magnitude surveys

Geophysical Survey Report

Cefn Park,

Wrexham

For

Tetra Tech Ltd.

Magnitude Surveys Ref: MSSJ1686

HER Event Number: TBC

January 2024 2024

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Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c.29.4ha of land at Cefn Park, Wrexham, Wales. A fluxgate gradiometer survey was carried out across the entire survey area. Anomalies of an archaeological, agricultural, modern, and undetermined origin have been identified. Archaeological activity has been identified in the form of a possible penannular anomaly in the centre of the survey area, with possible associated anomalies, and a partial rectilinear enclosure. Historical agricultural use of the land has been identified in the form of ridge and furrow, whilst modern agricultural activity in the form of drainage systems, ploughing trends and mapped and unmapped field boundaries also identified. Magnetic interference is generally limited to field edges, services and telegraph poles which may obscure weaker anomalies should they be present. Numerous anomalies across the survey area have not been able to be assigned a definite origin due to the lack of context or diagnostic morphology. These may be the result of agricultural, natural, or modern processes; however, an archaeological origin cannot be excluded.

Abstract

Comisiynwyd Magnitude Surveys i asesu potensial archaeolegol o dan yr wyneb tua 29.4ha o dir yng Nghefn Parc, Wrecsam, Cymru. Cynhaliwyd arolwg â theclyn mesur fflwcs magnetig (fluxgate gradiometer) ar draws ardal yr arolwg i gyd. Canfuwyd anghysondebau o darddiad archaeolegol, amaethyddol, modern ac amhendant. Canfuwyd gweithgarwch archaeolegol ar ffurf anghysondeb bylchgrwn posibl yng nghanol ardal yr arolwg, gydag anghysondebau cysylltiedig posibl, ac uned gaeedig unionlin rhannol. Nodwyd defnydd amaethyddol hanesyddol o'r tir ar ffurf cefnen a rhych, tra nodwyd gweithgarwch amaethyddol modern ar ffurf systemau draenio, patrymau aredig a ffiniau caeau wedi'u mapio a heb eu mapio hefyd. Yn gyffredinol, mae ymyriant magnetig wedi'i gyfyngu i ymylon caeau, gwasanaethau a pholion telegraff a allai guddio anghysondebau gwannach os ydynt yn bresennol. Nid oedd modd dynodi nifer o anghysondebau ar draws ardal yr arolwg i darddiad pendant oherwydd diffyg cyd-destun neu forffoleg ddiagnostig. Efallai fod y rhain o ganlyniad i brosesau amaethyddol, naturiol neu fodern; fodd bynnag ni ellir eithrio tarddiad archaeolegol.

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1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by Tetra Tech Ltd. to undertake a geophysical survey over a c. 29.4ha area of land at Cefn Park, Wrexham, Wales (SJ 35743 50731).

1.2. The geophysical survey comprised quad-towed 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 WSI produced by MS (Wilkinson, 2023).

1.5. The survey commenced on 18/01/2023 and took 9 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 is 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 nominated representative for the EAA Archaeological Prospection Community to the board 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. 50 m east of Rhosnesni, Wrexham (Figure 1). Gradiometer survey was undertaken across four arable fields and two pasture fields. The survey area was defined by Cefn road to the west, Bryn Estyn Road and Wrexham Rugby Club to the north, Liwyn Knottia Farm to the south and further fields to the east (Figure 2).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	The survey area consisted of an arable field sloping down to the east.	The survey area was surrounded by hedges with trees in all directions.
2	The survey area consisted of an arable field sloping down to the southeast corner.	The survey area was surrounded by hedges with trees on all sides.
3	The survey area consisted of an arable field sloping down to the north, east and south.	The survey area was surrounded by hedges with trees in all directions, with a fence along the northern boundary.
4	The survey area consisted of a flat pasture field.	The survey area was bordered by hedges with trees on all sides. Two adjacent goal posts were present toward the northeast and northwest corner of the field.
5	The survey area consisted of a flat pasture field.	The survey area was bordered by hedges and trees in all direction expect in the north where the field extended beyond the survey area. Steps were located on the western side of the area.
6	The survey area consisted of an arable field sloping down to the centre and east from the north and southwest.	The survey area was bordered by hedges and metal fencing on all sides. There was a section of the east boundary with no border. An area of deep tractor ruts was present in the northwest, and an animal burrow was located in the east.

