

# Light Valley Solar

Environmental Statement Volume 3

## Appendix 8.3: Geophysical Survey Results Part Biii

Document Reference: EN0110012/APP/LVS/06.03.08.03.01iii

March 2026

Planning Inspectorate Reference: EN0110012  
APFP Regulation: 5(2)(a)



Light Valley  
Solar

# Infrastructure Planning

## Planning Act 2008

### The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

## Light Valley Solar

## Development Consent Order 2025

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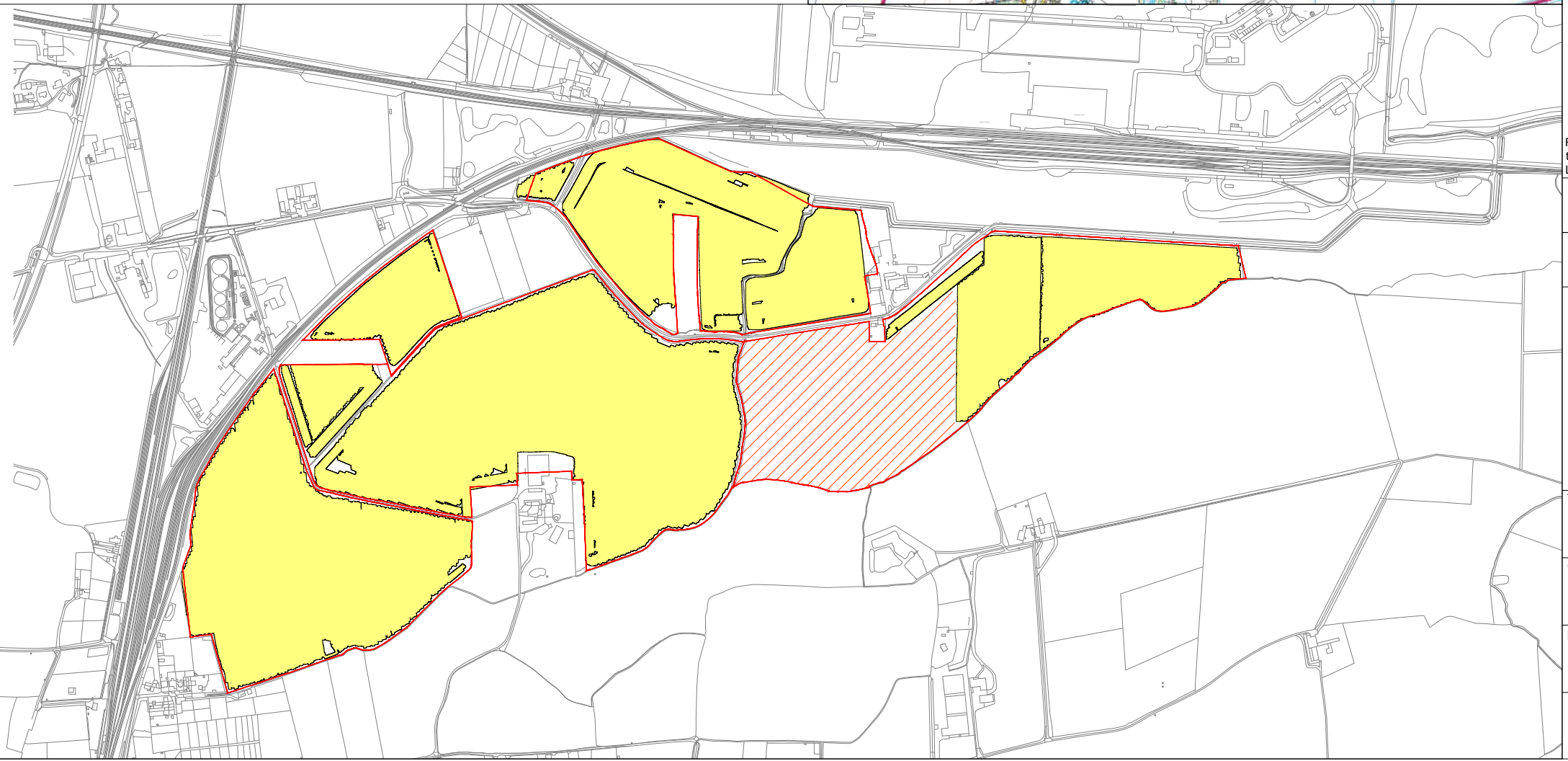
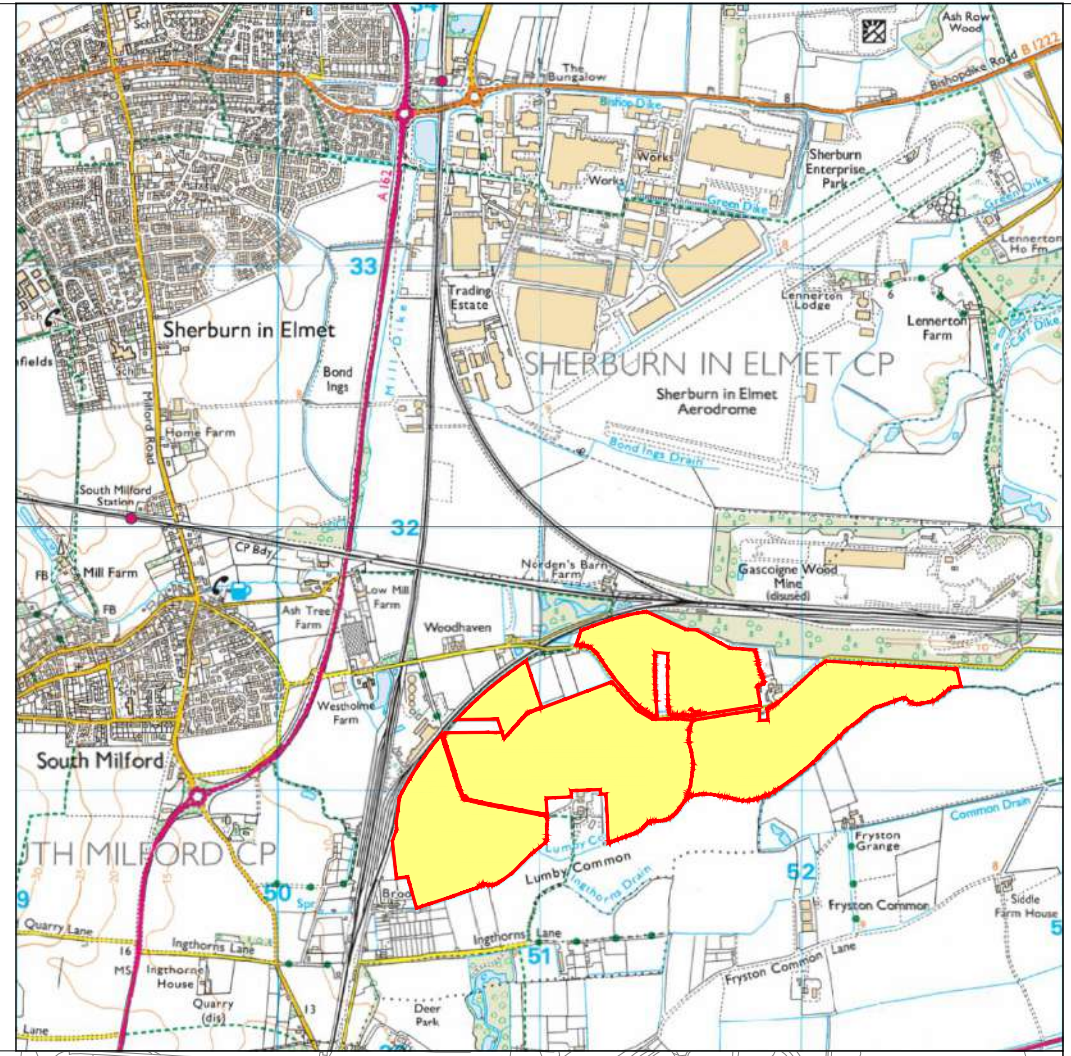
## Appendix 8.3: Geophysical Survey Results Part Biii

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<b>Regulation Reference</b>	APFP Regulation 5(2)(a)
<b>Planning Inspectorate Case Reference</b>	EN0110012
<b>Application Document Reference</b>	EN0110012/APP/LVS/06.03.08.03.01iii
<b>Author</b>	Light Valley Solar Limited

Version	Date	Status of Version
1.0	March 2026	DCO Submission

Survey Area

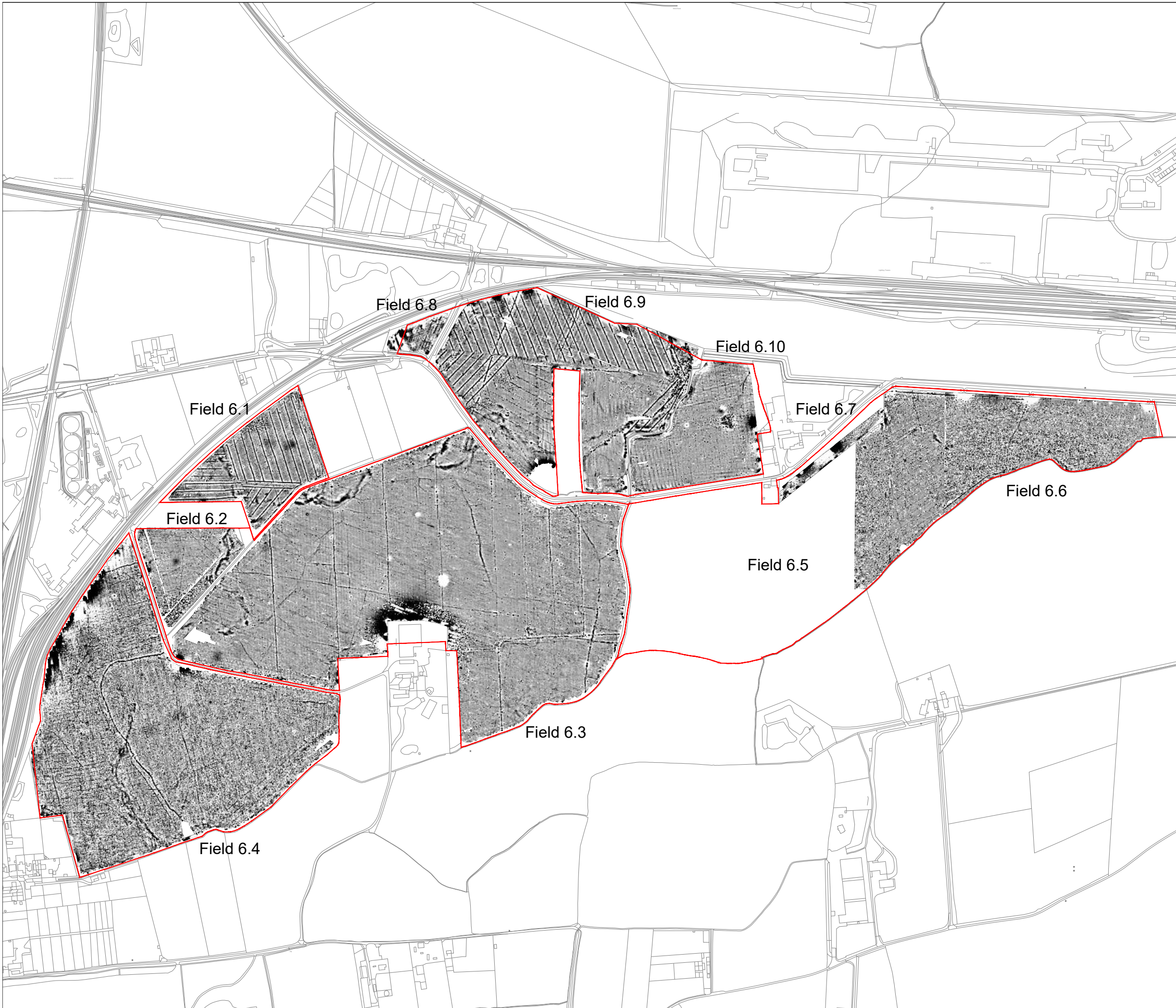


Reproduced from Ordnance Survey's 1:25 000 map of 1998 with the permission of the controller of Her Majesty's Stationery Office. Crown Copyright reserved. Licence No: 100018665

-  Survey Areas
-  Unsurveyable Area



Title:	Site Location	
Client:	Island Green Power UK Limited	
Project:	16614-6 - Light Valley Solar Project: Site 6	
Scale:	NOT TO SCALE	Fig No: 01



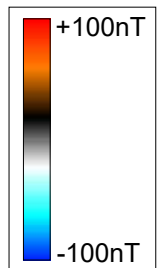
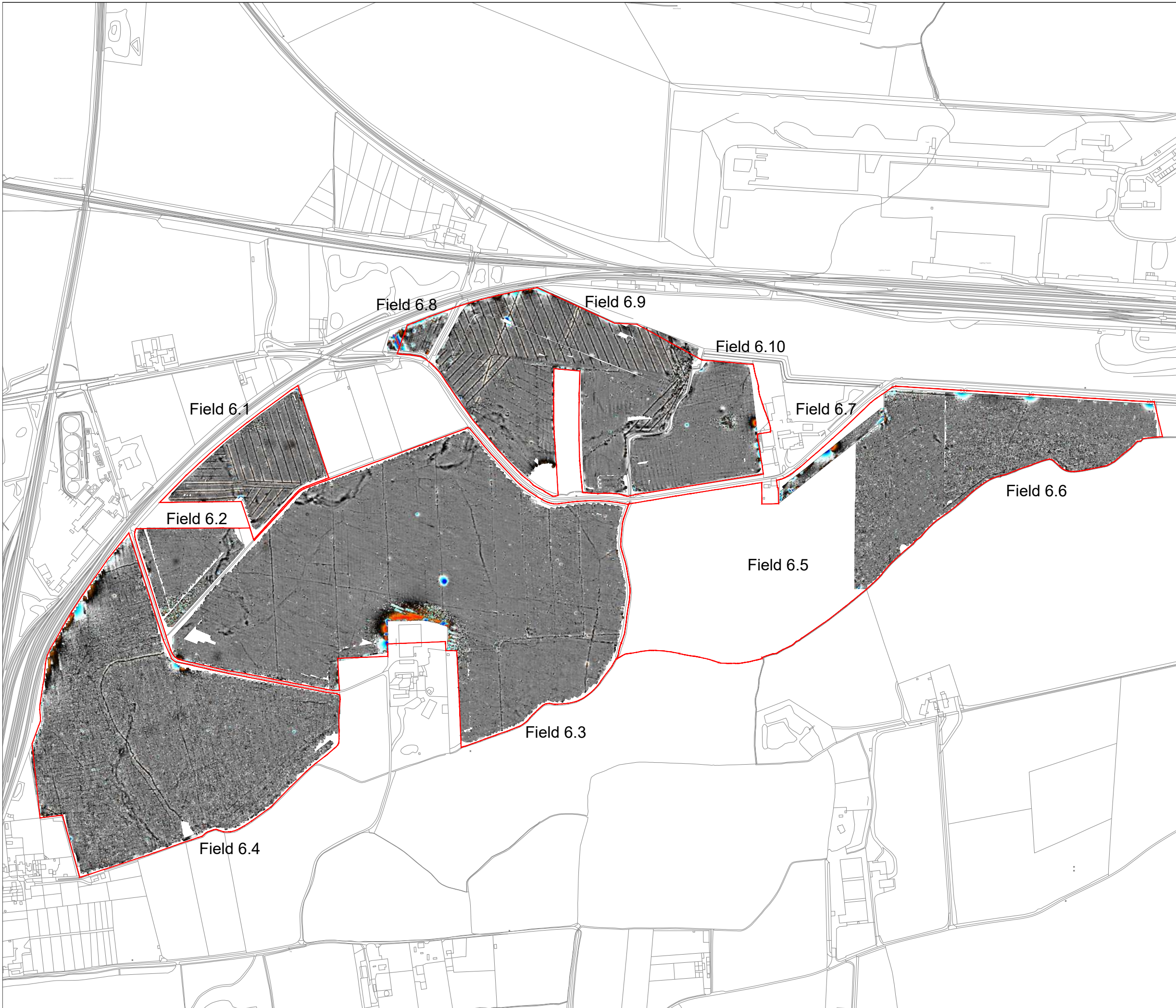
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Magnetometer Survey - Greyscale Plots

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 350  
1:7000 @ A3

Fig No:  
02



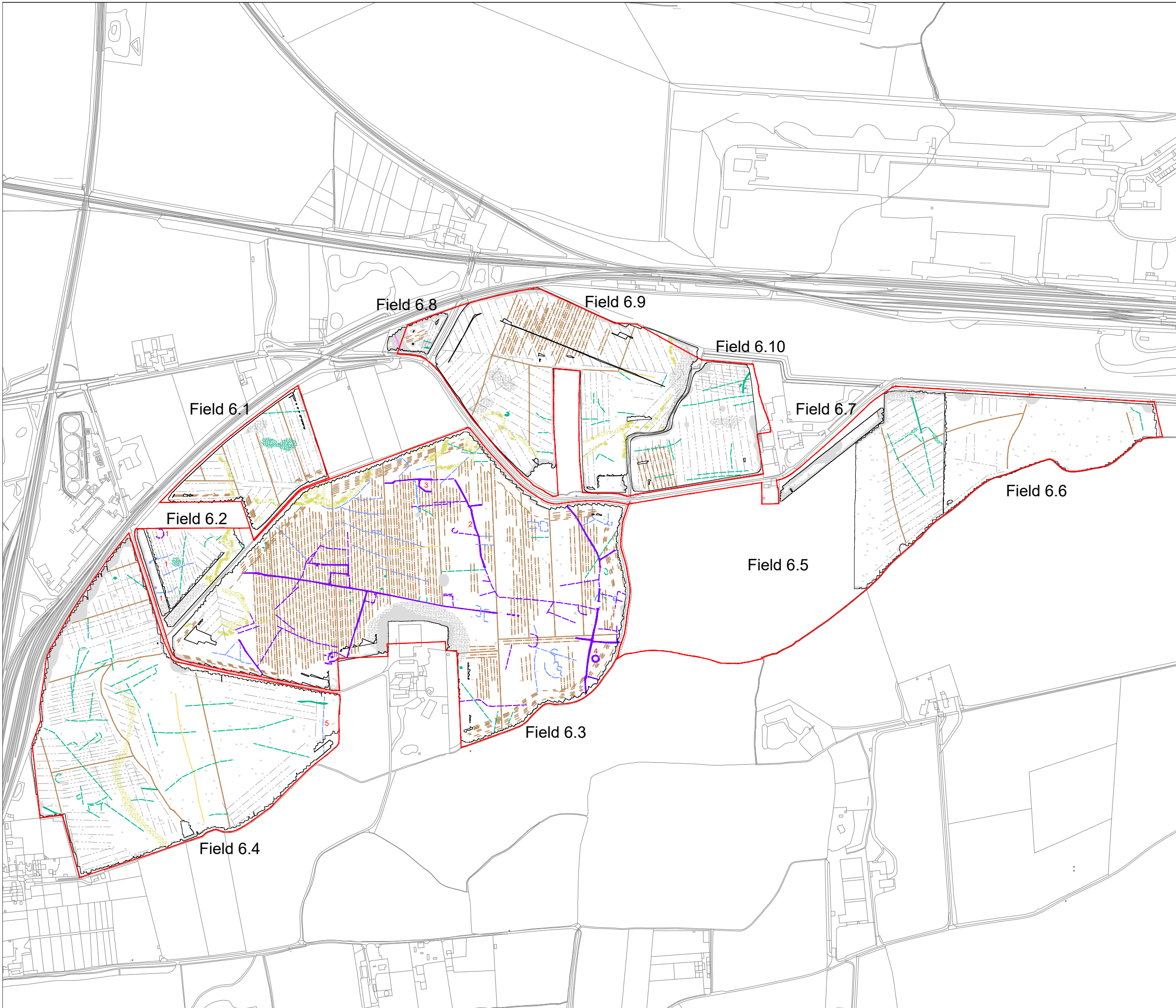
Title: Magnetometer Survey - Colour Plots

