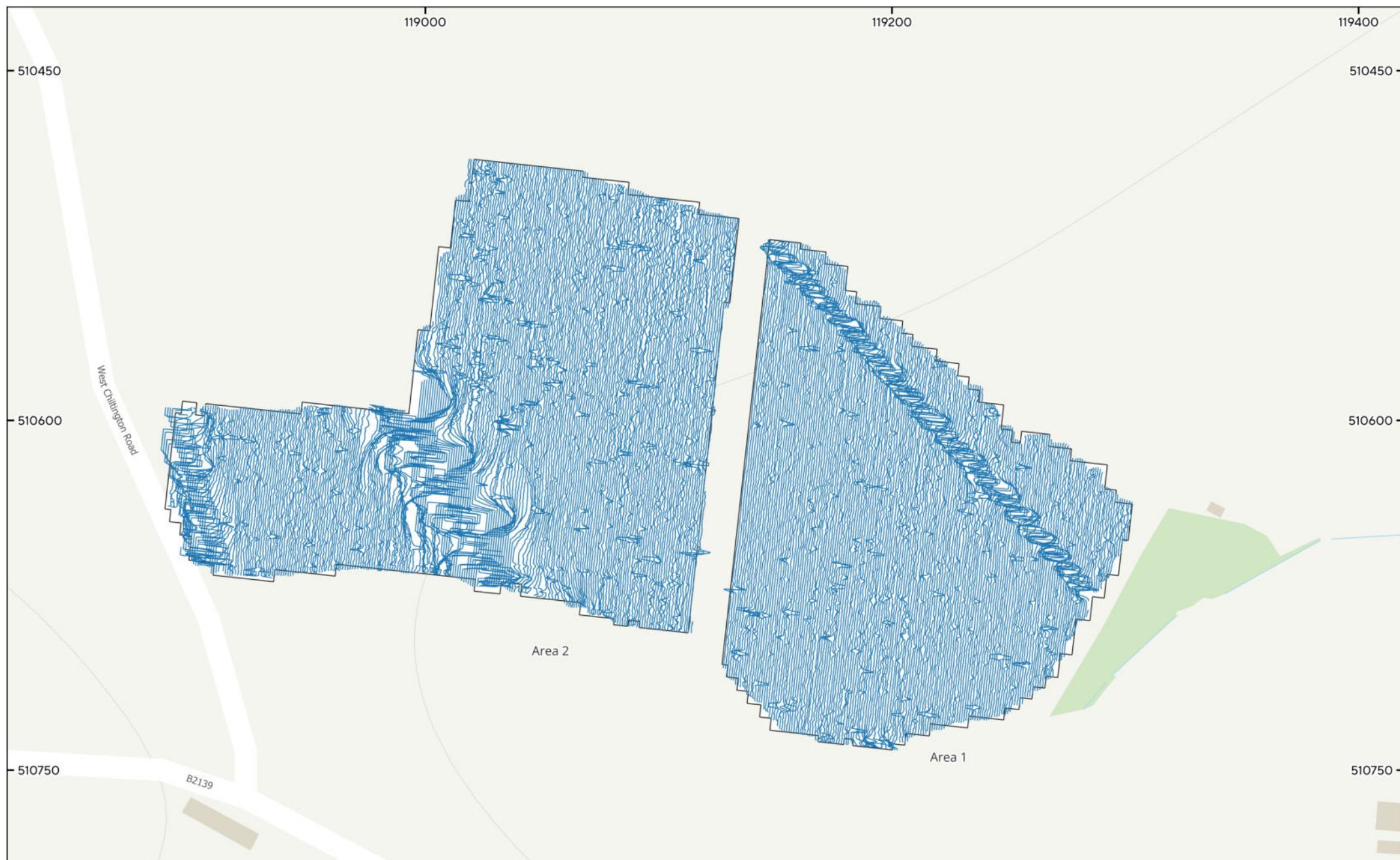
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 Figure 5 - Magnetic Interpretation
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- Magnetic Disturbance --- Service · Ferrous (Spike)
- Undetermined (Weak) — Drainage Feature

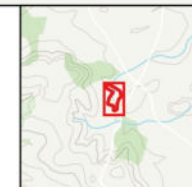


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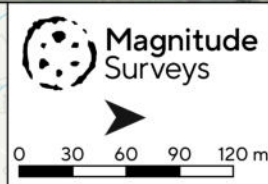
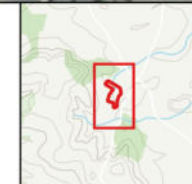
MSTQ2259 - Danhill, West Chillingdon: Rewilding
Figure 6 - XY Trace Plot
XY 30nT/cm at 1:1,500 @ A3
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MSTQ2259 - Danhill, West Chilton: Rewilding
 Figure 7 - Magnetic Interpretation Over Historical Mapping and
 Satellite Imagery
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 Contains historical mapping © CLS Data 2025: Ordnance Survey, 6"
 2nd edition c. 1882-1913
 Contains satellite imagery © Bing Satellite 2025

Magnetic Disturbance Service Ferrous (Spike)
 Undetermined (Weak) Drainage Feature





MSTQ2259 - Danhill, West Chilton: Rewilding
Figure 8 - GNSS Plot
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— GNSS Lines