4.3. The underlying geology comprises mudstone, sandstone and conglomerate of Salop formation. The superficial deposit consists mainly of sand and gravel from Devensian and Glaciofluvial sheet deposits. A portion of the western part of the survey area consists of diamicton from till and Devensian (British Geological Survey, 2024).

4.4. The soils consist of freely draining, slightly acid sandy soils (Soilscapes, 2024).

5. Archaeological Background

5.1. The following is a summary of an Archaeological and Heritage Desk Based Assessment produced and provided by Tetra Tech Ltd (Hilton, 2021).

5.2. A hoard of six bronze palstaves and one chisel have been located c. 1km to the northwest of the survey area. An early Bronze Age socketed axe identified to the south border of the study area has also been found.

5.3. A copper alloy coin of Marcus Aurelius and a bronze coin of Hadrian were identified within the centre of the survey area. A broken dolphin brooch and a fragment of a Roman fibula brooch was also found located c. 1km to the south of the site. Several spindle whorls were found within the survey area which are thought to date between Roman and post-medieval periods. The Chester Caer Gai Roman Road is located 14km to the west of the survey area, with a Roman road near Holt located 8.2km to the east of the survey area.

5.4. Cefn Park is visible in medieval mapping showing enclosure pale to the east of Wrexham. A copper alloy beehive thimble has been found c. 1km away to the southeast of the survey area. A trapezoidal copper alloy buckle was also identified to the east of the site.

5.5. Post-medieval activity and industrial activity in the form of marl pits and buildings have been found 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.

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

6.1.3. 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

6.1.4. The magnetic data were collected using MS' bespoke quad-towed cart GNSS-positioned system.

6.1.4.1. MS' cart 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.

6.1.4.2. Magnetic and GPS data were 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.

6.1.4.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were 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 were 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. 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 (Figures 7, 10, 13). 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 (2024) 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 4).

7.2.2.A fluxgate gradiometer survey was successfully completed across the survey area. Anomalies of an archaeological, agricultural, natural, and undetermined origin have been identified. Modern disturbance is generally limited to the boundaries of the survey area, electrical pylons, football goal posts and surrounding buried services.

7.2.3.Anomalies of possible archaeological origin have been detected in the southeast of Area 4 and the centre and south of Area 3 (Figures 6 & 9). A penannular anomaly is located in the corner of Area 3, with possible internal features. Surrounding this are a series of weak linear anomalies, which appear to form a partial rectilinear enclosure, orientated east to west. Ridge and furrow cultivation was identified over the possible archaeology, and may have impacted the archaeological remains, making it difficult to be certain of the exact shapes and extents of the anomalies. Due to the lack of any further identified archaeology, and the weak signal, these anomalies have been classified as possible archaeology.

7.2.4.Several anomalies of agricultural origin have been detected within Area 4 and the south of Area 5 (Figure 6). The linear anomalies within Area 4 display a negative magnetic signal. These anomalies either correspond with a mapped field boundary, or run parallel to one, and therefore is thought to be an unmapped former field boundary (Figure 4). and are possibly indicative of drainage or field system. Numerous discreet linear anomalies have been identified throughout the Areas 4 and 5 (Figure 6). These have been classified as a drainage regime due to their weak magnetic enhancement and close

spacing. Modern ploughing trends were also identified across the survey area (Figure 4), running on varying orientations.

7.2.5. Historical agricultural activity has been identified in the form of ridge and furrow cultivation within Area 3 (Figure 6). This is consistent with the post-medieval historical landscape of the site.

7.2.6. Several amorphous anomalies have been identified throughout Areas 1 & 6 (Figures 9 & 12). These weakly enhanced anomalies correlate changes in the contours and geology as well as matching crop marks seen in satellite imagery (Google Earth Pro, 2024). Thus, a natural categorisation has been ascribed.

7.2.7. Several linear and curvilinear anomalies have been detected throughout the survey area (Figures 6, 9 & 12). These anomalies lack key defining characteristics indicative of a specific feature and have therefore been classified as undetermined, although an archaeological and agricultural origin cannot be ruled out.

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. **Ferrous (Spike)** – Discrete dipolar anomalies are likely to be the result of isolated pieces of modern ferrous debris on or near the ground surface.

7.3.1.3. **Ferrous/Debris (Spread)** – A ferrous/debris spread refers to a concentration of multiple discrete, dipolar anomalies usually resulting from highly magnetic material such as rubble containing ceramic building materials and ferrous rubbish.