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 350  
1:7000 @ A3

Fig No: 03



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



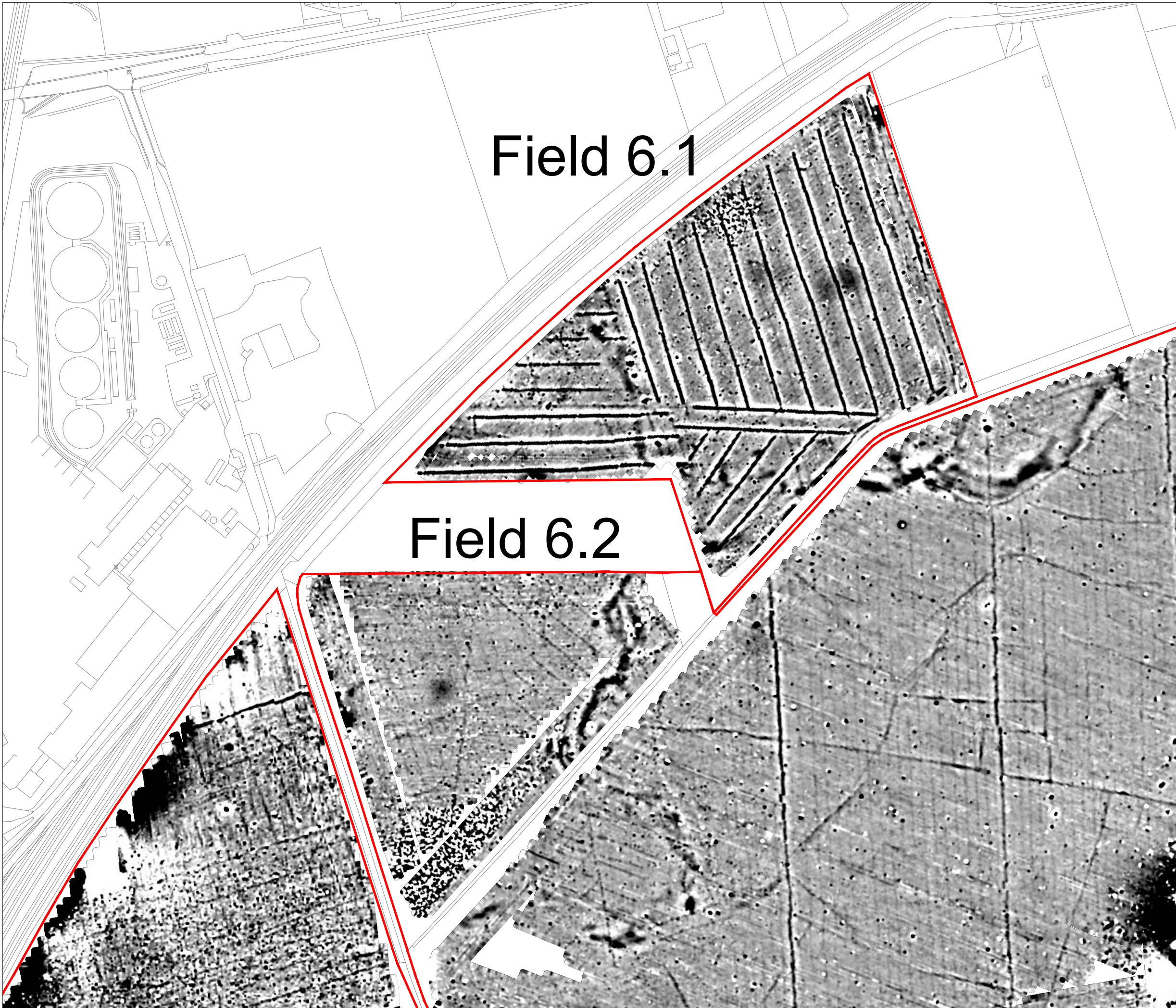
Title: Magnetometer Survey - Interpretation

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 350  
1:7000 @ A3

Fig No: 04



Field 6.1

Field 6.2



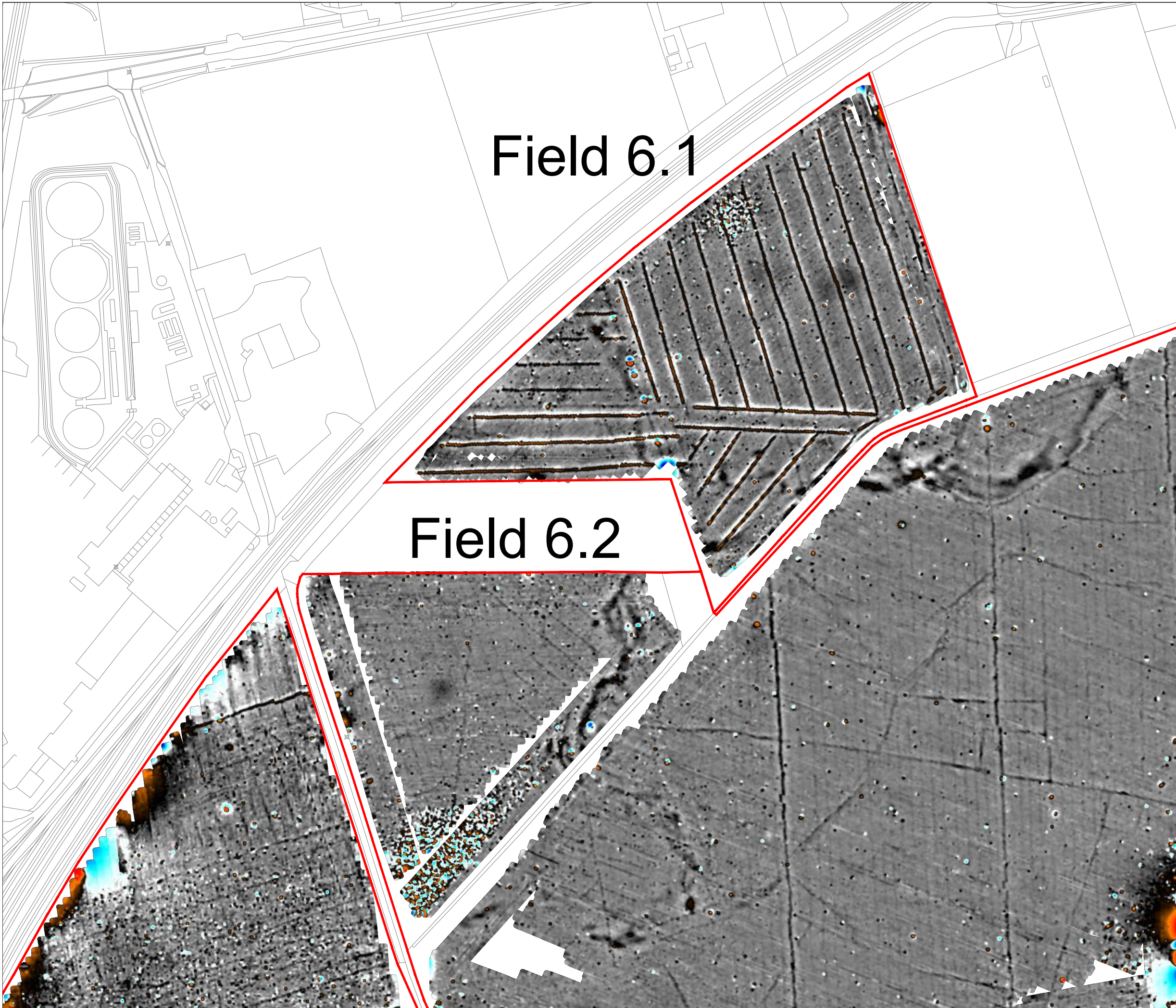
Title: Magnetometer Survey - Greyscale Plots  
(Fields 6.1 & 6.2)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

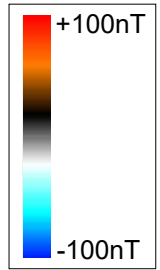
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Fig No: 05



Field 6.1

Field 6.2



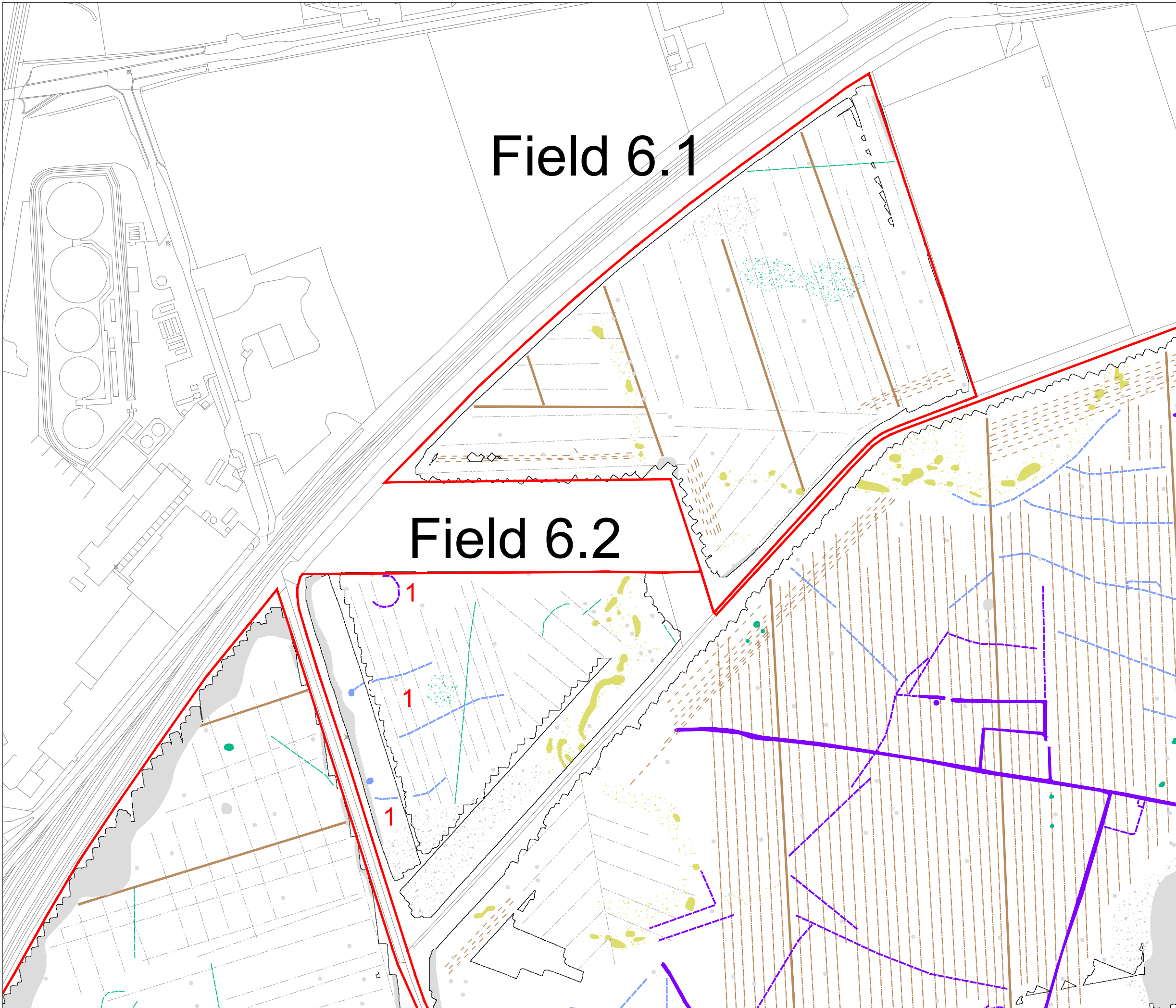
Title: Magnetometer Survey - Colour Plots (Fields 6.1 & 6.2)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 06



Field 6.1

Field 6.2



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



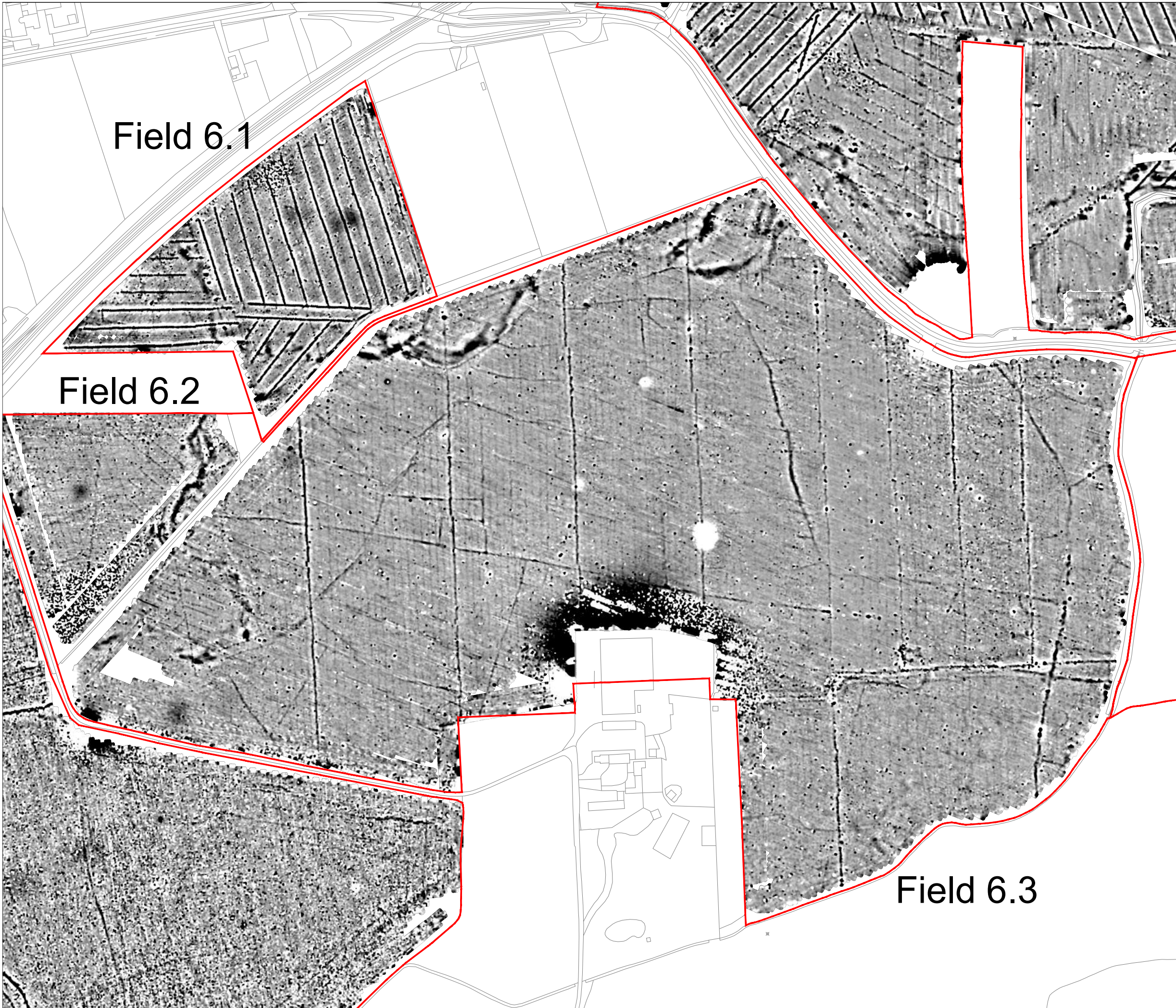
Title: Magnetometer Survey - Interpretation (Fields 6.1 & 6.2)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 07



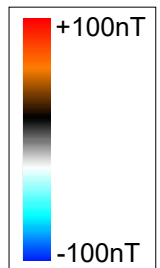
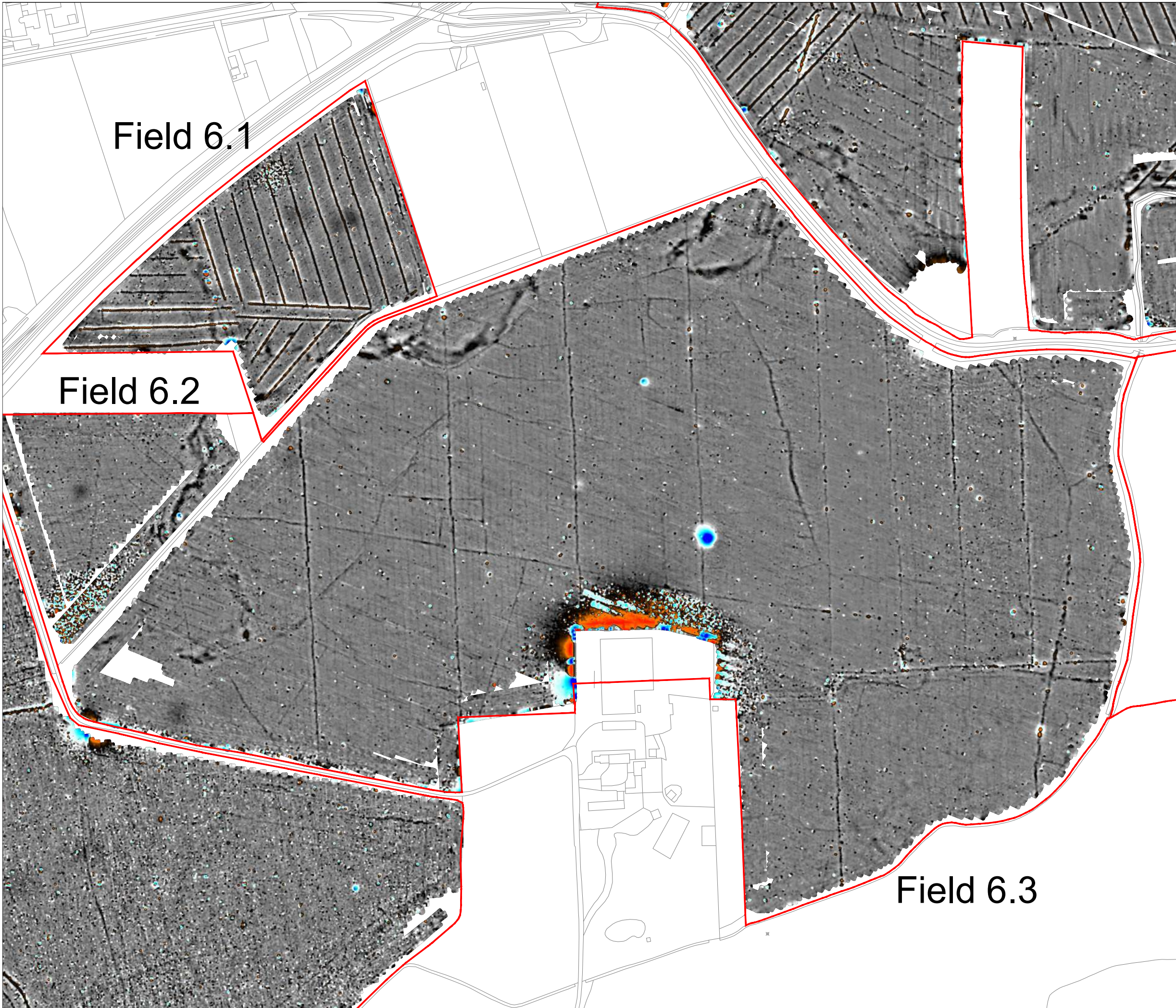
Title: Magnetometer Survey - Greyscale Plot (Field 6.3)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 150  
1:3000 @ A3

Fig No: 08



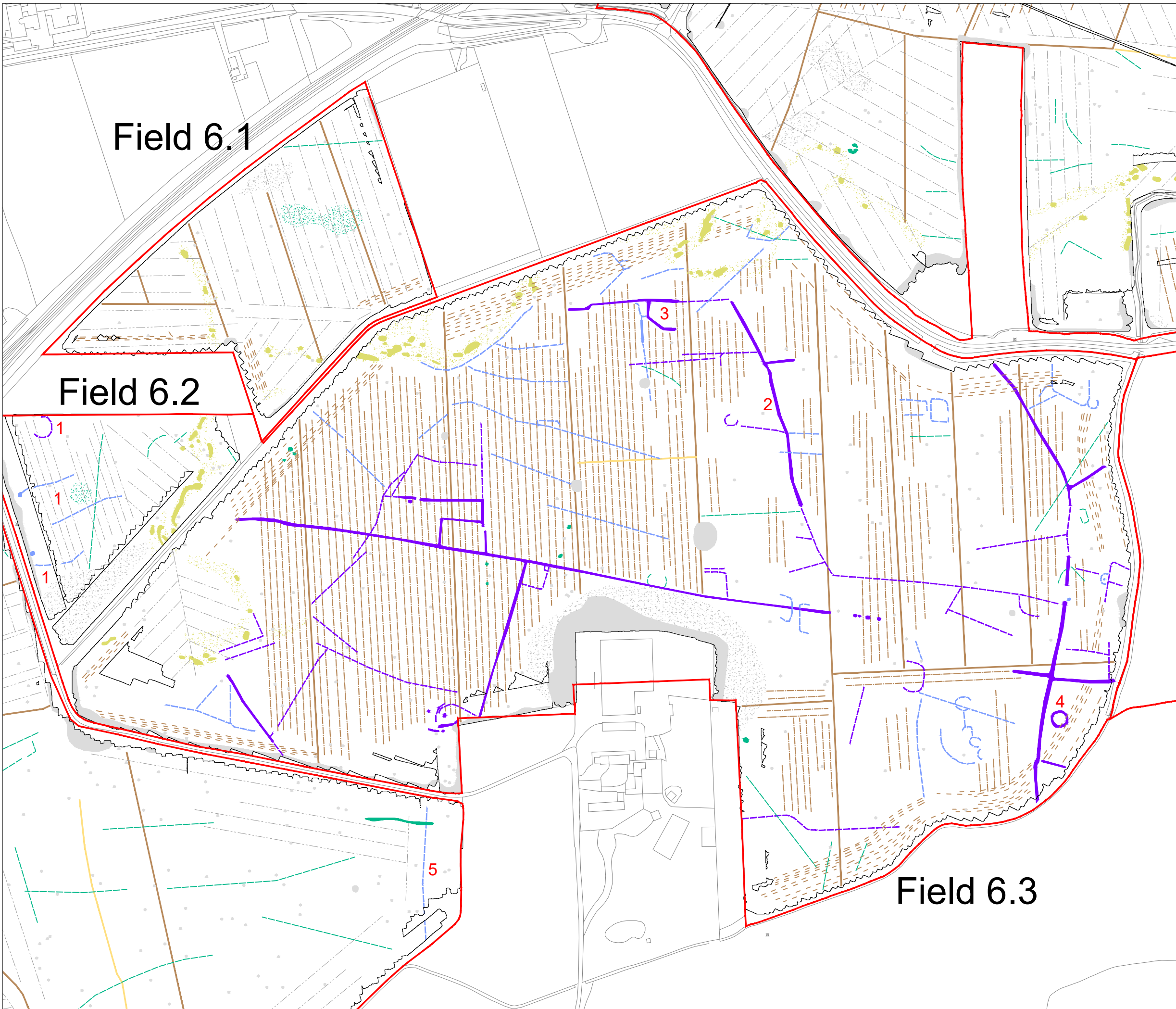
Title:  
Magnetometer Survey - Colour Plot (Field 6.3)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 150  
1:3000 @ A3

Fig No:  
09



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



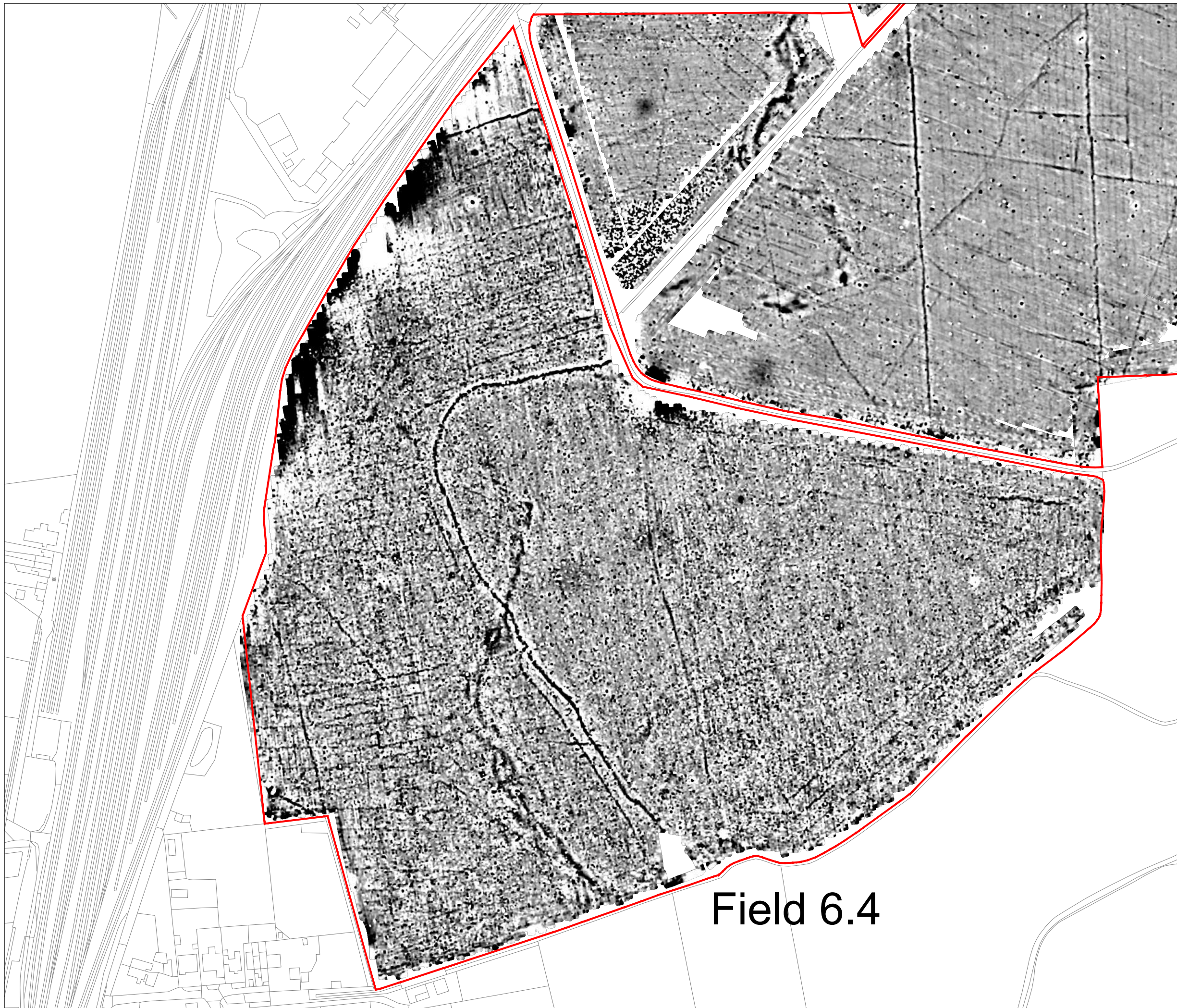
Title:  
Magnetometer Survey - Interpretation (Field 6.3)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 150  
1:3000 @ A3

Fig No:  
10



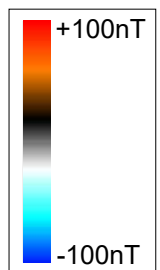
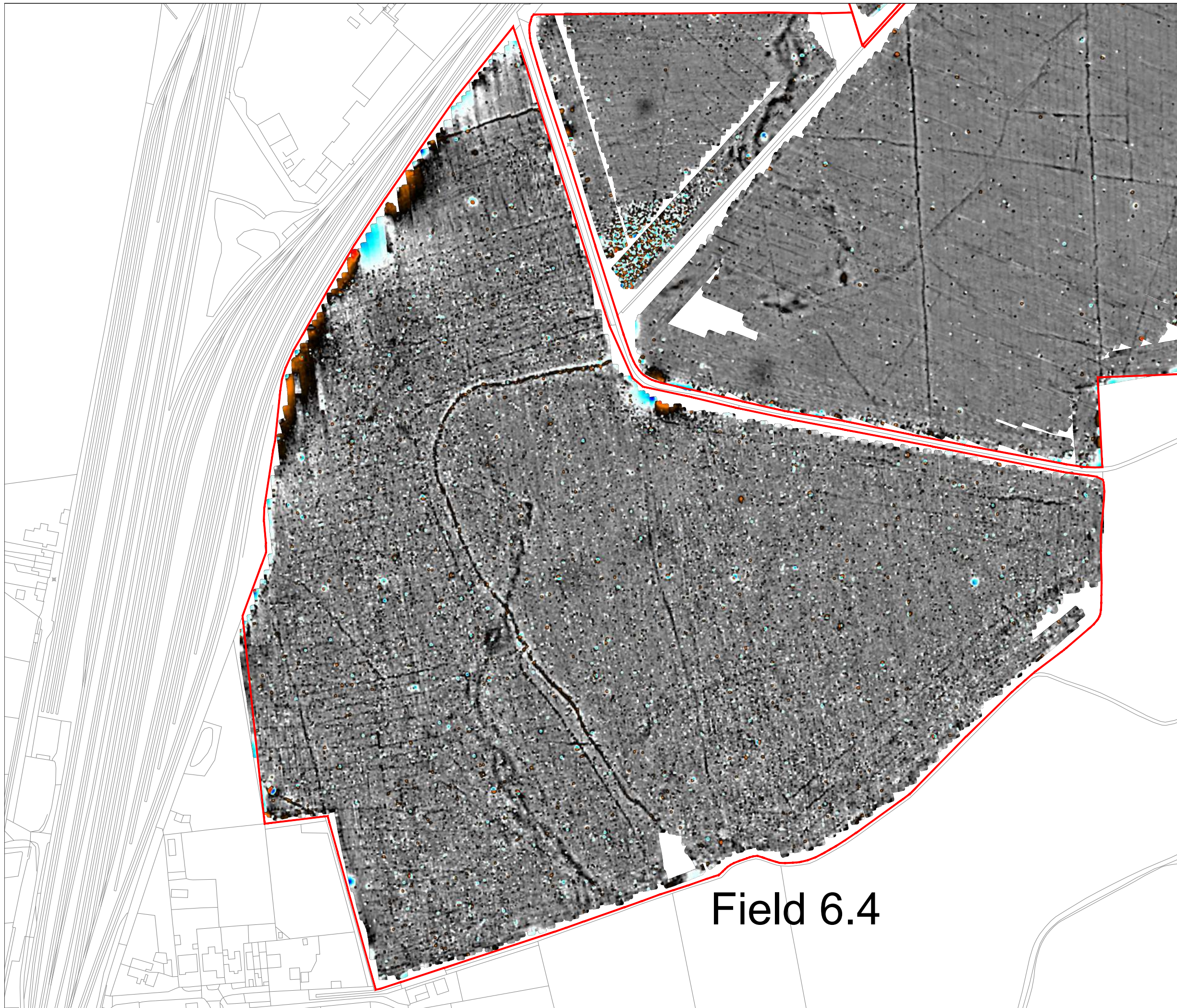
Title:  
Magnetometer Survey - Greyscale Plot (Field 6.4)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
11



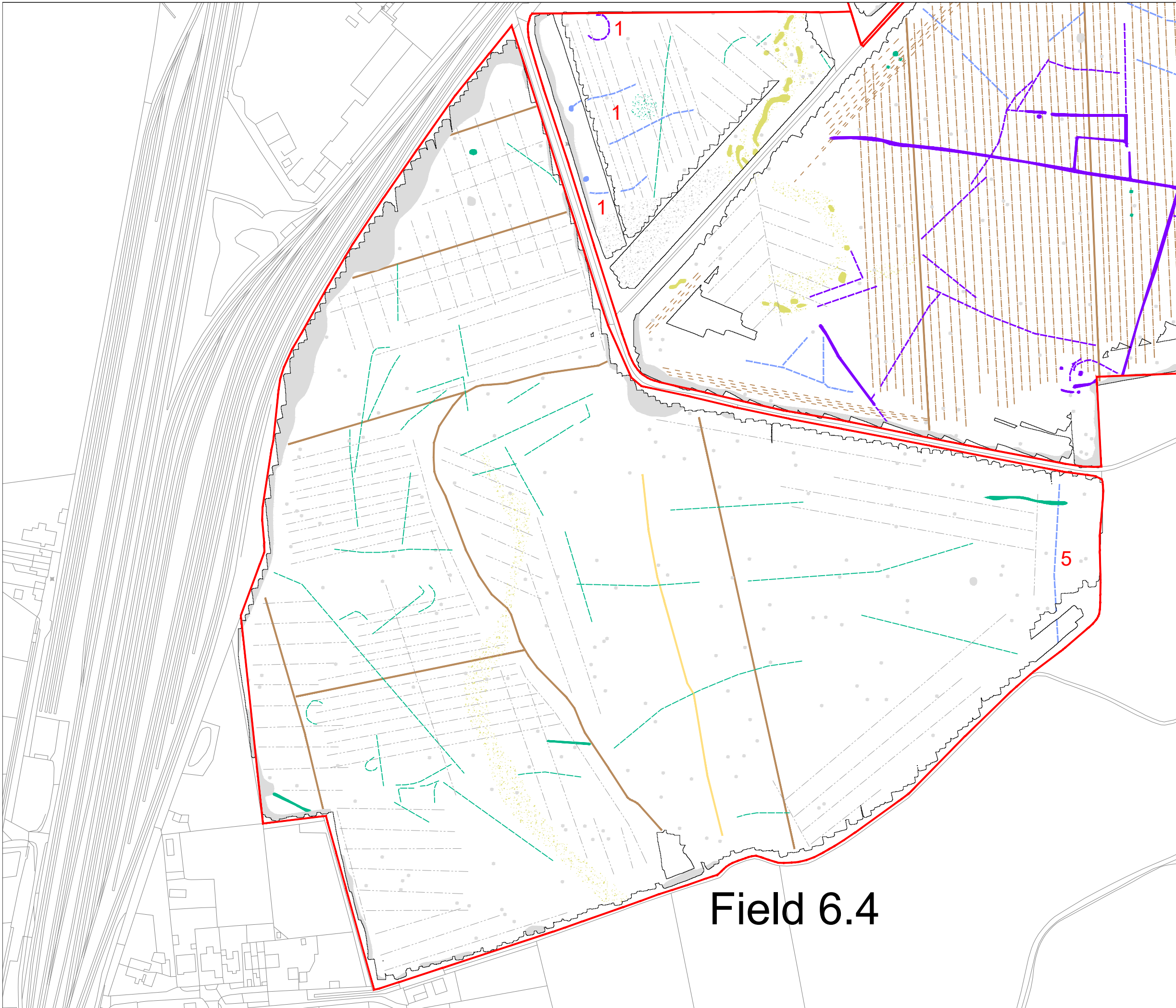
Title:  
Magnetometer Survey - Colour Plot (Field 6.4)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
12



# Field 6.4



## KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



Title:  
Magnetometer Survey - Interpretation (Field 6.4)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
13



Field 6.7

Field 6.5



Title: Magnetometer Survey - Greyscale Plots (Fields 6.5 & 6.7)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

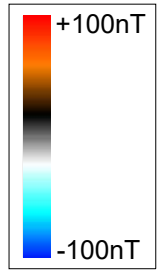
Scale: 0 metres 110 1:2200 @ A3

Fig No: 14



Field 6.7

Field 6.5



Title: Magnetometer Survey - Colour Plots  
(Fields 6.5 & 6.7)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

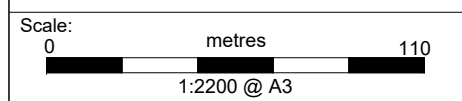
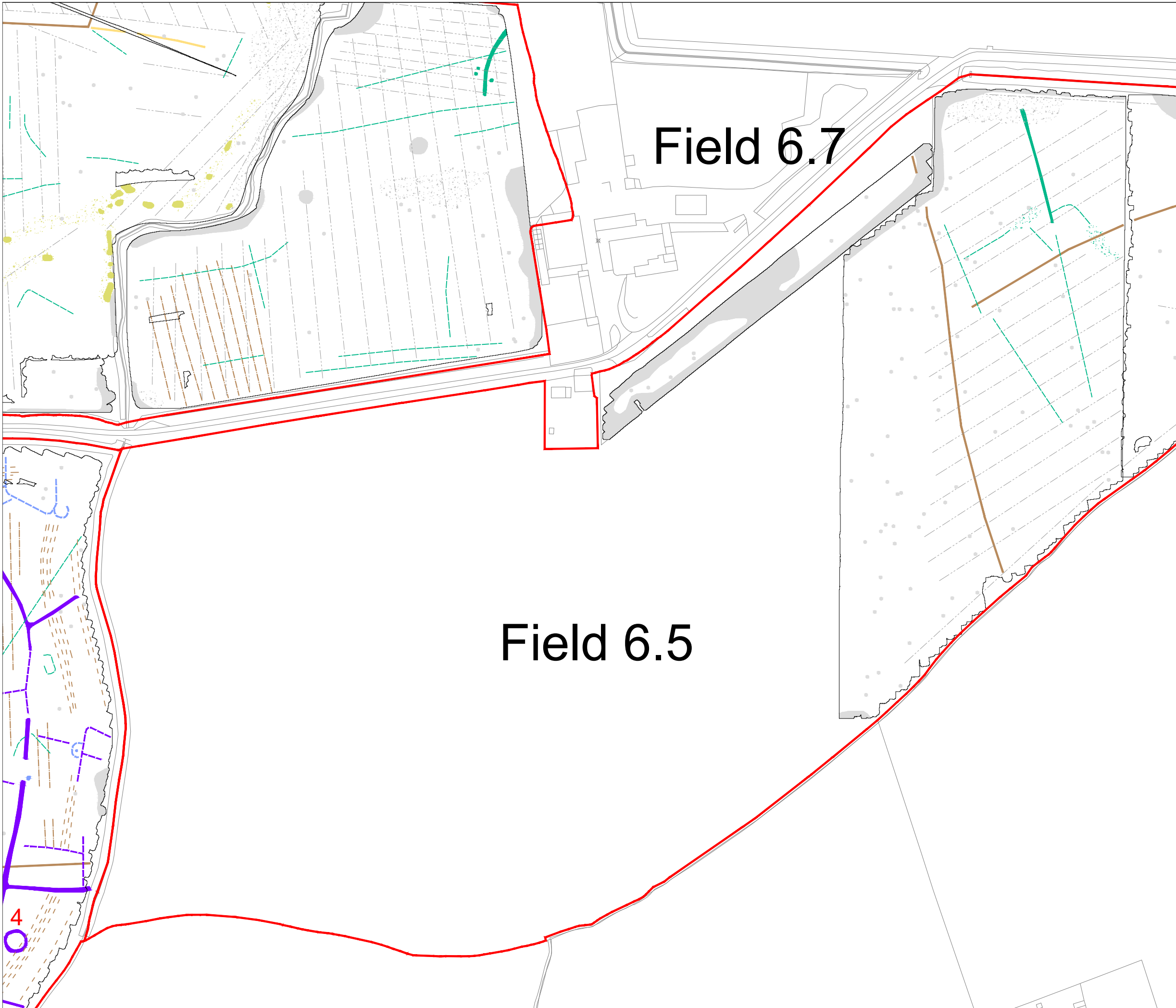














Fig No: 15



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



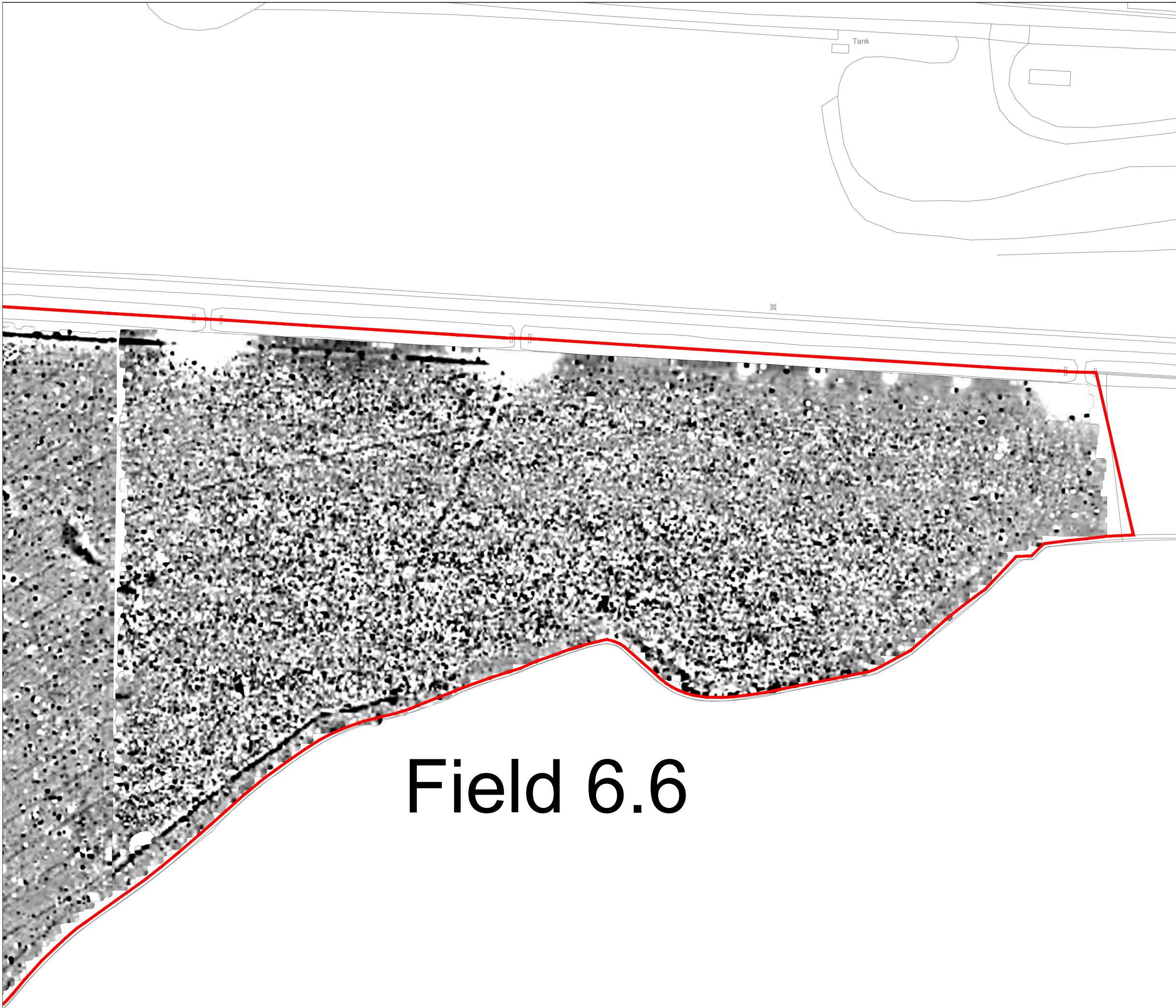
Title: Magnetometer Survey - Interpretation  
(Fields 6.5 & 6.7)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 110  
1:2200 @ A3