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. **Archaeology Possible (Weak)** – In the south west corner of Area 3, several anomalies have been identified of possible archaeological origin [**3a**]. This

includes a penannular anomaly, measuring c. 19m in diameter. Several smaller amorphous anomalies identified within the anomaly could be associated pits (Figure 6). A linear anomaly running southwest to northeast appears to extend out from the south of the penannular anomaly, as well as another linear running northwest to southeast.

7.3.2.2. **Archaeology Possible (Strong and Weak)** – Surrounding anomaly [**3a**], a series of linear anomalies have been identified (Figures 6 & 9). These anomalies appear to form a possible partial rectilinear enclosure, running across two of the survey fields.

7.3.2.3. **Agricultural (Drainage) –** Several linear anomalies have been identified running east to west in Area 4 and in the south of Area 5, running on a northeast to southwest orientation. These anomalies display a weak negative signal (Figure 6) and due to the pattern and alignment they exhibit, these are likely to be drainage regimes.

7.3.2.4. **Agricultural (Weak) –** In the north of Area 4, and the south of Area 5, weak linear anomalies were identified, running northwest to southeast in Area 4, and east to west in Area 5 (Figures 6 & 9). These anomalies either align with a former field boundary, visible on historical OS mapping (Figure 4), or they run parallel to a former boundary, and are thought to be unmapped former field boundaries.

7.3.2.5. **Agricultural (Trend) –** Across Areas 1 and 2, weak parallel linear anomalies have been identified (Figure 9). Due to the close spacing and morphology, they are thought to be modern ploughing.

7.3.2.6. **Natural –** Anomalies classified as natural have been identified throughout Areas 1 and 6, and to the south of Area 2. The disparate nature of the magnetic signal and amorphous spread of the anomalies are indicative of natural variations resultant from geological or pedological processes (Figures 9 & 12).

7.3.2.7. Undetermined – Across the survey area, numerous linear, curvilinear, and penannular anomalies have been detected. These anomalies have not been attributed a definite origin due to their lack of context, amorphous shape, or lack of pattern. Across Areas 4 and 3, several linear and curvilinear anomalies appear to connect with the area of archaeological potential (Figures 6 & 9). Due to that proximity, an archaeological origin cannot be ruled out.

8. Conclusions

8.1. A fluxgate gradiometer was successfully carried across the survey area. Magnetic disturbance was present around field edges, surrounding buried services, pylons, and goal posts and other playground equipment in the east. These may locally obscure weaker anomalies should they be present.

8.2. The geophysical results have identified several possible archaeological anomalies within the northwest of the survey area. These include a penannular anomaly, with possible internal features, along with a possible partial enclosure, and associated linear anomalies.

8.3. Anomalies of undetermined origin have been detected throughout the survey area, although a definite classification for these anomalies cannot be given, due to the lack of any further context.

8.4. Evidence of supporting a prolonged agricultural use of the landscape have been detected in the form of ridge and furrow linear trends. Weak linear anomalies have also been detected and identified as drainage regimes, along with former mapped and unmapped field boundaries, and modern ploughing.

8.5. Amorphous anomalies displaying a weak and spread magnetic signal have been detected throughout the south and east of the survey area. These are probably the result of changes within the natural background.

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

British Geological Survey, 2024. Geology of Britain. Wrexham, Wales. [http://mapapps.bgs.ac.uk/geologyofbritain/home.html/]. Accessed 11/01/2024.

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12. Project Metadata

MS Job Code	MSSJ1686
Project Name	Cefn Park, Wrexham
Client	Tetra Tech Ltd.
Grid Reference	SJ 35743 50731
Survey Techniques	Magnetometry
Survey Size (ha)	28.8ha (Magnetometry)
Survey Dates	18/12/2023 to 22/12/2023
Project Lead	Krasimir Dyulgerski BA MRes
Project Officer	Sacha O'Connor BA
HER Event No	N/A
OASIS No	N/A
S42 Licence No	N/A
Report Version	1.0

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	CG	SOC	23 January 2024
0.2	Corrections from Project Lead	HR	AL	29/01/2024
0.3	Corrections from Director	AL	FPC	31/01/2024
1.0	Data Management Plan and Welshe abstract added. Report issued as Final	KD	KD	28/02/2024