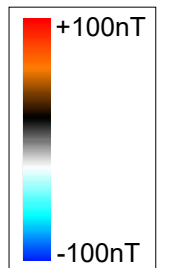
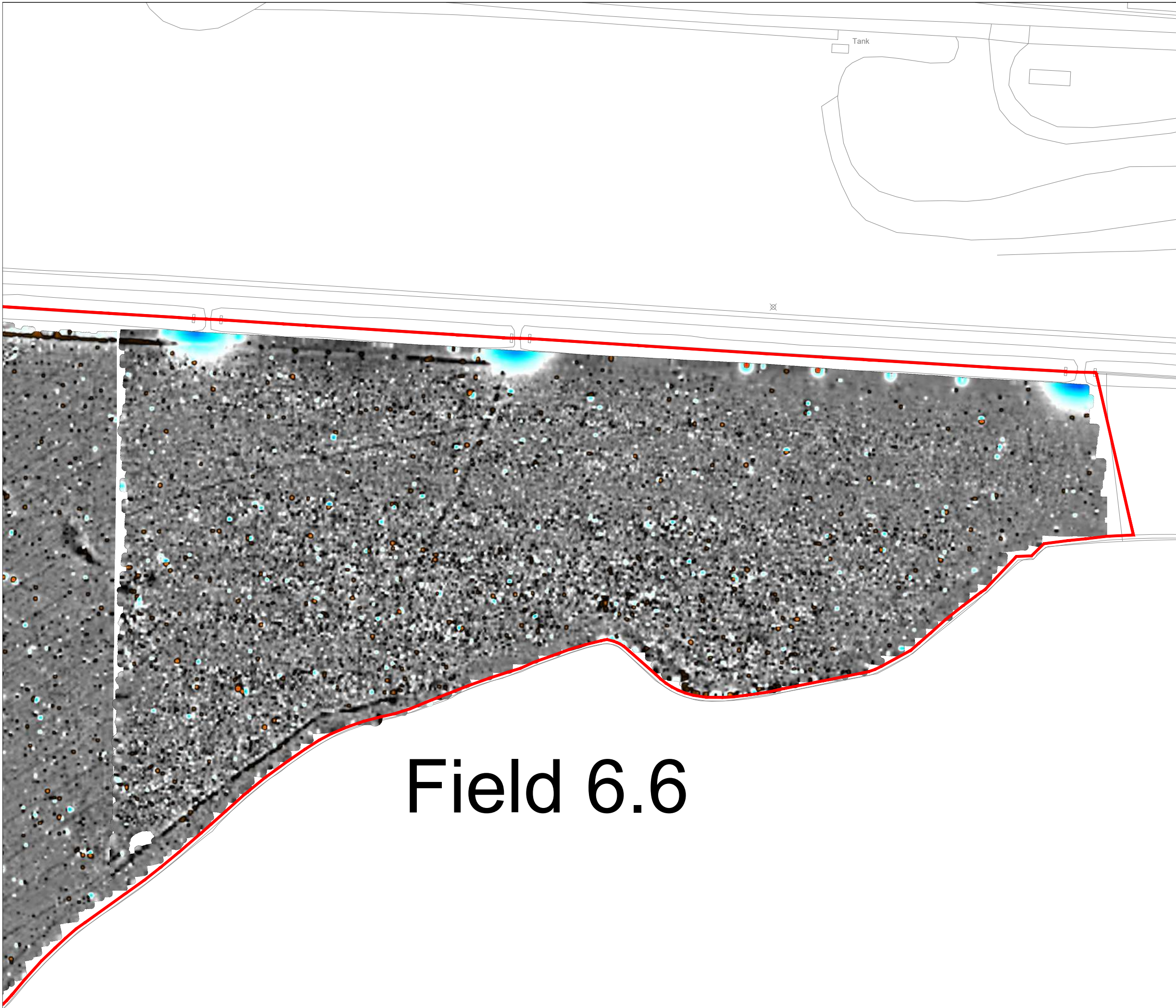
Fig No: 16



# Field 6.6



Title: Magnetometer Survey - Greyscale Plot (Field 6.6)	
Client: Island Green Power UK Limited	
Project: 16614-6 - Light Valley Solar Project: Site 6	
Scale: 0 metres 75 1:1500 @ A3	Fig No: 17



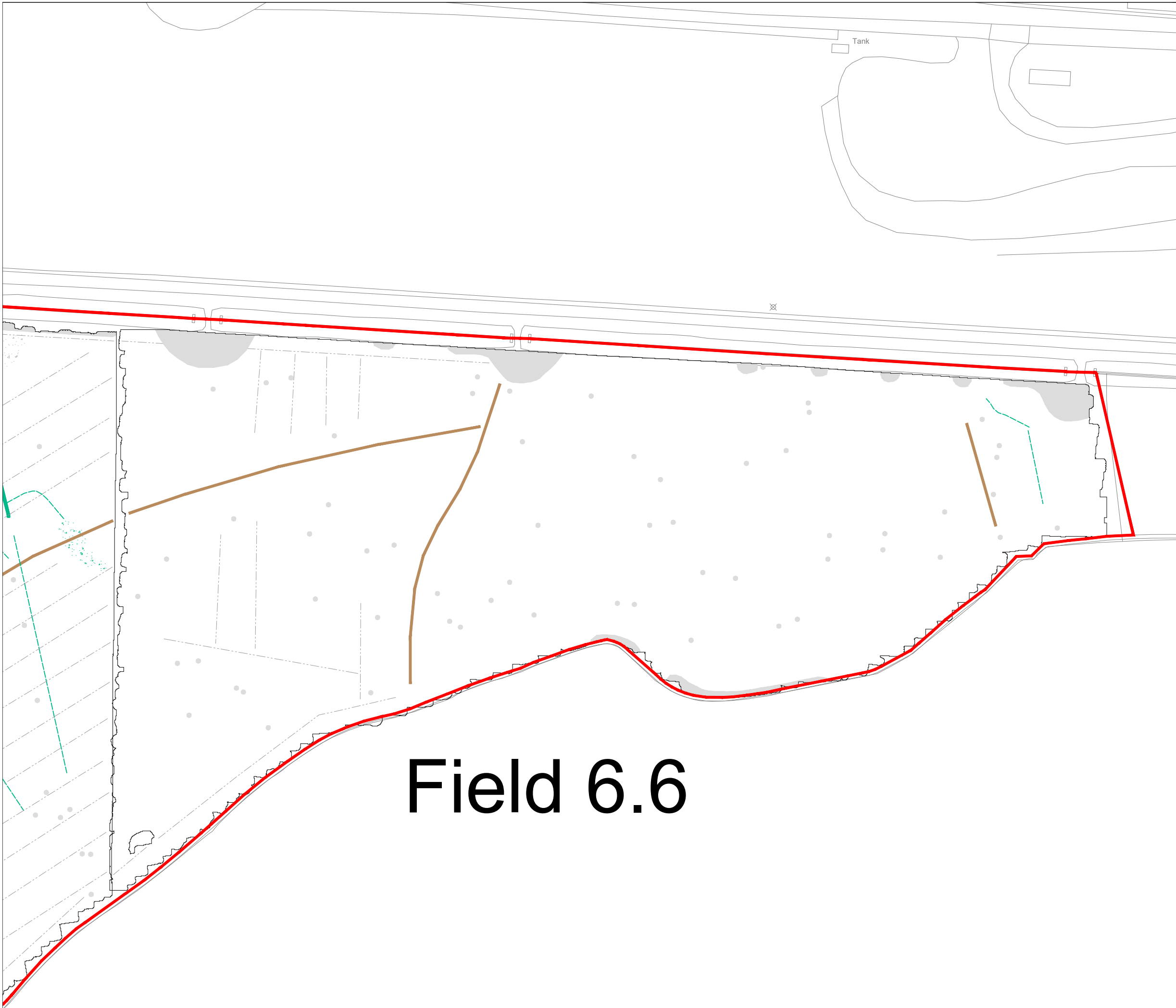
Title:  
Magnetometer Survey - Colour Plot (Field 6.6)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 75  
1:1500 @ A3

Fig No:  
18



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



**Field 6.6**

Title:  
Magnetometer Survey - Interpretation (Field 6.6)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

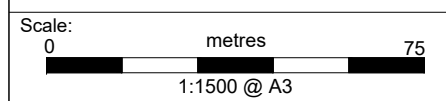
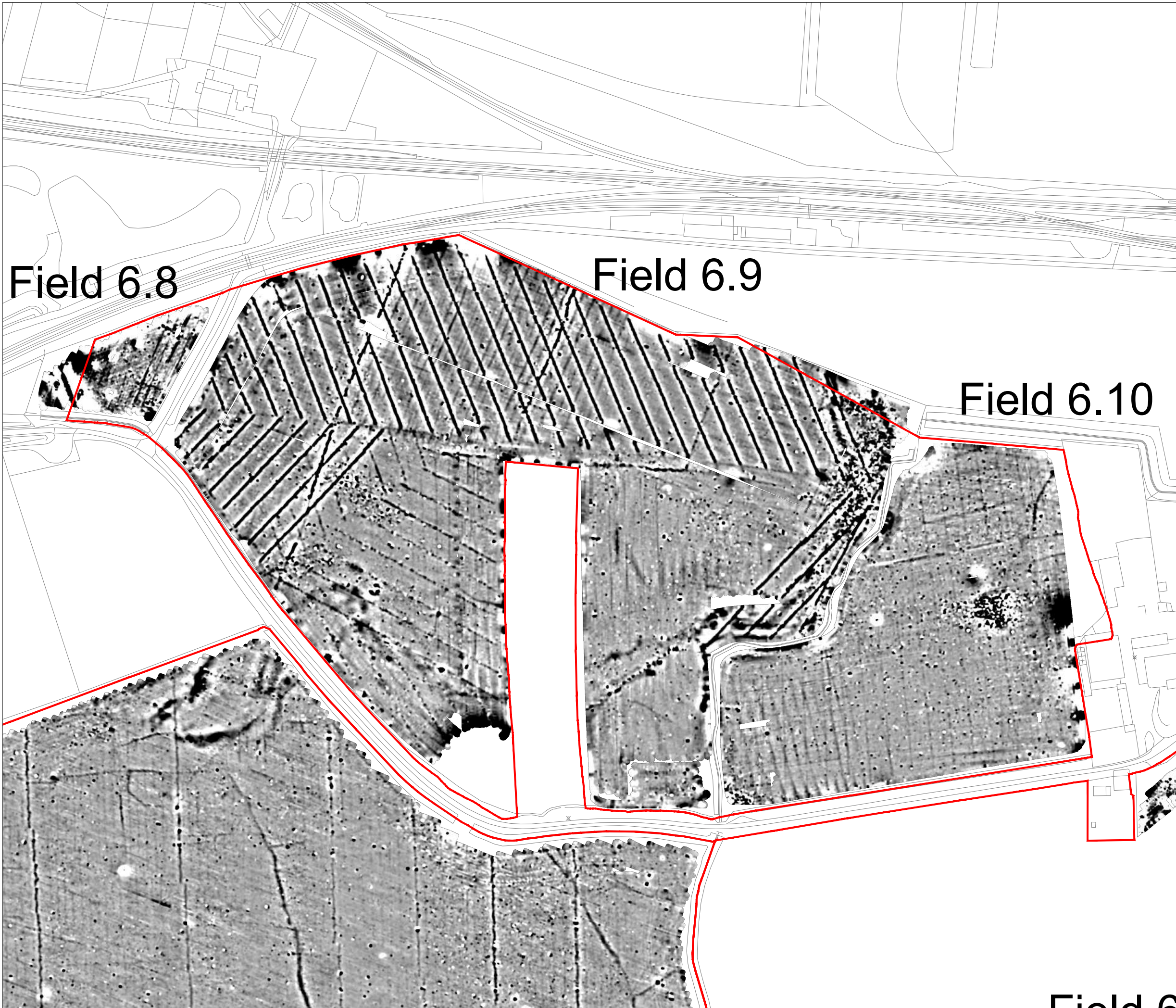


Fig No:  
19



Field 6.8

Field 6.9

Field 6.10



Title: Magnetometer Survey - Greyscale Plots  
(Fields 6.8, 6.9 & 6.10)

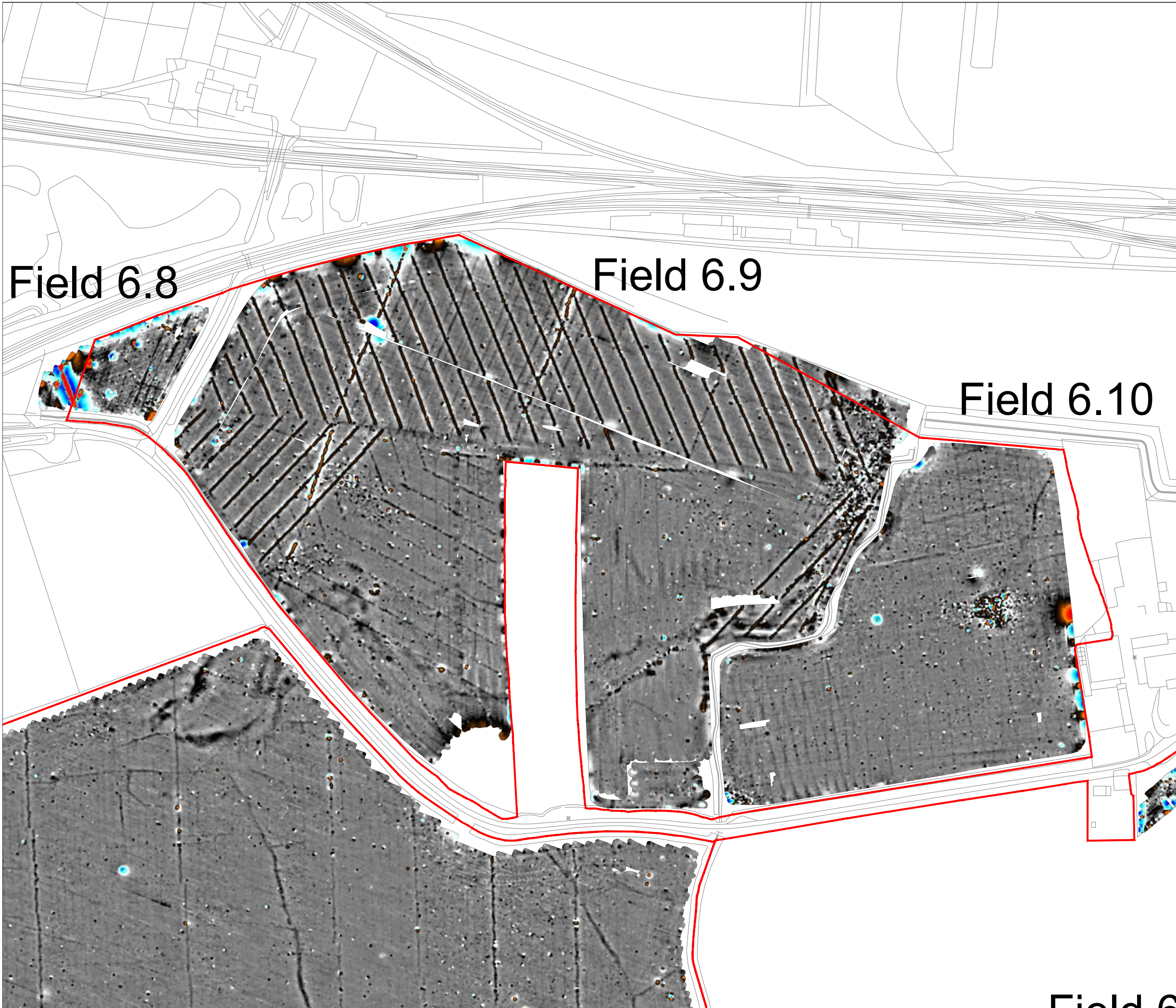
Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 125  
1:2500 @ A3

Fig No: 20

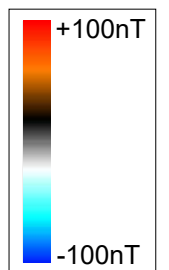
Field 6



Field 6.8

Field 6.9

Field 6.10



Title: Magnetometer Survey - Colour Plots  
(Fields 6.8, 6.9 & 6.10)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

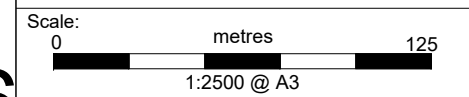
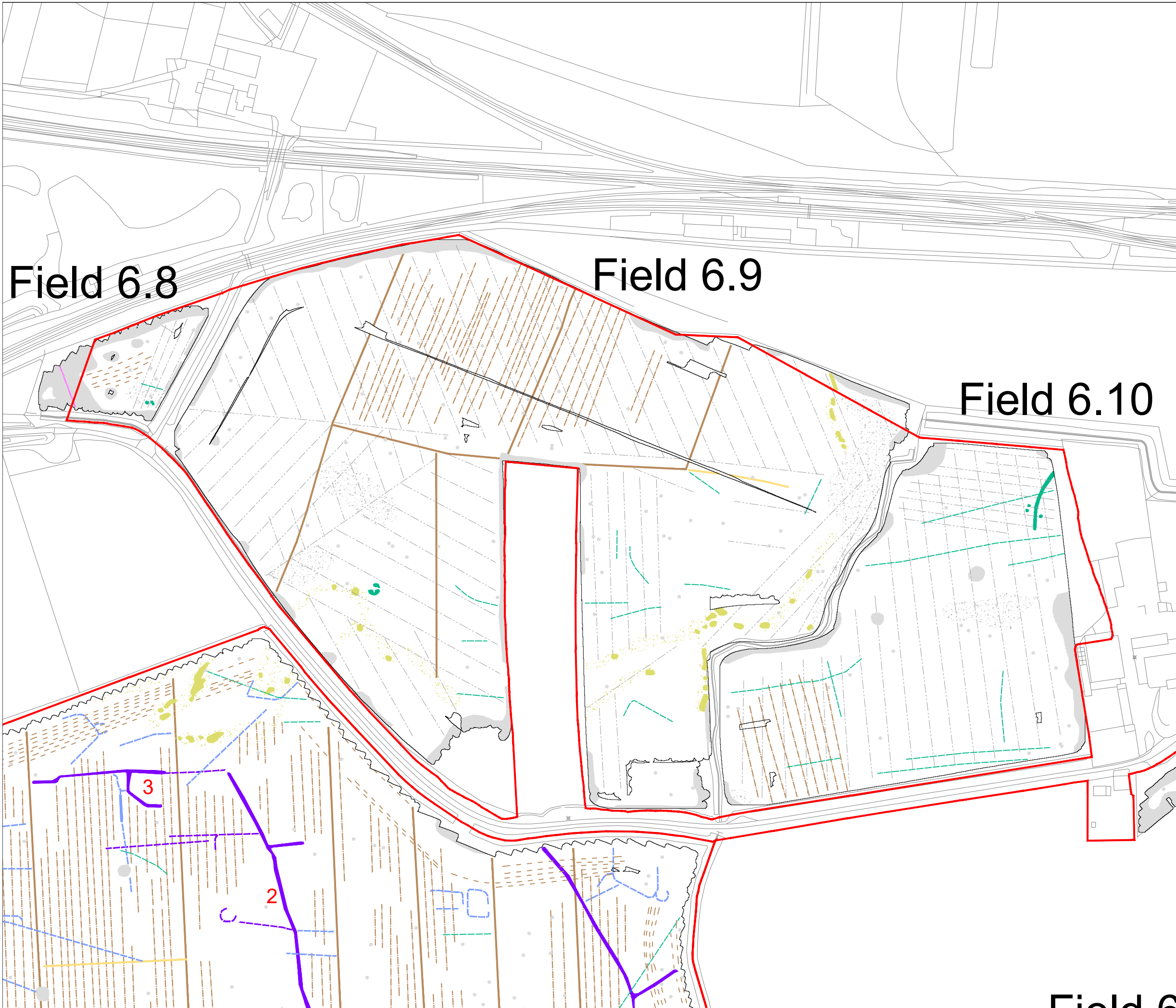


Fig No: 21

Field 6



**KEY**

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Interpretation (Fields 6.8, 6.9 & 6.10)