14. Data Management Plan

MS Job Code	MSSJ1686		
Project Name	Cefn Park, Wrexham		
Client	Tetra Tech Ltd		
Grid Reference	SJ 35743 50731		
Survey Techniques	Magnetometer		
Survey Size (ha)	29.4ha		
Survey Dates	18/01/2024-26/01/2024		
Project Lead	Krasimir Dyulgerski BA MRes		
Project Officer	Sacha O'Connor BA		
Section 42	N/A		
HER Event No	TBC		
Planning Application	TBC		
Author	Krasimir Dyulgerski BA MRes	Revisor:	
Initiation Date	27/02/2024	Last Date of Revision:	
Version	0.1		
Status	Draft		

Summary of Changes	
File Name/Location	

Data Collection and Generation

- GNSS-positioned fluxgate gradiometer data will be collected and stored in digital format by Magnitude Surveys Ltd. (MS) for the purposes of archaeological applications.
- Data collected in the field will be stored on MS servers as CSV files (raw data) and GeoTiffs (processed data). Other data collected and generated in the field such as site photos (.JPEG), SSRAs (MS Word), site diaries (MS Word) and site notes (.PNG).
- Data will be collected to a high quality as ensured by on site processing, allowing for real-time data QA and trouble shooting. Duplicate traverses will be collected to provide evidence for the repeatability of the survey method.
- Analysis of the data includes the generation of topography contours and XY traces (.SHP) Interpretation of the data is carried out in QGIS through the creation of polygons, polylines and points. This data is stored on a PostGres GIS database on MS servers.
- Deliverables, including the WSI and final report (MS Word) will be available to clients as PDF files.

Metadata and Documentation

- Sufficient metadata is stored by MS to allow for other users of the data to be able to repeat both collection and processing methods if desired, as well as understand the generation and evolution of the data collected in the field.
- Any changes to standard practice will be clearly recorded in the metadata documentation.

Data Storage, Access and Preservation

- All data produced by MS for this project will be stored on MS network which is backed up daily.
- Data is accessible to MS staff through the company's network, and deliverables and any other data requested will be provided to the client upon the completion of the project.
- 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.
- MS contributes reports to the ADS Grey Literature Library along with the competition of an OASIS form following survey, providing permission has been granted by the client.
- 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.

Long Term Curation of Archive

- A copy of the digital archive will also be deposited with the Historic Environment Record Data Deposit Online System as per CPAT requirements.

Resources and Responsibilities

- The resources required to cover this data management plan are covered by the project budget.
- The project officer is responsible for ensuring that this data management plan is adhered to.

References

Schmidt, A. and Ernenwein, E., 2013. Guide to good practice: geophysical data in archaeology. (2nd edition). Oxbow Books: Oxford.



MSSJ1686: Cefn Park, Wrexham
Figure 1 - Site Location
1:25,000 @ A4
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Site Boundary

N

0 0.5 1 km

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MSSJ1686: Cefn Park, Wrexham
Figure 2 - Location of Survey Areas
1:5,000 @ A3
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Survey Extent

N

0 150 300 450 m

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335250
335500
335750
336000
336250
351000
350750
350500
Area 1
Area 2
Area 3
Area 4
Area 5
Area 6
Oakhurst
Cefn Road
Lôn Hullah / Hullah Lane
Churchill Drive
Conway Drive
Erlas Grove
Ridley View

MSSJ1686: Cefn Park, Wrexham
Figure 3 - Magnetic Total Field (Lower Sensor) (Overview)
1:3,000 @ A3
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48,990 nT 49,020

N

0 80 160 240 m

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335250 335500 335750 336000 336250

351000

350750

350500

Area 1

Area 2

Area 3

Area 4

Area 5

Area 6

Woodbine Farm

Hullah Farm

Warm House

B.M. 266.8

MSSJ1686: Cefn Park, Wrexham
Figure 4 - Magnetic Interpretation Over Combined Satellite Imagery and Historical Maps (Overview)
1:3,000 @ A3
Copyright Magnitude Surveys Ltd 2024
Contains historical mapping © CLS Data 2024: Ordnance Survey, 6" 2nd edition c. 1882-1913
Contains Satellite Imagery © 2020 Bing Satellite

- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Weak)
- Natural (Weak)
- Magnetic Disturbance
- Natural (Spread)
- Ferrous/Debris (Spread)
- Undetermined (Weak)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Drainage Feature
- Service
- Ferrous (Spike)

N

0 80 160 240 m

magnitude surveys

335200
335400
335600
351000
350800
Area 3
Area 4
Area 5
Lôn Sutton / Sutton Drive
Cefn Road