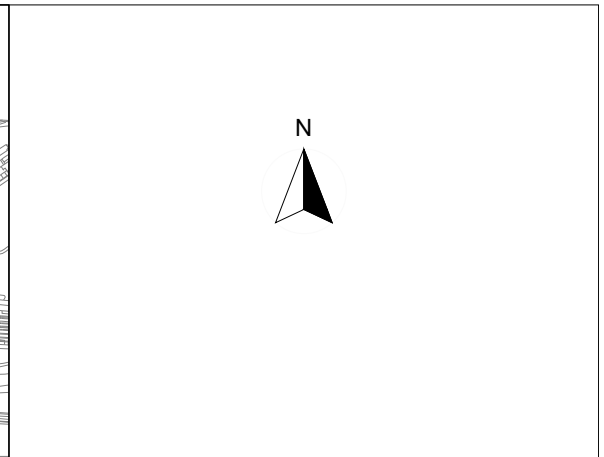
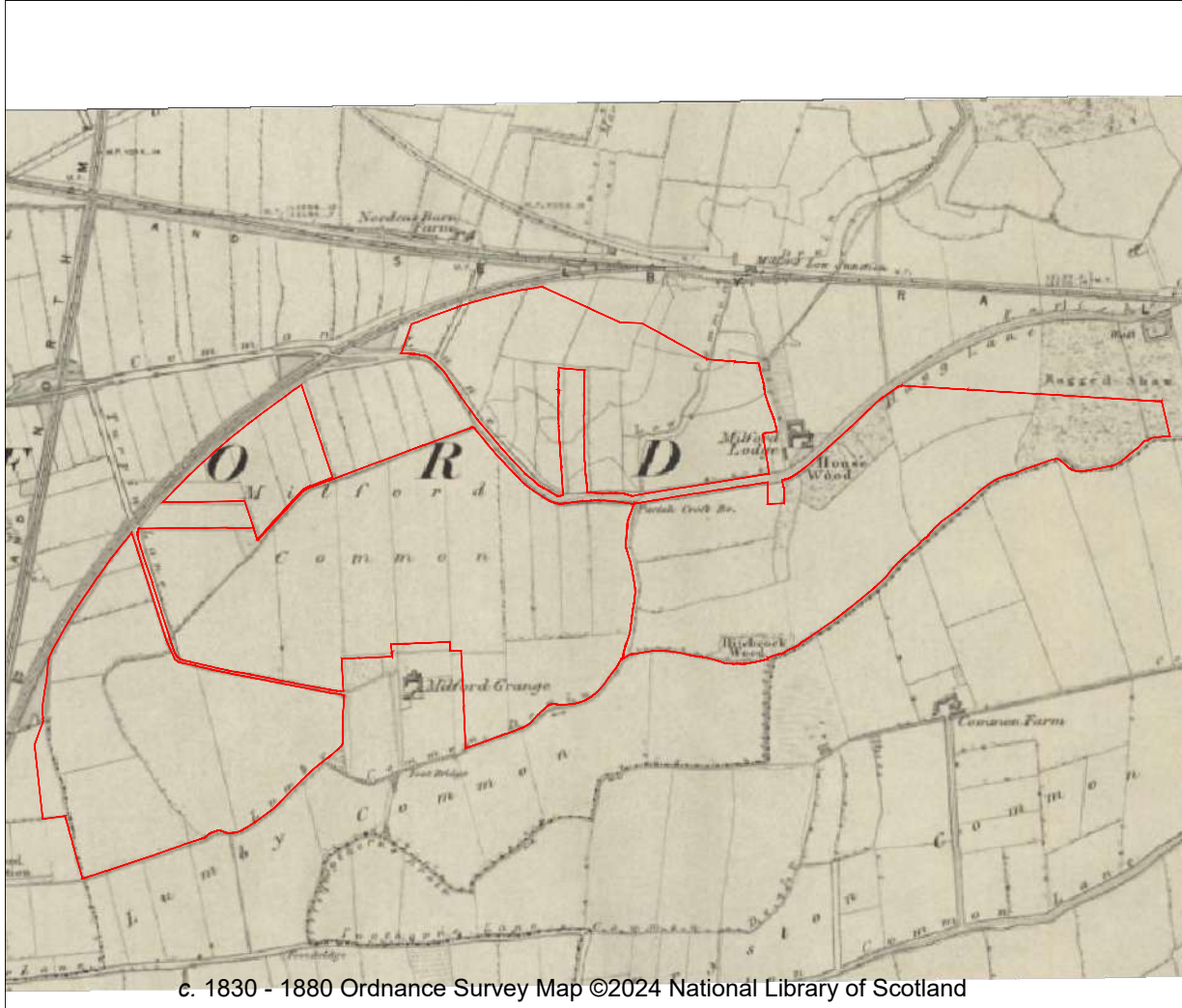
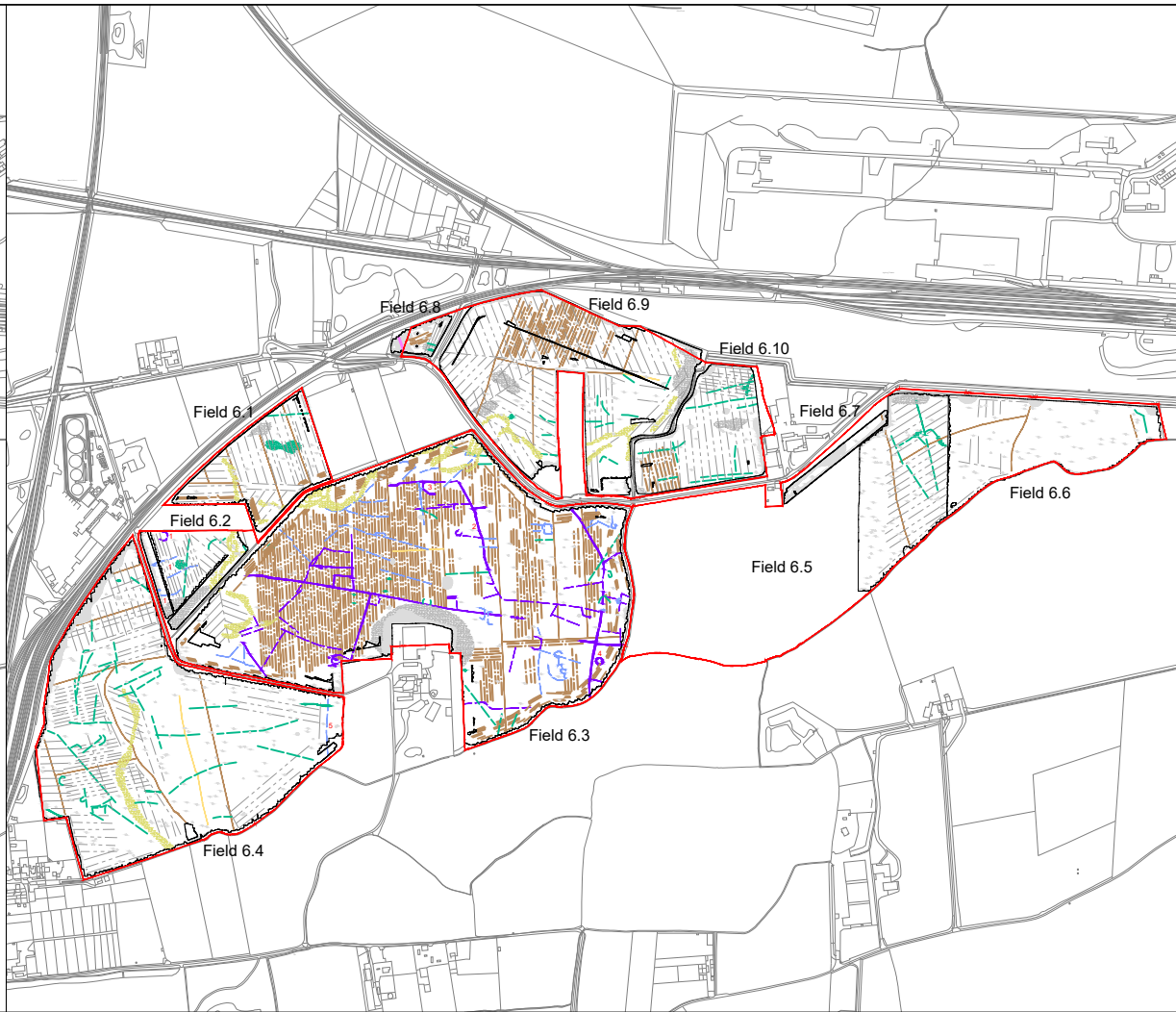
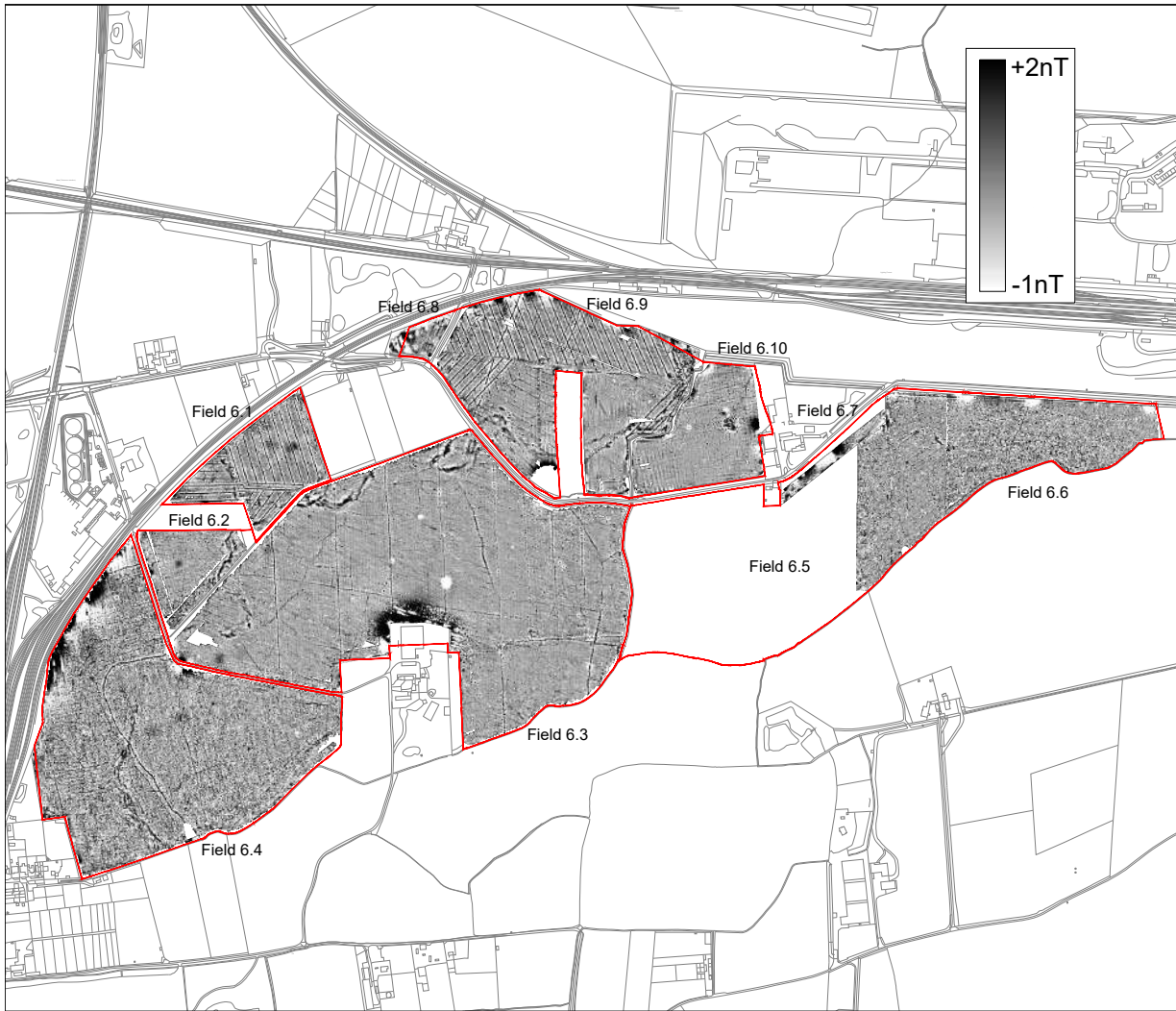
Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 125  
1:2500 @ A3

Fig No: 22

Field 6



KEY	
	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

**sumo**  
GeoSurveys

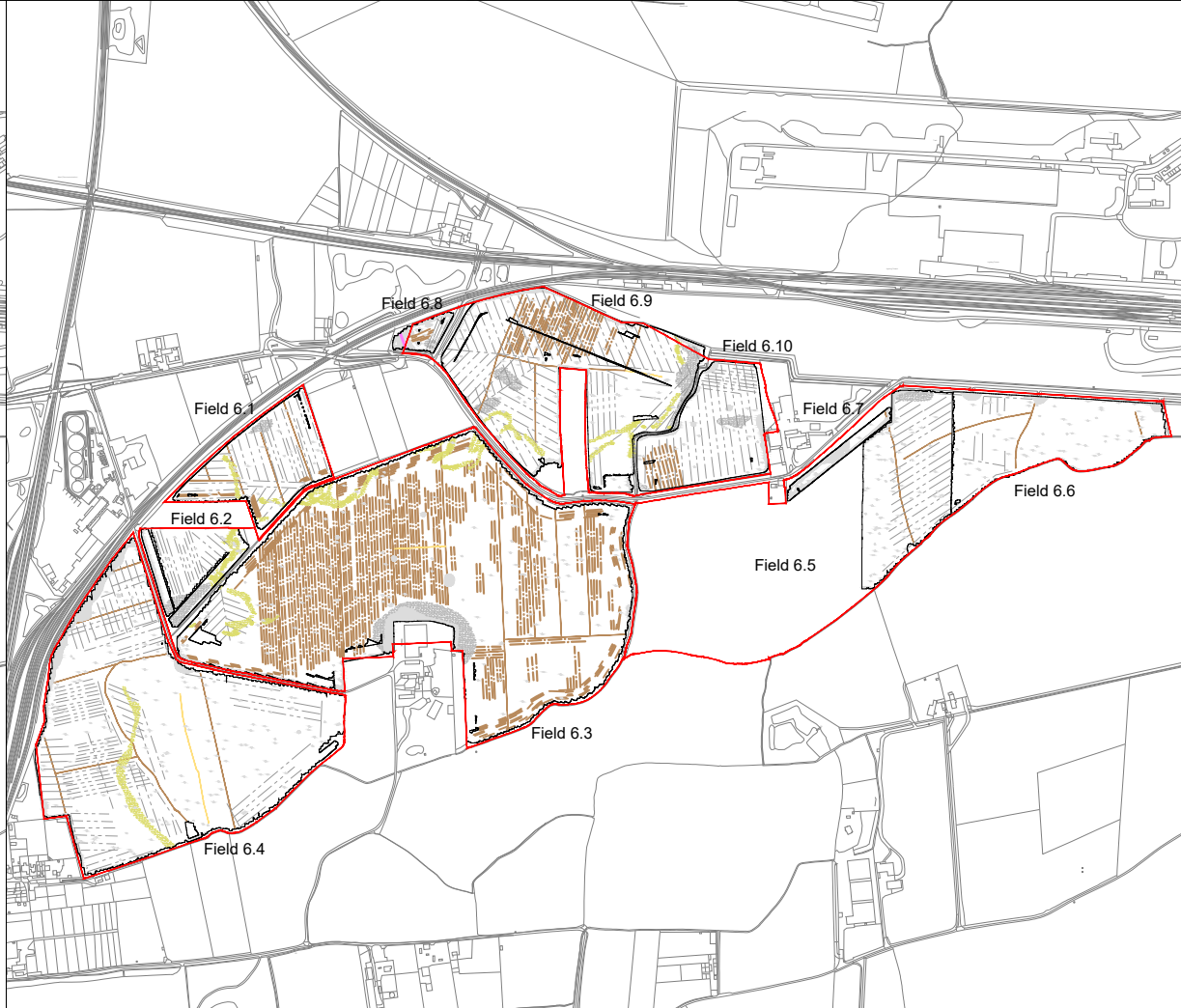
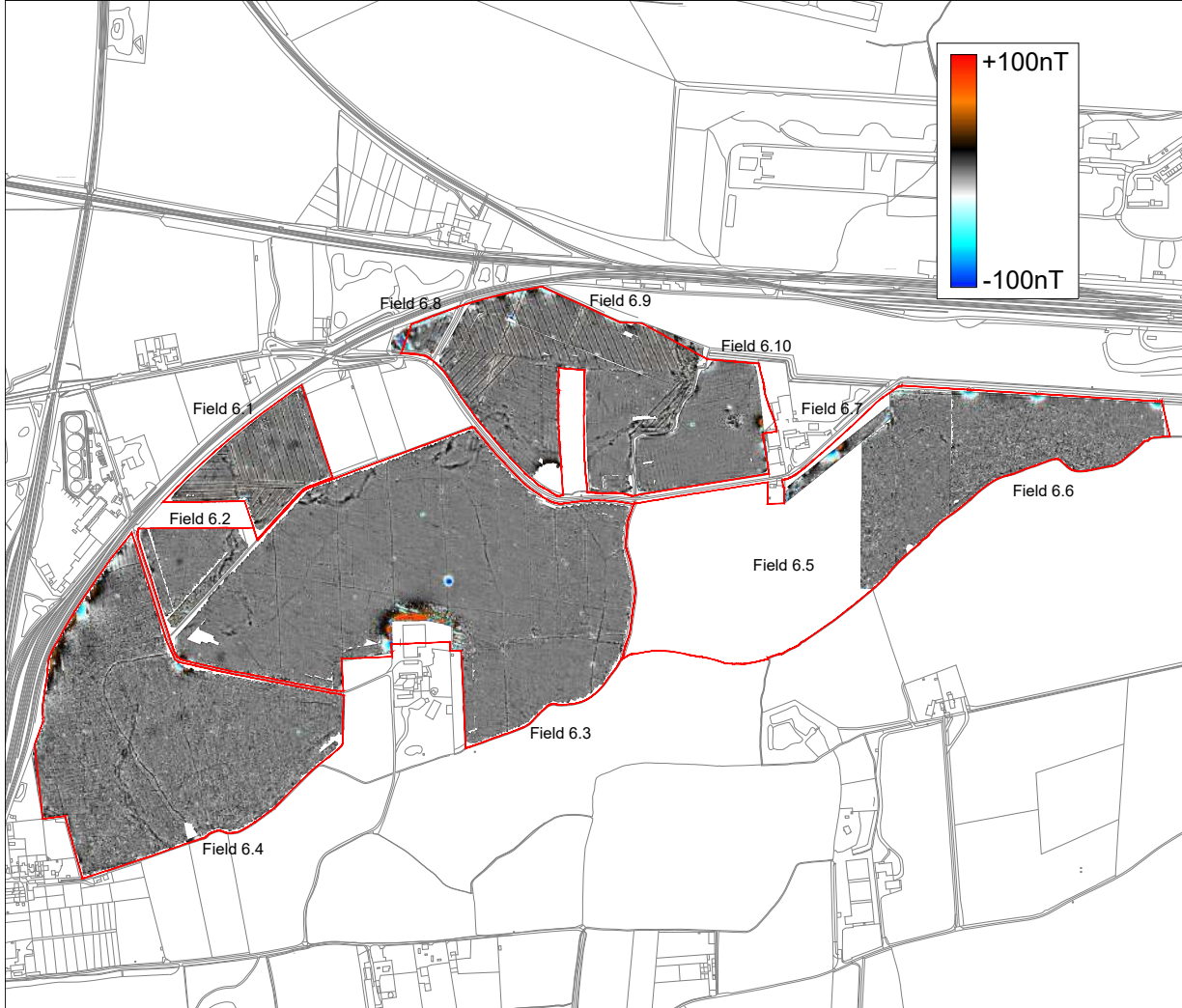
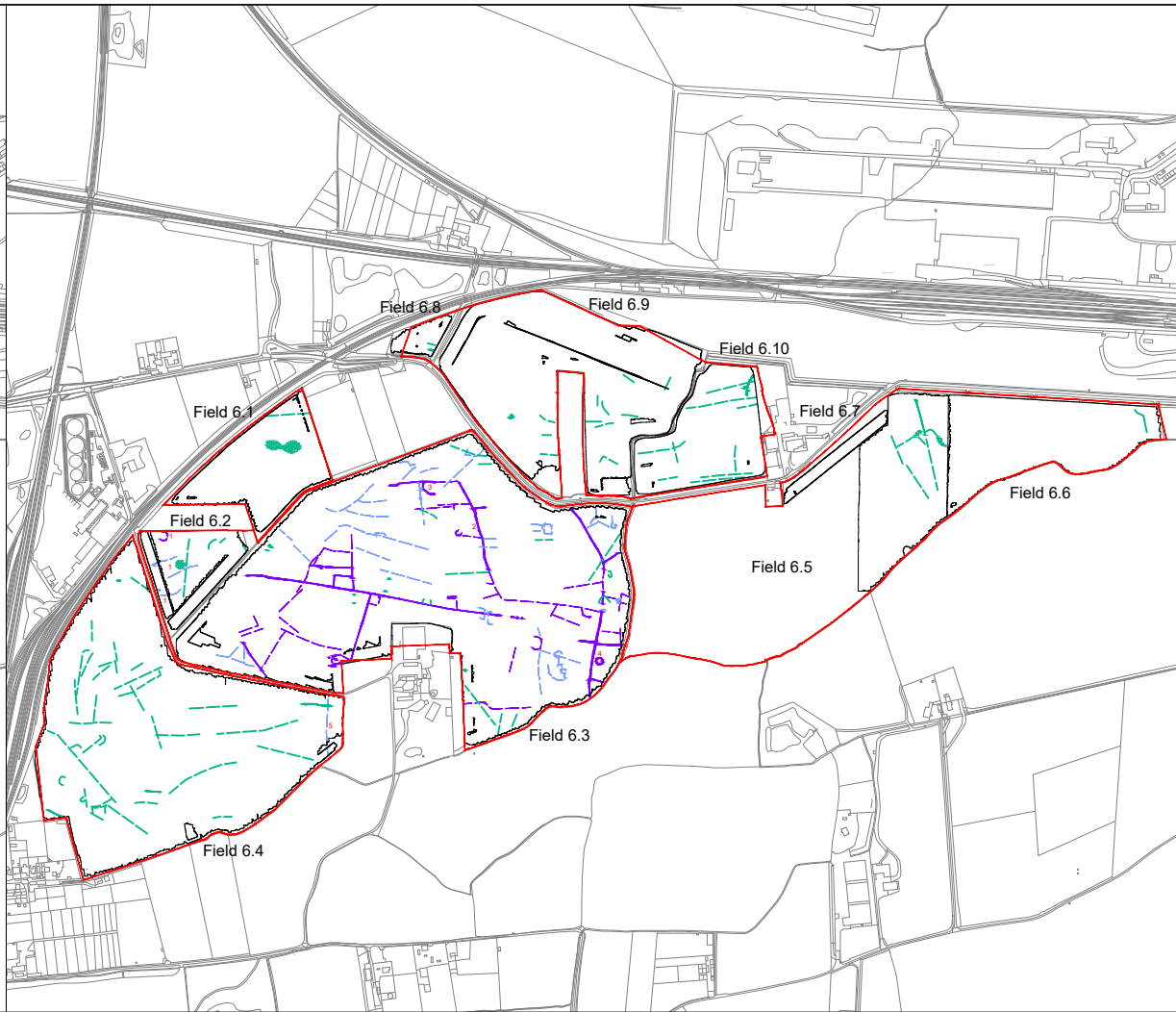
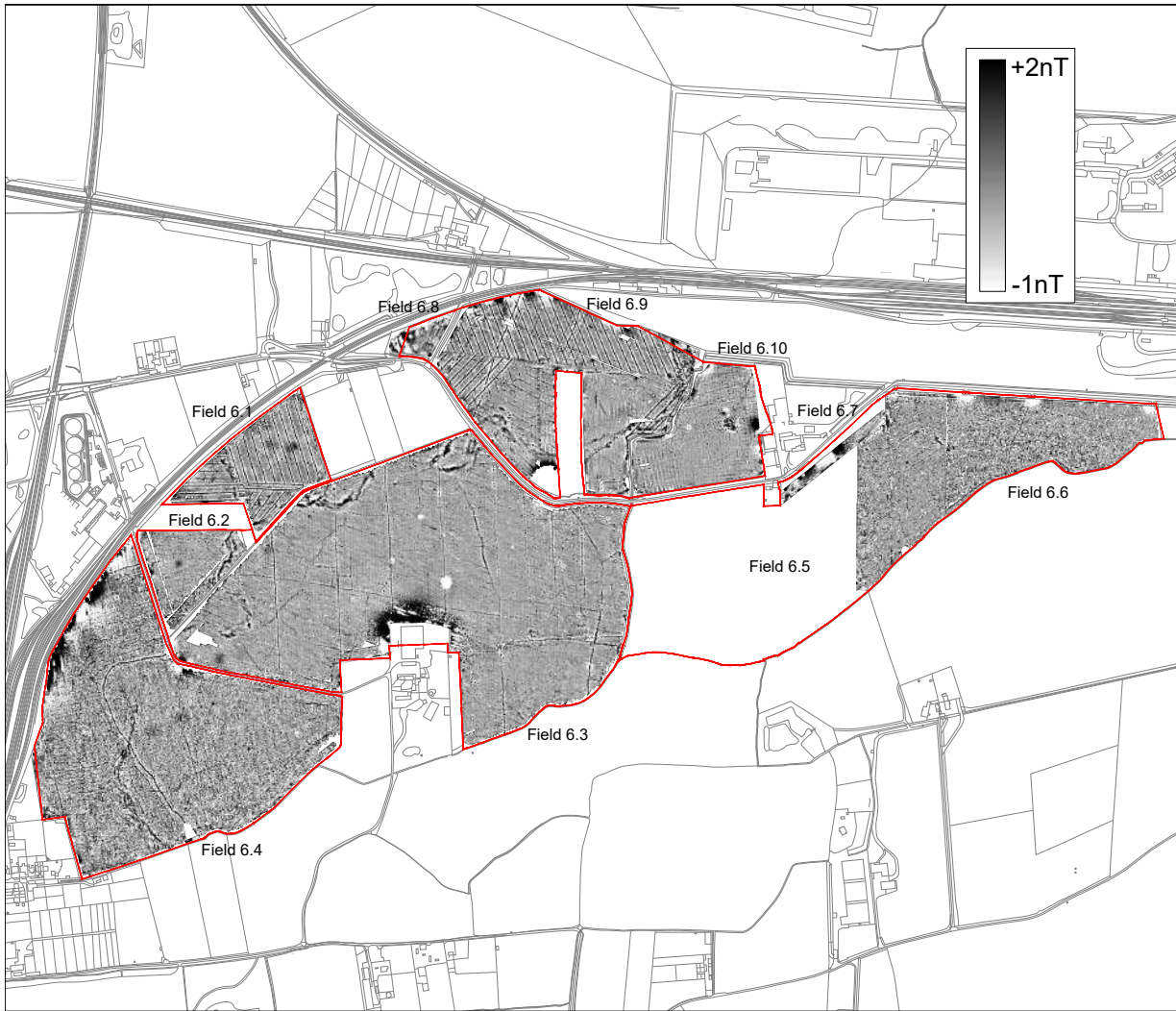
Title:  
Greyscale Plots / Interpretation / 1830-1880  
Ordnance Survey Map / 2024 Aerial Image

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
NOT TO SCALE

Fig No:  
23

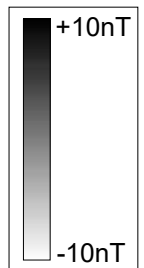
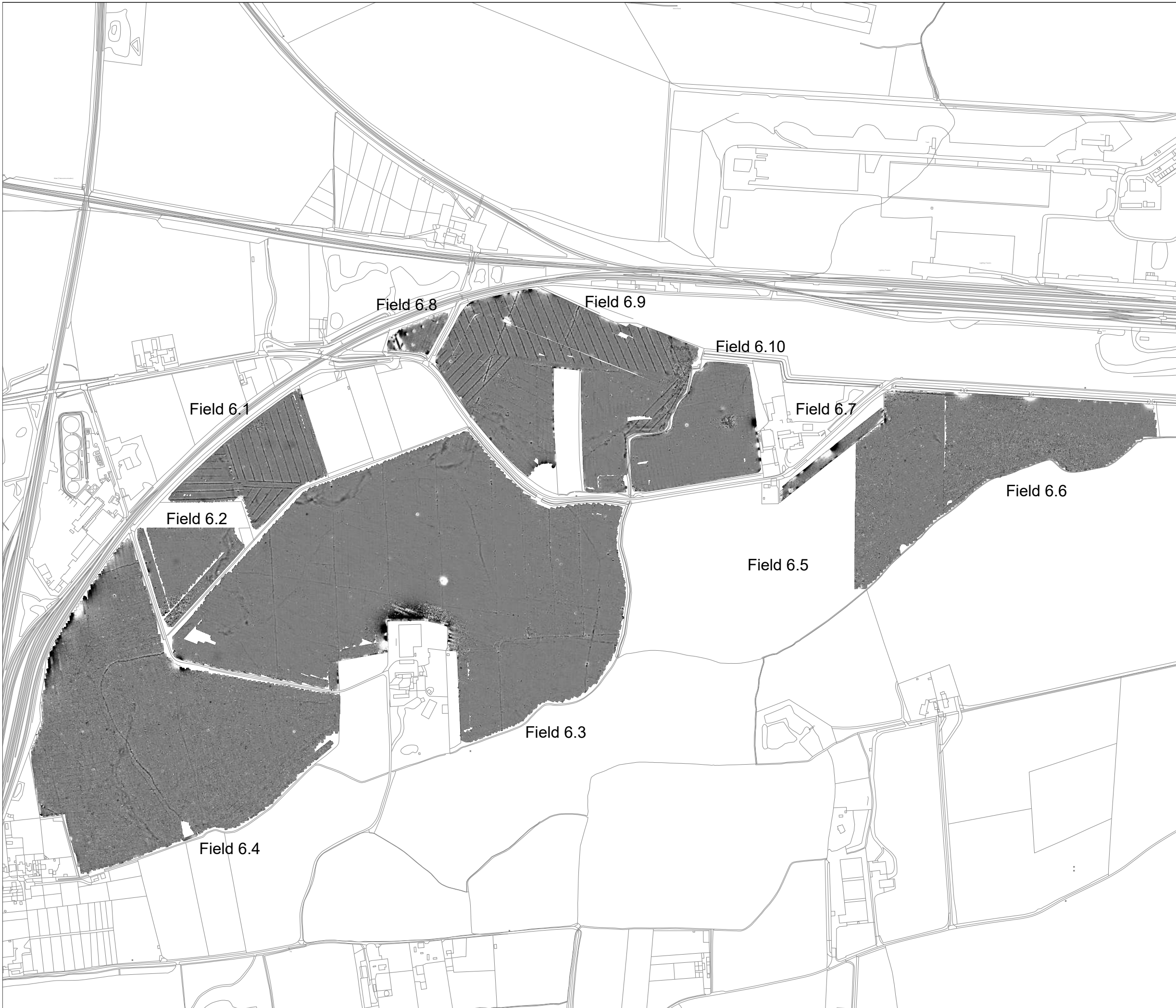


### KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



Title: Greyscale and Colour Plots / Interpretation split	
Client: Island Green Power UK Limited	
Project: 16614-6 - Light Valley Solar Project: Site 6	
Scale: NOT TO SCALE	Fig No: 24



Title: Minimally Processed Data - Greyscale Plots

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 350  
1:7000 @ A3

Fig No: 25



Field 6.1

Field 6.2



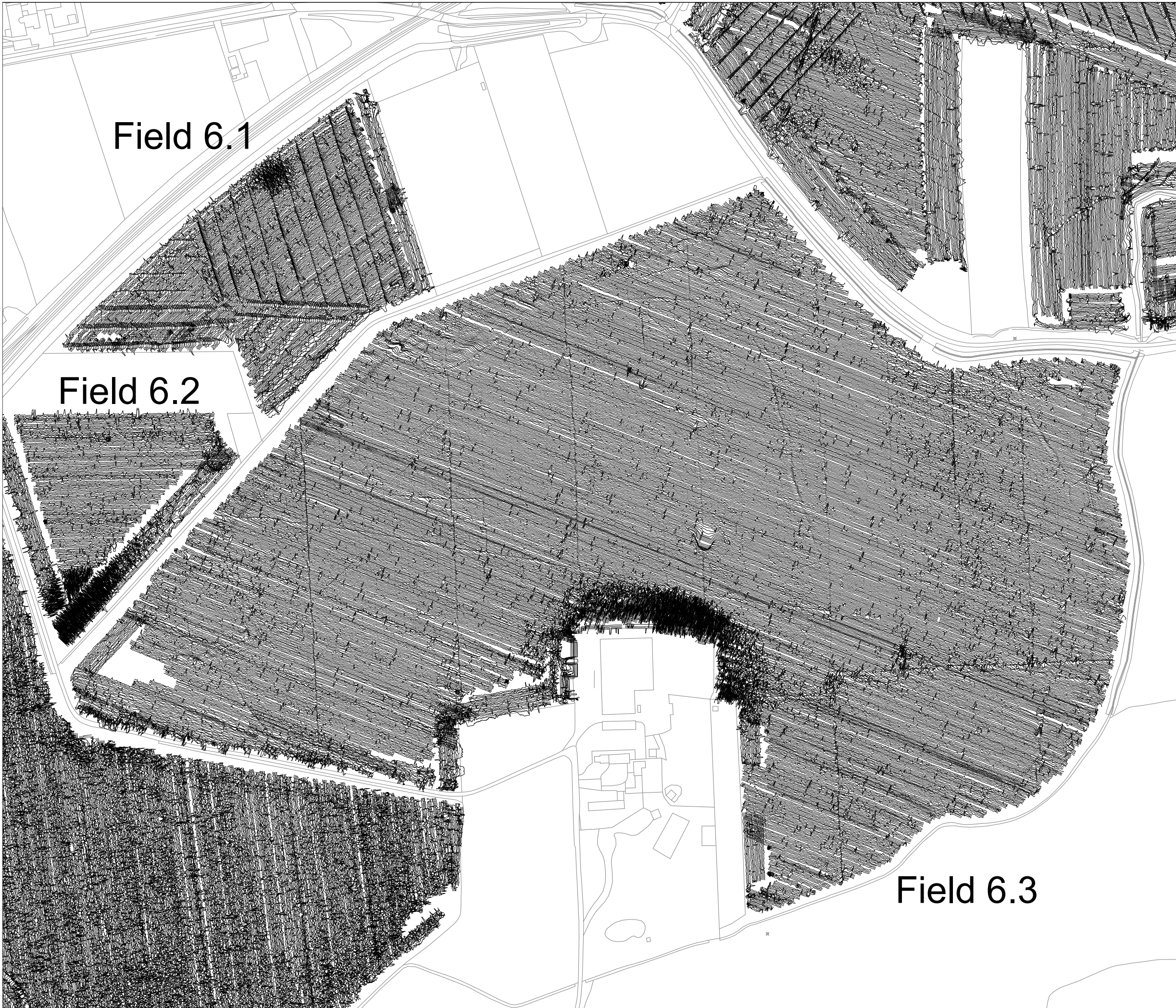
Title: XY Trace Plots  
(Fields 6.1 & 6.2 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 26



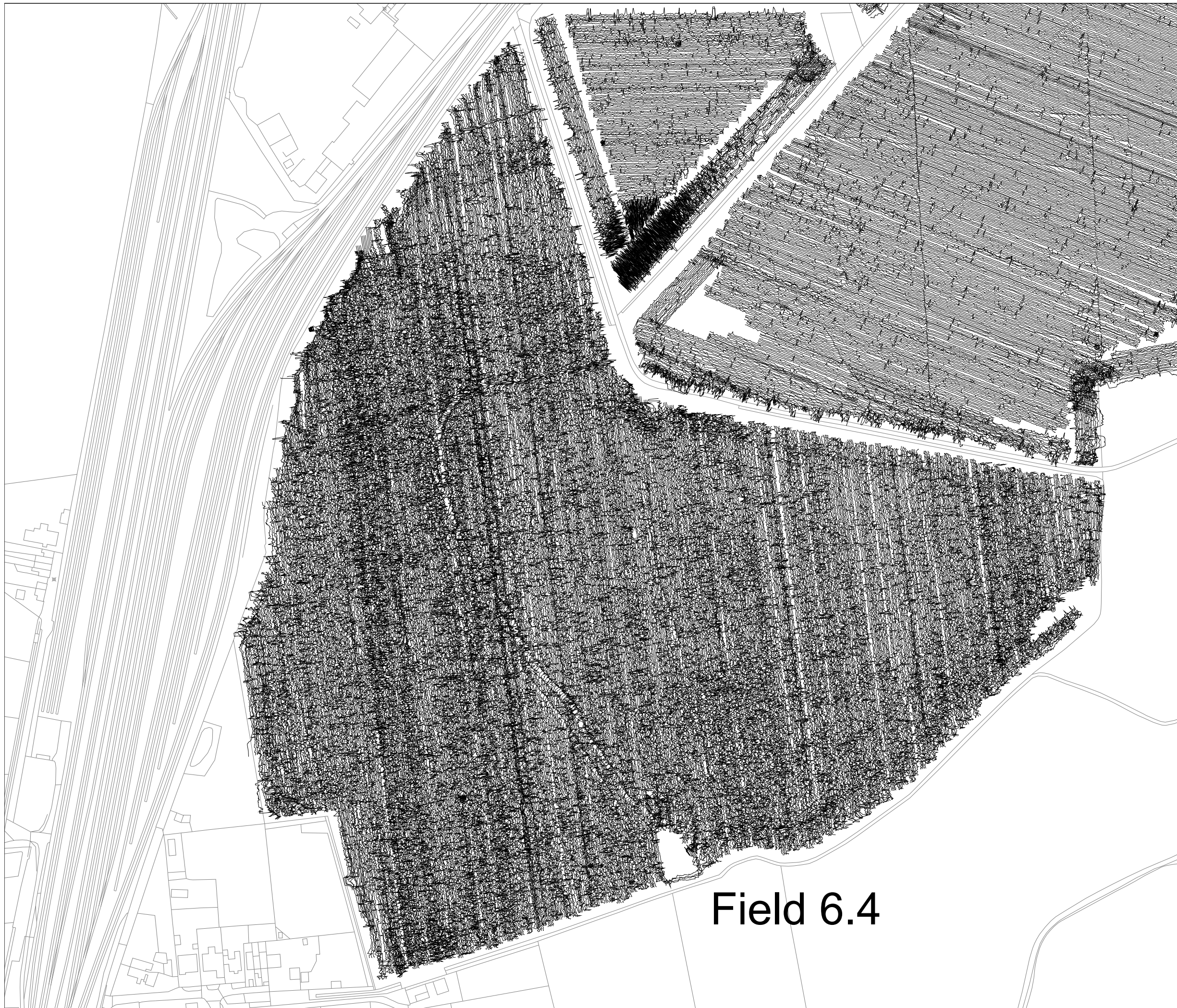
Title:  
XY Trace Plots (Field 6.3 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 150  
1:3000 @ A3

Fig No:  
27



Title:  
XY Trace Plots (Field 6.4 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
28



Field 6.7

Field 6.5



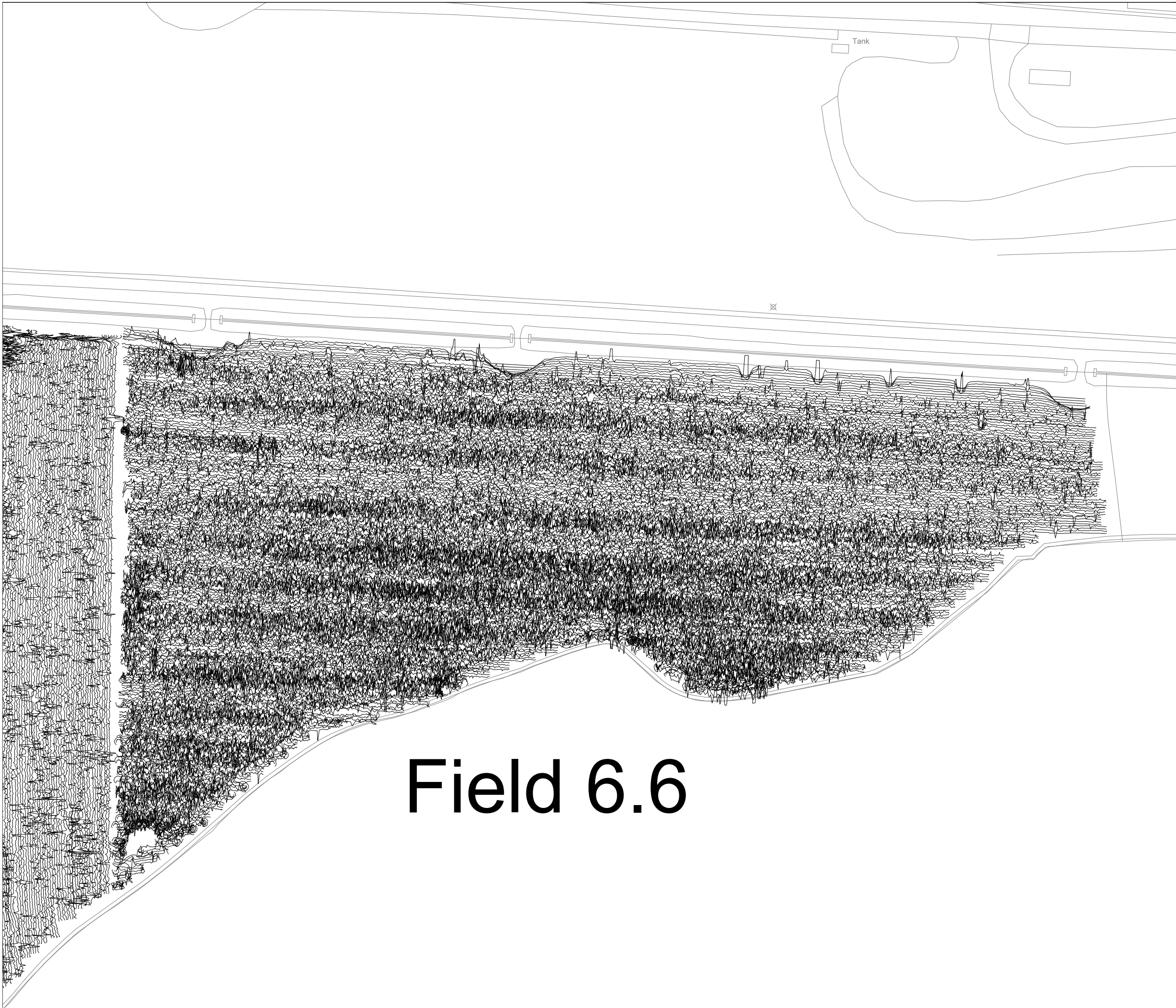
Title: XY Trace Plots  
(Field 6.5 & 6.7 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 110  
1:2200 @ A3

Fig No: 29



# Field 6.6



Title:  
XY Trace Plots (Field 6.6 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-6 - Light Valley Solar Project: Site 6

Scale:  
0 metres 75  
1:1500 @ A3

Fig No:  
30



Field 6.8

Field 6.9

Field 6.10



Title: XY Trace Plots  
(Field 6.8, 6.9 & 6.10 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-6 - Light Valley Solar Project: Site 6

Scale: 0 metres 125  
1:2500 @ A3

Fig No: 31

Field 6

## Appendix A - Technical Information: Magnetometer Survey Method

### Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m
Magnetometer	MACS Cart System (Foerster)	1.0m	0.125m

### Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

### Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

### Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### MACS Cart System (Foerster)

A multi-sensor array cart system (MACS) utilising 4 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 1m intervals, with a control unit and data logger was used for the magnetic survey. Each data point is geographically referenced using an on-board RTK GNSS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### Data Processing

Zero Mean Traverse      This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.