MSSJ1686: Cefn Park, Wrexham
Figure 5 - Magnetic Gradient (Areas 3, 4, 5)
1:1,500 @ A3
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-1 nT 2

Bryn Estyn Road
Cefn Road
Fox Covert
Cottage Wood

N

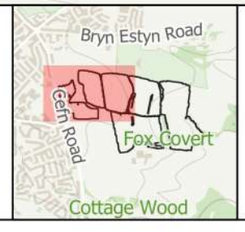
0 40 80 120 m

magnitude surveys

335200
335400
335600
351000
350800
Area 3
Area 4
Area 5
3a
Lôn Sutton / Sutton Drive
Cefn Road

MSSJ1686: Cefn Park, Wrexham
Figure 6 - Magnetic Interpretation (Areas 3, 4, 5)
1:1,500 @ A3
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Archaeology Possible (Strong)
Archaeology Possible (Weak)
Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Ridge and Furrow (Trend)
Drainage Feature
Service
Ferrous (Spike)

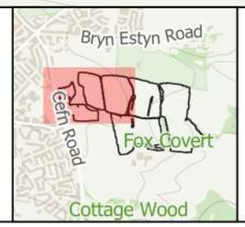


N
0
40
80
120 m

magnitude surveys

335200
335400
335600
351000
350800
Area 3
Area 4
Area 5
Lôn Sutton / Sutton Drive
Cefn Road

MSSJ1686: Cefn Park, Wrexham
Figure 7 - XY Trace Plot (Areas 3, 4, 5)
30nT/cm at 1:1,500 @ A3
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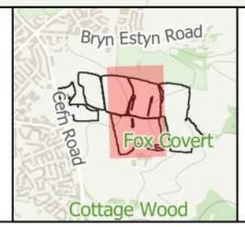
N
0
40
80
120 m

magnitude surveys

351000
350800
350600
Area 1
Area 2
335800
335800
Area 3
335600

MSSJ1686: Cefn Park, Wrexham
Figure 8 - Magnetic Gradient (Areas 1, 2, 3)
1:1,500 @ A3
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-1 nT 2



N

0 40 80 120 m

magnitude surveys

351000
350800
350600
335800
335800
335600
Area 1
Area 2
Area 3
3a

MSSJ1686: Cefn Park, Wrexham
Figure 9 - Magnetic Interpretation (Areas 1, 2, 3)
1:1,500 @ A3
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Archaeology Possible (Strong)
Archaeology Possible (Weak)
Agricultural (Weak)
Natural (Weak)
Magnetic Disturbance
Natural (Spread)
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Ridge and Furrow (Trend)
Service
Ferrous (Spike)

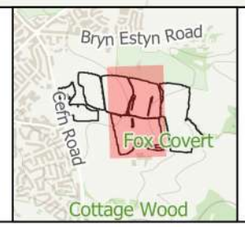


N
0
40
80
120 m

magnitude surveys

351000
350800
350600
Area 1
Area 2
335800
335800
Area 3
335600

MSSJ1686: Cefn Park, Wrexham
Figure 10 - XY Trace Plot (Areas 1, 2, 3)
30nT/cm at 1:1,500 @ A3
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N

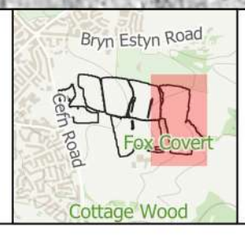
0 40 80 120 m

magnitude surveys

351000
350800
350600
336200
336200
336000
336000
Area 6
Area 1
Area 2

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Figure 11 - Magnetic Gradient (Areas 1, 2, 6)
1:1,500 @ A3
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-1 nT 2



N

0 40 80 120 m

magnitude surveys

351000
350800
350600
336200
336200
336000
336000
Area 6
Area 1
Area 2

MSSJ1686: Cefn Park, Wrexham
Figure 12 - Magnetic Interpretation (Areas 1, 2, 6)
1:1,500 @ A3
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Natural (Weak)
Magnetic Disturbance
Natural (Spread)
Ferrous/Debris (Spread)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)



N
0
40
80
120 m

magnitude surveys

351000
350800
350600
336200
336000
Area 6
Area 1
Area 2
MSSJ1686: Cefn Park, Wrexham
Figure 13 - XY Trace Plot (Areas 1, 2, 6)
30nT/cm at 1:1,500 @ A3
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Bryn Estyn Road
Cefn Road
Fox Covert
Cottage Wood
N
0
40
80
120 m
magnitude surveys