Step Correction (De-stagger)      When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

## Display

Greyscale/  
Colourscale Plot

This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

## Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall, etc.*) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology / Probable Archaeology</i>	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable &amp; possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge &amp; Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern.

Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

*Uncertain Origin*

Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology / Natural* or (in the case of linear responses) *Possible Archaeology / Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

## Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.

## Appendix C - OASIS Summary

<b>OASIS ID (UID)</b>	sumogeop1-533200
<b>Project Name</b>	Geophysical Survey at Light Valley Solar Project: Site 6
<b>Sitename</b>	Light Valley Solar Project: Site 6
<b>Sitecode</b>	16614-6
<b>Project Identifier(s)</b>	SUMO-16614-6
<b>Activity type</b>	Geophysical Survey, MAGNETOMETRY SURVEY
<b>Planning Id</b>	
<b>Reason For Investigation</b>	Planning requirement
<b>Organisation Responsible for work</b>	SUMO Geophysics Ltd.
<b>Project Dates</b>	20-Jan-2025 - 09-Apr-2025
<b>Location</b>	<p><b>Light Valley Solar Project: Site 6</b></p> <p>NGR: SE 50853 31336  LL: 53.77588652442215, -1.229843983617545  12 Fig: 450853,431336</p> <p>NGR: SE 50700 30840  LL: 53.77143893337236, -1.232237015604775  12 Fig: 450700,430840</p> <p>NGR: SE 51429 31280  LL: 53.77532486688565, -1.221107516839029  12 Fig: 451429,431280</p> <p>NGR: SE 51118 31099  LL: 53.773731510380806, -1.225854140400389  12 Fig: 451118,431099</p> <p>NGR: SE 52052 31271  LL: 53.775185464573674, -1.211655342250357  12 Fig: 452052,431271</p> <p>NGR: SE 51503 31476  LL: 53.777082853652566, -1.219955186000319  12 Fig: 451503,431476</p>
<b>Administrative Areas</b>	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: South Milford
<b>Project Methodology</b>	Data was collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in

	localised magnetic anomalies compared with the general magnetic background. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings were taken at 0.125m centres along traverses 1.0m apart. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
<b>Project Results</b>	The magnetometer survey has recorded magnetic responses that have been interpreted as being of archaeological interest. In Fields 6.2, 6.3 and 6.4 numerous ditches, enclosures, ring-ditches and pits have been detected. They probably reflect widescale land divisions and clusters of enclosures. Some of anomalies correspond with HER records. A possible barrow has also been marked in the south-east of Field 6.3. Ridge and furrow cultivation is visible in Fields 6.3, 6.9 and 6.10. Numerous responses of uncertain origin have been plotted in the data; while archaeological origins cannot be discounted for all these anomalies, some may be due to natural or agricultural processes. At the time of the survey the western part of Field 6.5 was unsurveyable due to a rapeseed crop. Former field boundaries, land drains and modern ploughing have been recorded throughout Site 6. Discrete anomalies located within sinuous bands of increased response have been caused by natural processes. Green waste appears to have been spread across Fields 6.4, 6.5 and 6.6 which has caused increased levels of magnetic background 'noise'. The route of a service pipe is visible in the west of Field 6.8. Zones of magnetic disturbances in Fields 6.1, 6.2, 6.3, 6.8, 6.9 and 6.10 are due to the spreading of modern debris.
<b>Keywords</b>	Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Field System - UNCERTAIN - FISH Thesaurus of Monument Types Ditched Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Ring Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Pit - UNCERTAIN - FISH Thesaurus of Monument Types Enclosed Settlement - UNCERTAIN - FISH Thesaurus of Monument Types Ridge And Furrow - MEDIEVAL - FISH Thesaurus of Monument Types Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Plough Marks - POST MEDIEVAL - FISH Thesaurus of Monument Types Drainage System - 20TH CENTURY - FISH Thesaurus of Monument Types Pipeline - 20TH CENTURY - FISH Thesaurus of Monument Types
<b>Funder</b>	Private or public corporation Island Green Power UK Limited
<b>HER</b>	North Yorkshire HER - unRev - STANDARD
<b>Person Responsible for work</b>	Thomas Cockcroft
<b>HER Identifiers</b>	
<b>Archives</b>	

## Appendix D – Data Management Plan & Archive Selection Strategy

### Data Management Plan

Project ID / OASIS ID

SUMO- 16614-6 / sumogeop1-533200

Project Name

Light Valley Solar Project: Site 6

Project Description

Detailed magnetic survey over approx.100ha

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

Craig Wakefield / Simon Lobel / Liam Brice-Bateman

Date DMP created

26.03.2024

Date DMP last updated

17.04.2025

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart magnetometers

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).

- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

## **Archive Selection Strategy**

### **Digital Data**

#### Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

#### De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

### **Documents**

Not applicable – no archive

### **Materials**

Not applicable – no archive



- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.  
SUMO Services Ltd, incorporated under the laws of England and Wales,  
Company Registration No.4275993.  
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL

# Annex F Light Valley Site 7 Geophysical Survey Report



# GEOPHYSICAL SURVEY REPORT

## Light Valley Solar Project: Site 7

Client

**Island Green Power UK Limited**

Survey Report

**16614-7**

OASIS Ref. No.

**sumogeop1-536640**

Date

**09 September 2025**



## Survey Report 16614-7: Light Valley Solar Project: Site 7

<b>Survey dates</b>	29 August 2025
<b>Field co-ordinator</b>	Jelmer Wubs BA MA
<b>Field Team</b>	Morgan Potter
<b>Report Date</b>	09 September 2025
<b>CAD Illustrations</b>	Thomas Cockcroft MSc MCIfA
<b>Report Author</b>	Thomas Cockcroft MSc MCIfA
<b>Project Manager</b>	Thomas Cockcroft MSc MCIfA
<b>Report approved</b>	Dr John Gater BSc DSc(Hon) MCIfA FSA

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SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.

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## 1 LIST OF FIGURES

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## 2 LIST OF APPENDICES

Appendix A	Technical Information: Magnetometer Survey Methods, Processing and Presentation
Appendix B	Technical Information: Magnetic Theory
Appendix C	OASIS Data Collection Sheet
Appendix D	Data Management Plan & Archive Selection Strategy

## 3 SURVEY TECHNIQUE

3.1 Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site. All survey techniques followed the guidance set out by ClfA (2020) and the European Archaeology Council (EAC) (2016).

MACS Cart System (Foerster)    Traverse Interval 1.0m                      Sample Interval 0.125m

The only processes performed on data are the following unless specifically stated otherwise:

Zero Mean Traverse	This process sets the background mean of each traverse to zero. The operation removes instrument striping effects and edge discontinuities over the whole of the data set.
-----------------------	--

## 4 EXECUTIVE SUMMARY OF RESULTS

- 4.1 A magnetometer survey of 8.6 hectares of land at Site 7 of the Light Valley Solar Project not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. Numerous uncertain responses are visible in the survey which are likely to have been caused by a combination of underlying natural variations and agricultural processes. Several former field boundaries and land drains have also been marked.

## 5 INTRODUCTION

- 5.1 **SUMO GeoSurveys** was commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by **Island Green Power UK Limited**.

- 5.2 This survey is part of the Light Valley Solar Project which is composed of eight separate magnetometer survey reports.

### 5.3 Site Details

NGR / Postcode	SE 50648 31655 / LS25 5BX
Location	The site is located 1.5 km south-east of Sherburn in Elmet and 1.7 km north of Monk Fryston. The survey area is bounded to the south by Common Lane and to the north and west by railway lines.
HER	North Yorkshire HER
OASIS Ref. No.	sumogeop1-536640
District	n/a
Parish	South Milford CP
Topography	Flat
Land Use	Arable
Geology (BGS 2025)	Bedrock: Brotherton Formation - Limestone, dolomitic Superficial: Hemingbrough Glaciolacustrine Formation - Clay, silty.
Soils (CU 2025)	Soilscape 18: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	8.6 ha

### 5.4 *Archaeological Background*

- 5.4.1 A search of the HER has revealed that no designated or non-designated heritage assets are recorded within the site.

### 5.5 *Aims and Objectives*

- 5.5.1 To locate and characterise any anomalies of possible archaeological interest within the study area.

## 6 RESULTS

### 6.1 ***Probable / Possible Archaeology***

6.1.1 No magnetic responses have been recorded that could be interpreted as being of definite archaeological interest.

### 6.2 ***Uncertain***

6.2.1 Uncertain trends and a few zones of increased response have been detected in the survey which have been assigned to the category of *Uncertain*. While archaeological origins cannot be entirely ruled out, the responses generally lack the defined morphology of anomalies that would normally warrant such an interpretation. The responses are likely to have been caused by a combination of underlying natural variations and agricultural processes.

### 6.3 ***Former Field Boundary – Corroborated***

6.3.1 A number of linear anomalies have been detected in the survey which correspond with the locations of former field boundaries which are visible in historic mapping (see Figure 05).

### 6.4 ***Agricultural – Land Drains***

6.4.1 Widely spaced and parallel responses are visible in the survey which mark the routes of land drains.

### 6.5 ***Ferrous / Magnetic Disturbance***

6.5.1 Ferrous responses close to boundaries are due to adjacent fences and gates. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

## 7 DATA APPRAISAL & CONFIDENCE ASSESSMENT

7.1 Historic England Table 4 (EH 2008) states that the typical magnetic response on the local soils / geology is variable. The results from this survey indicate the presence of former field boundaries; consequently, there is no *a priori* reason why archaeological features would not have been detected, if present.

## 8 CONCLUSION

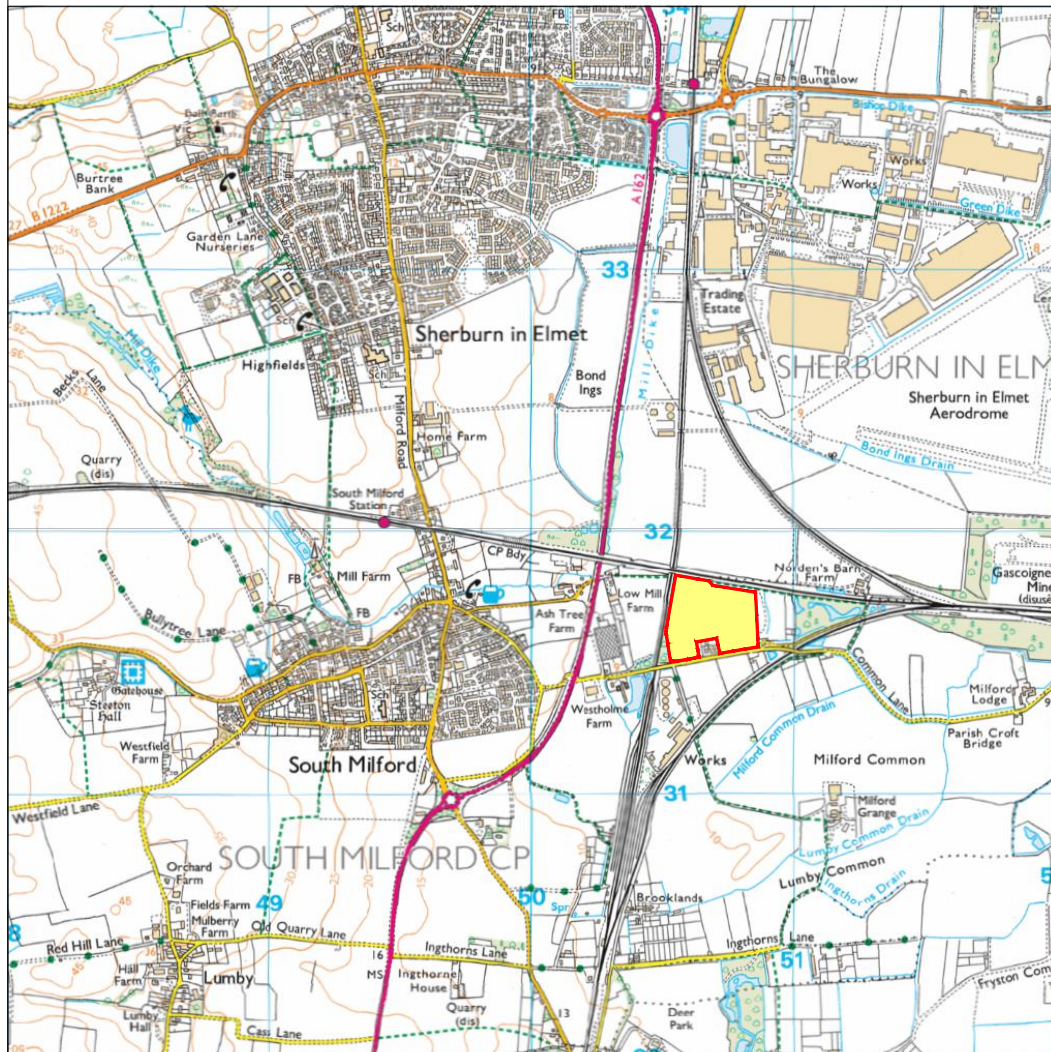
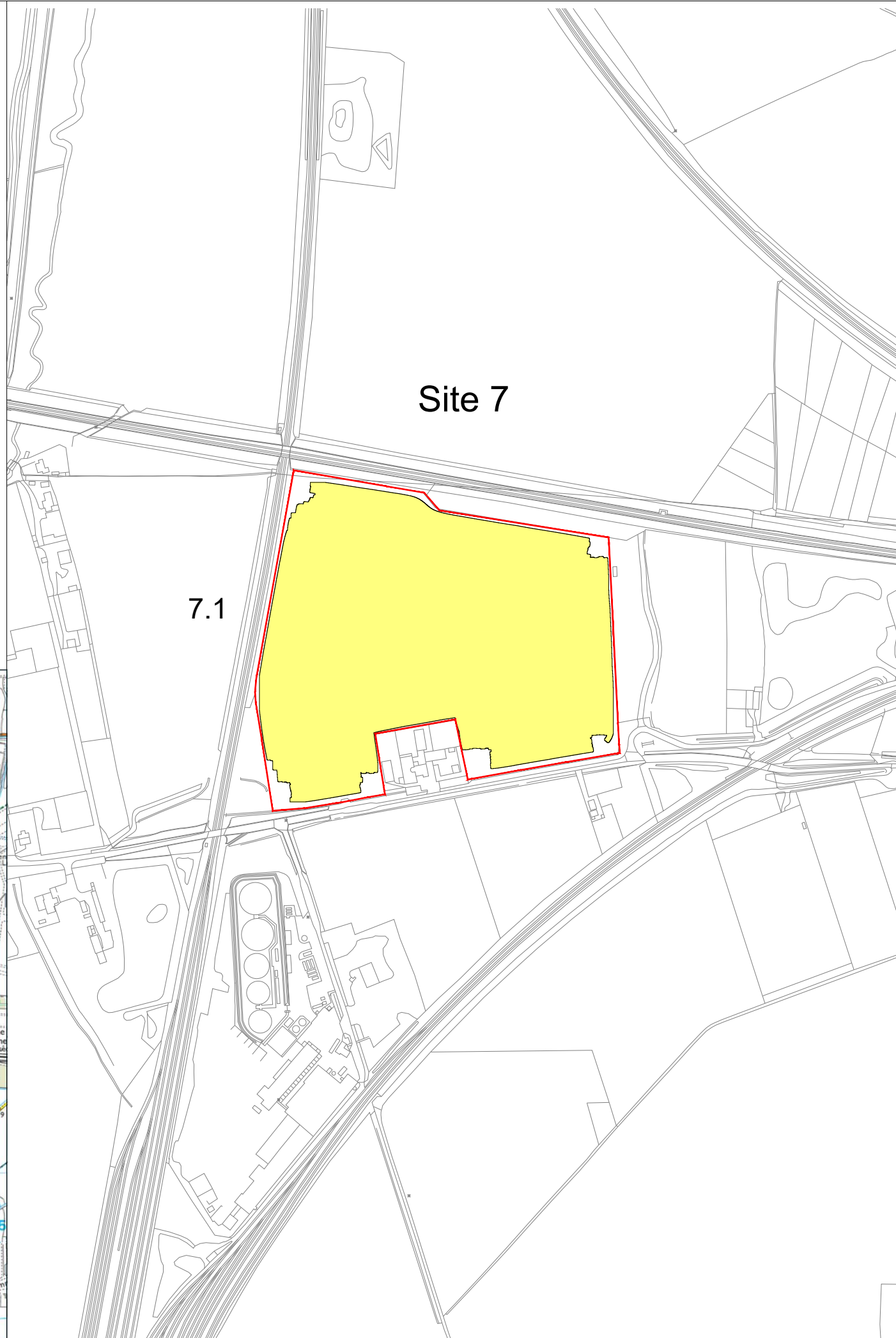
8.1 The magnetometer survey has not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. Numerous uncertain responses are visible in the survey which are likely to have been caused by a combination of underlying natural variations and agricultural processes. Several former field boundaries and land drains have also been marked.

## 9 REFERENCES


- BGS 2025 *Geology of Britain Viewer*, British Geological Survey, website:  
[REDACTED]
- ClfA 2020 *Standard and Guidance for Archaeological Geophysical Survey*. 2014 amended 2020. ClfA Guidance note. Chartered Institute for Archaeologists, Reading  
[REDACTED]
- CU 2025 *The Soils Guide*. www.landis.org.uk. Cranfield University, UK. website:  
[REDACTED]
- EAC 2016 *EAC Guidelines for the Use of Geophysics in Archaeology*, European Archaeological Council, Guidelines 2.
- EH 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage, Swindon (now withdrawn, but used for evaluating suitability of soil types)

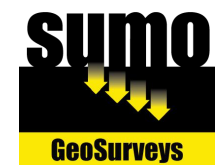
## 10 ARCHIVE

- 10.1 The minimally processed data, data images, XY traces and a copy of this report are stored in **SUMO GeoSurveys'** digital archive, on an internal RAID configured NAS drive in the Midlands Office. These data are also backed up to the Cloud for off-site storage.
- 10.2 The Grey Literature will be archived with OASIS and the relevant HER within a period of 12 months.



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 Survey Areas



Title: Site Location

Client: Island Green Power UK Limited

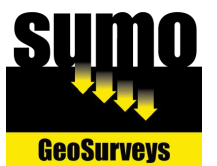
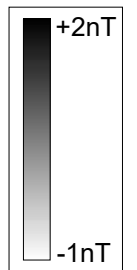
Project: 16614-7 - Light Valley Solar Project: Site 7

Scale: NOT TO SCALE

Fig No: 01

# Site 7

7.1



Title: Magnetometer Survey - Greyscale Plot

Client: Island Green Power UK Limited

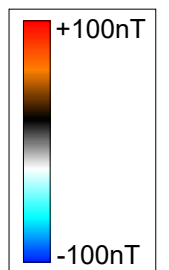
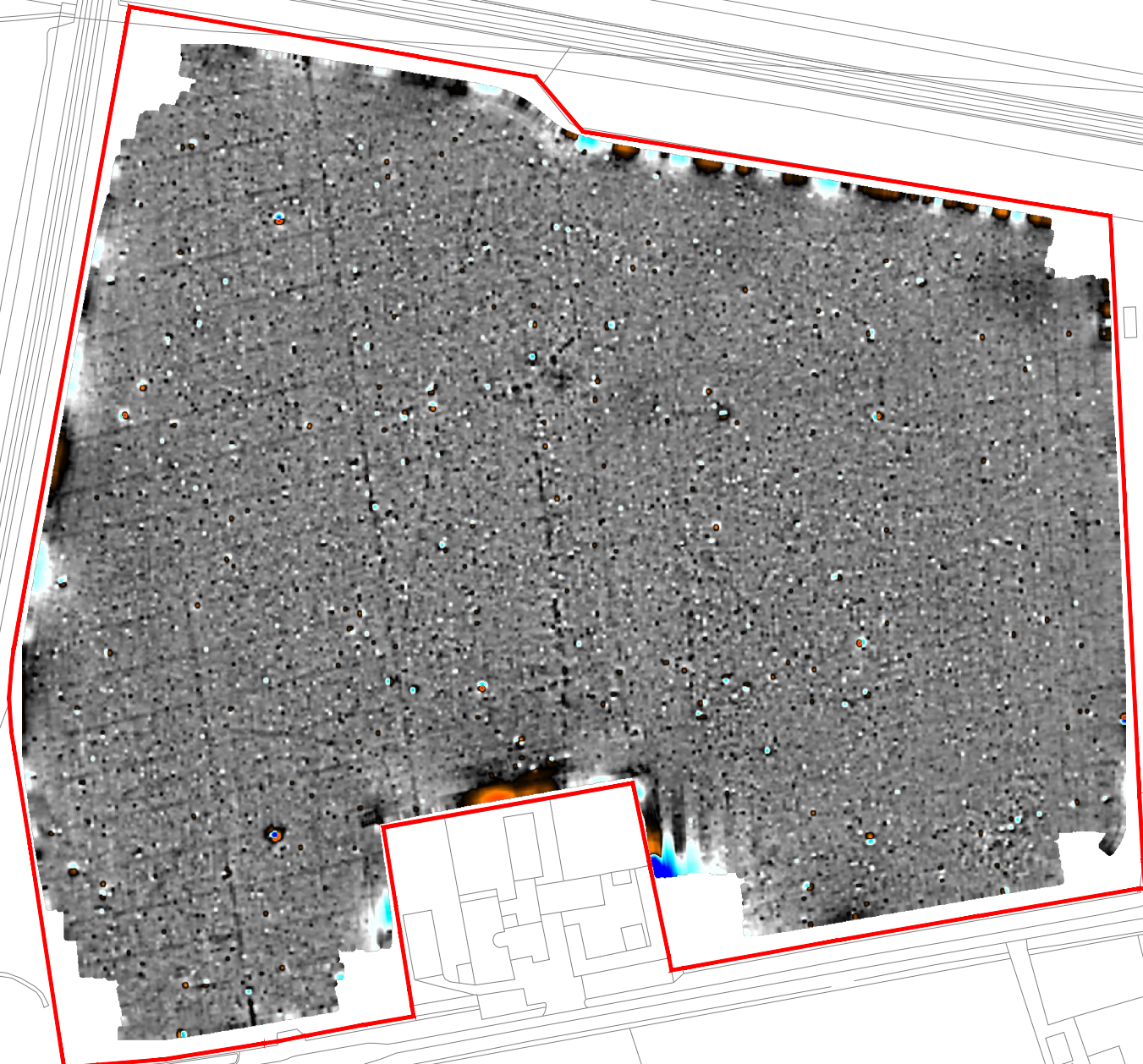
Project: 16614-7 - Light Valley Solar Project: Site 7

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 02

# Site 7

7.1



Title: Magnetometer Survey - Colour Plot

Client: Island Green Power UK Limited

Project: 16614-7 - Light Valley Solar Project: Site 7

Scale: 0 metres 100  
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Fig No: 03

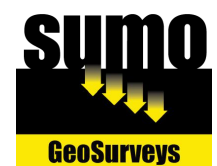
# Site 7

7.1



## KEY

	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Agriculture (land drain)
	Ferrous



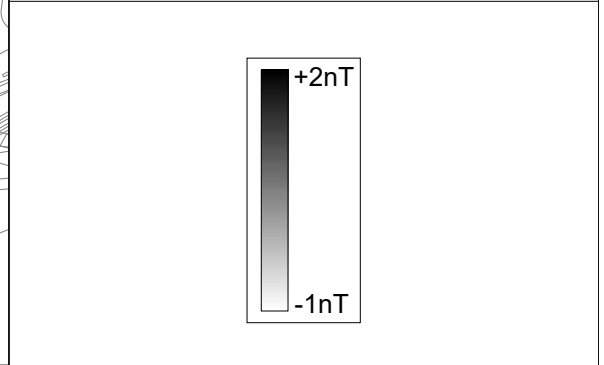
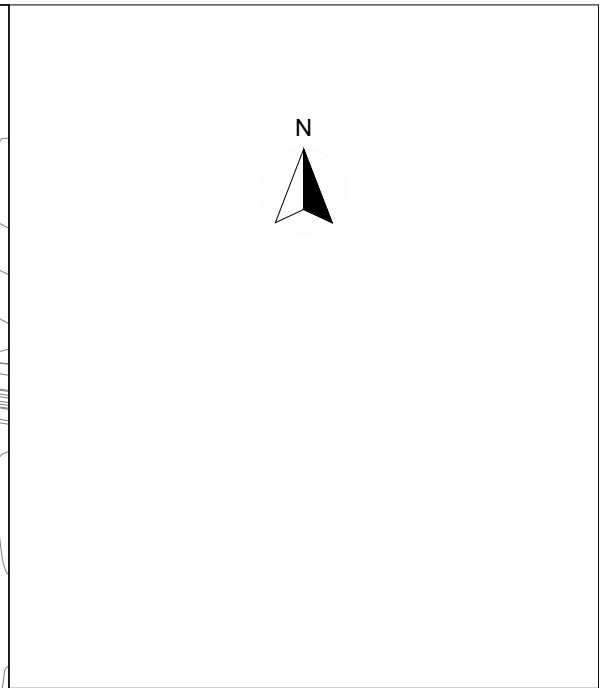
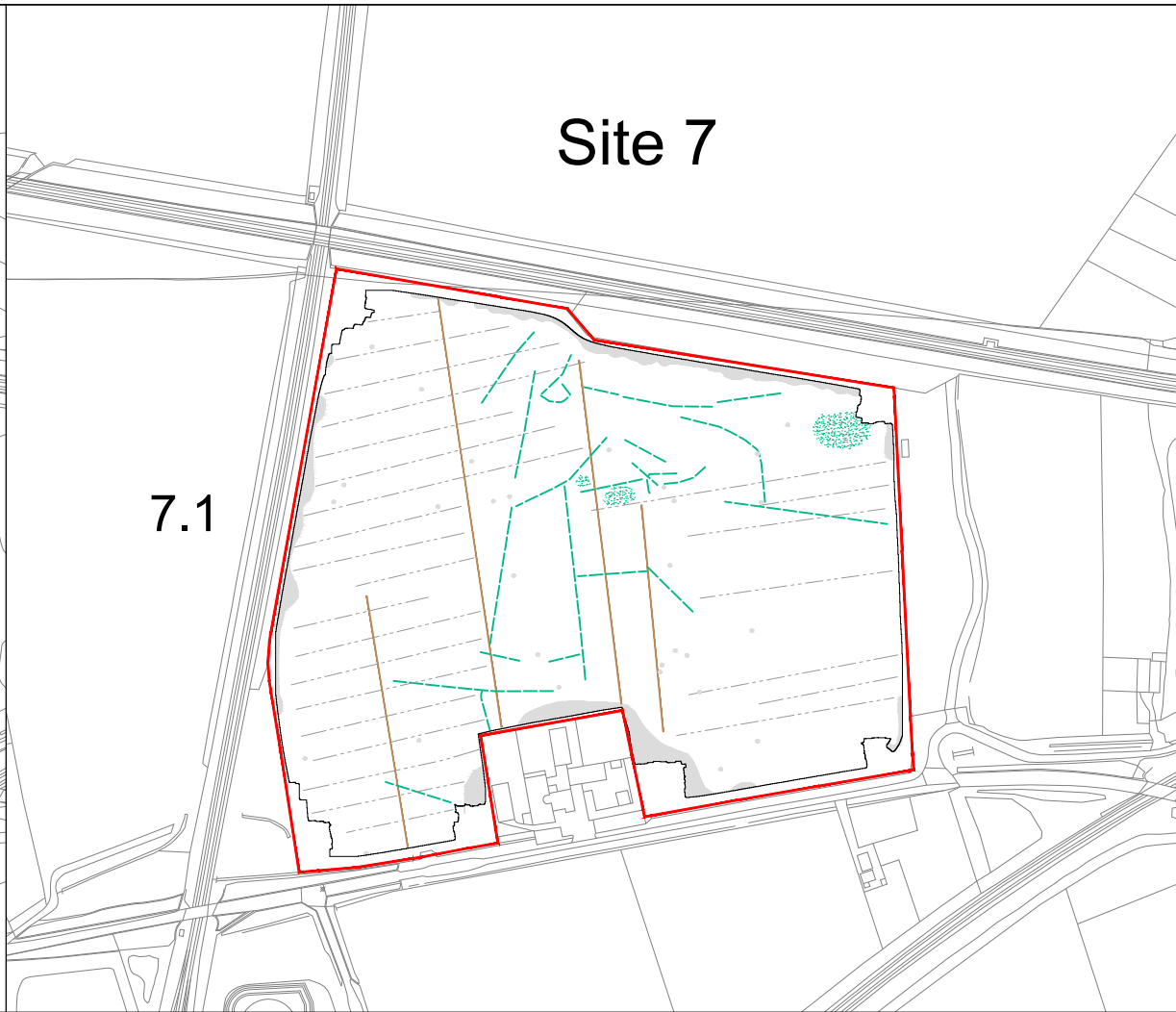
Title: Magnetometer Survey - Interpretation

Client: Island Green Power UK Limited

Project: 16614-7 - Light Valley Solar Project: Site 7

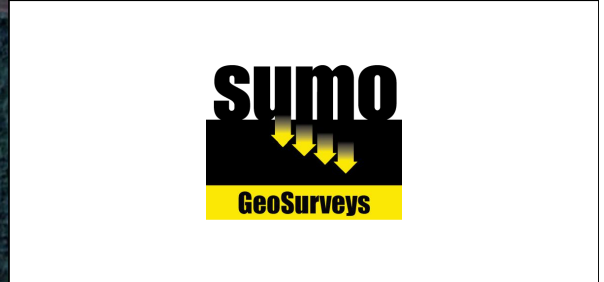
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1:2000 @ A3

Fig No: 04



**KEY**

	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Agriculture (land drain)
	Ferrous



Title: Greyscale Plot / Interpretation / 1830-1880 Ordnance Survey Map / 2025 Aerial Image

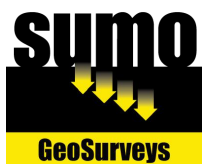
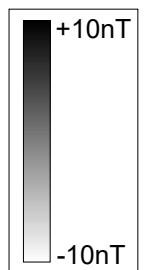
Client: Island Green Power UK Limited

Project: 16614-7 - Light Valley Solar Project: Site 7

Scale: NOT TO SCALE Fig No: 05

# Site 7

7.1



Title:  
Minimally Processed Data - Greyscale Plot

Client:  
Island Green Power UK Limited

Project:  
16614-7 - Light Valley Solar Project: Site 7

Scale:  
0 metres 100  
1:2000 @ A3

Fig No:  
06

# Site 7

7.1



Title:  
XY Trace Plots (clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-7 - Light Valley Solar Project: Site 7

Scale:  
0 metres 100  
1:2000 @ A3

Fig No:  
07

## Appendix A - Technical Information: Magnetometer Survey Method

### Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m
Magnetometer	MACS Cart System (Foerster)	1.0m	0.125m

### Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

### Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

### Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### MACS Cart System (Foerster)

A multi-sensor array cart system (MACS) utilising 4 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 1m intervals, with a control unit and data logger was used for the magnetic survey. Each data point is geographically referenced using an on-board RTK GNSS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### Data Processing

Zero Mean	This process sets the background mean of each traverse within each grid to zero.
Traverse	The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

## Display

Greyscale/  
Colourscale Plot

This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

## Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall, etc.*) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology / Probable Archaeology</i>	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable &amp; possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge &amp; Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern.

Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

*Uncertain Origin*

Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology / Natural* or (in the case of linear responses) *Possible Archaeology / Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

## Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.

## Appendix C - OASIS Summary

<b>OASIS ID (UID)</b>	sumogeop1-536640
<b>Project Name</b>	Magnetometry Survey at Light Valley Solar Project: Site 7
<b>Sitename</b>	Light Valley Solar Project: Site 7
<b>Sitecode</b>	16614-7
<b>Project Identifier(s)</b>	16614-7
<b>Activity type</b>	Magnetometry Survey, MAGNETOMETRY SURVEY
<b>Planning Id</b>	
<b>Reason For Investigation</b>	Planning requirement
<b>Organisation Responsible for work</b>	SUMO Geophysics Ltd.
<b>Project Dates</b>	29-Aug-2025 - 29-Aug-2025
<b>Location</b>	<b>Light Valley Solar Project: Site 7</b> NGR: SE 50680 31664 LL: 53.778848912532126, -1.23240801978016 12 Fig: 450680,431664
<b>Administrative Areas</b>	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: South Milford
<b>Project Methodology</b>	Data was collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings were taken at 0.125m centres along traverses 1.0m apart. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
<b>Project Results</b>	The magnetometer survey has not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. Numerous uncertain responses are visible in the survey which are likely to have been caused by a combination of underlying natural variations and agricultural processes. Several former field boundaries and land drains have also been marked.
<b>Keywords</b>	Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Drainage System - 20TH CENTURY - FISH Thesaurus of Monument Types

<b>Funder</b>	Private or public corporation Island Green Power UK Limited
<b>HER</b>	North Yorkshire HER - unRev - STANDARD
<b>Person Responsible for work</b>	Thomas Cockcroft
<b>HER Identifiers</b>	
<b>Archives</b>	

Report generated on: 09-09-2025:0918

## Appendix D – Data Management Plan & Archive Selection Strategy

### Data Management Plan

Project ID / OASIS ID

SUMO- 16614-6 / sumogeop1-536640

Project Name

Light Valley Solar Project: Site 7

Project Description

Detailed magnetic survey over approx.8.6ha

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

Jelmer Wubs

Date DMP created

26.03.2024

Date DMP last updated

09.09.2025

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart magnetometers

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).

- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

## **Archive Selection Strategy**

### **Digital Data**

#### Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

#### De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

### **Documents**

Not applicable – no archive

### **Materials**

Not applicable – no archive



- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

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SUMO Services Ltd, incorporated under the laws of England and Wales,  
Company Registration No.4275993.  
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL

# Annex G Light Valley Site 8 Geophysical Survey Report



# **GEOPHYSICAL SURVEY REPORT**

## **Light Valley Solar Project: Site 8**

Client

**Island Green Power UK Limited**

Survey Report

**16614-8**

OASIS Ref. No.

**sumogeop1-532823**

Date

**31 March 2025**



## Survey Report 16614-8: Light Valley Solar Project: Site 8

<b>Survey dates</b>	27-30 January 2025 03-06 February 2025 14 & 17-20 March 2025
<b>Field co-ordinator</b>	William Vernon BA (Hons) Liam Brice-Bateman BA Craig Wakefield MSc
<b>Field Team</b>	Gemma Asbury MA Amy Allinson MSc
<b>Report Date</b>	31 March 2025
<b>CAD Illustrations</b>	Thomas Cockcroft MSc MCIfA
<b>Report Author</b>	Thomas Cockcroft MSc MCIfA
<b>Project Manager</b>	Thomas Cockcroft MSc MCIfA
<b>Report approved</b>	Dr John Gater BSc DSc(Hon) MCIfA FSA

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SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.

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## 2 LIST OF APPENDICES

Appendix A	Technical Information: Magnetometer Survey Methods, Processing and Presentation
Appendix B	Technical Information: Magnetic Theory
Appendix C	OASIS Data Collection Sheet
Appendix D	Data Management Plan & Archive Selection Strategy

## 3 SURVEY TECHNIQUE

3.1 Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site. All survey techniques followed the guidance set out by ClfA (2020) and the European Archaeology Council (EAC) (2016).

Bartington Cart System      Traverse Interval 1.0m      Sample Interval 0.125m

The only processes performed on data are the following unless specifically stated otherwise:

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes instrument striping effects and edge discontinuities over the whole of the data set.
--------------------	---

## 4 EXECUTIVE SUMMARY OF RESULTS

- 4.1 A magnetometer survey of 60 hectares of land at Site 8 of the Light Valley Solar Project has recorded a few magnetic responses which have been interpreted as being of possible archaeological interest. A partial enclosure has tentatively been marked in the north of Field 8.1 / 8.2. Uncertain anomalies have also been detected which have probably been caused by agricultural processes or buried ferrous debris. Former field boundaries, ploughing, land drains and service pipes have all been marked in the dataset. Zones of magnetic disturbance have been detected throughout the site which have been caused by spreads of modern debris or ground disturbance.

## 5 INTRODUCTION

- 5.1 **SUMO GeoSurveys** was commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by **Island Green Power UK Limited**.

- 5.2 This survey is part of the Light Valley Solar Project which is composed of eight separate magnetometer survey reports.

### 5.3 Site Details

NGR / Postcode	SE 54016 31751 / YO8 9GB
Location	The site is located 10.5km north-east of Castleford and 1km north-west of Hambleton. The site is bounded to the south by a railway line, to the east by Phillip Lane and to the west / north by Habholme Brook.
HER	North Yorkshire HER
OASIS Ref. No.	sumogeop1-532823
District	N/a
Parish	Hambleton Civil Parish
Topography	Flat
Land Use	Arable
Geology (BGS 2025)	Bedrock: Sherwood Sandstone Group - Sandstone Superficial: Hemingbrough Glaciolacustrine Formation - Clay, silty Brighton Sand Formation - Sand.
Soils (CU 2025)	Soilscape 18: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils Soilscape 22: Loamy soils with naturally high groundwater
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	60 ha

### 5.4 **Archaeological Background**

- 5.4.1 A search of the HER has revealed that no designated or non-designated heritage assets are recorded within the survey area.

### 5.5 **Aims and Objectives**

- 5.5.1 To locate and characterise any anomalies of possible archaeological interest within the study area.

## 6 RESULTS

6.1 *The survey has been divided into three survey areas (Fields 8.1-8.3); at the time of the survey there was no boundary between Field 8.1 and 8.2. Specific anomalies have been given numerical labels [1][2] which appear in the text below, as well as on the Interpretation Figure(s). Gaps in the magnetic data in Field 8.1 / 8.2 have been caused by standing water.*

### 6.2 **Possible Archaeology**

6.2.1 In the north of Field 8.1 / 8.2 magnetic trends and short discrete responses appear to form a partial enclosure [1]. Parallel trends are visible in the south and may be evidence of a double ditch along this side of the enclosure. A gap in the eastern ditch could mark the location of an entrance, while whether there is a western ditch is obscured by land drains. There are no obvious internal features visible in the magnetic data.

### 6.3 **Uncertain**

6.3.1 Numerous pit-like responses and trends have been detected in the survey which have been assigned to the category of *Uncertain*. They generally lack the defined morphology of anomalies that would warrant an archaeological interpretation. They have probably been caused by agricultural processes or buried ferrous debris.

### 6.4 **Former Field Boundary – Corroborated / Conjectural**

6.4.1 Numerous linear responds have been recorded which correspond with the routes of former field boundaries which are visible on 1888-1915 Ordnance Survey Mapping (see Figure 14).

6.4.2 Other anomalies have been categorised as being conjectural former field boundaries. While they don't correspond with field boundaries marked on available historic mapping, they have a similar magnetic signature to the corroborated boundaries.

### 6.5 **Agricultural – Ploughing / Land Drains**

6.5.1 Curving linear responses on the western edges of Fields 8.1 / 8.2 have been caused by ploughing.

6.5.2 Magnetically weak linear responses on numerous alignments have been detected throughout Site 8 which have been caused by land drains; many form characteristic herringbone patterns.

### 6.6 **Service**

6.6.1 A strong linear dipolar ferrous response in the south of Field 8.1 / 8.2 marks the route of an underground service pipe. It is unclear whether the strong magnetic responses along the southern edge of Fields 8.1 and 8.3 are due to a buried service or the adjacent railway and fence.

### 6.7 **Ferrous / Magnetic Disturbance**

6.7.1 Zones of magnetic disturbance have been detected throughout the site which have been caused by spreads of modern debris or ground disturbance. Buildings were once located in a gap in the data between Field 8.1 and 8.3 and marked as 'Ruddings' on 1888-1914 Ordnance Survey mapping (Figure 14).

6.7.2 A strong ferrous response [2] in Field 8.1 / 8.2 has been caused by an infilled pond which is visible on historic mapping (see Figure 14). Ferrous responses close to boundaries are due to adjacent fences and gates. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the

topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

## 7 DATA APPRAISAL & CONFIDENCE ASSESSMENT

7.1 Historic England Table 4 (EH 2008) states that the typical magnetic response on the local soils / geology is variable. The results from this survey indicate the presence of partial enclosure; consequently, there is no *a priori* reason why archaeological features would not have been detected.

## 8 CONCLUSION

8.1 The magnetometer survey recorded a few magnetic responses which have been interpreted as being of possible archaeological interest. A tentative partial enclosure has been marked in the north of Field 8.1 / 8.2; parallel trends on the southern side could be evidence of a double ditches while a gap in the eastern ditch may also mark the location of an entrance. Numerous uncertain pit-like responses and trends have been detected in the survey which have probably been caused by agricultural processes or buried ferrous debris. Former field boundaries, ploughing, land drains and service pipes have all been marked in the dataset. Zones of magnetic disturbance have been detected throughout the site which have been caused by spreads of modern debris or ground disturbance, some associated with former buildings on the site. A strong ferrous anomaly in Field 8.1 / 8.2 has been caused by an infilled pond.

## 9 REFERENCES

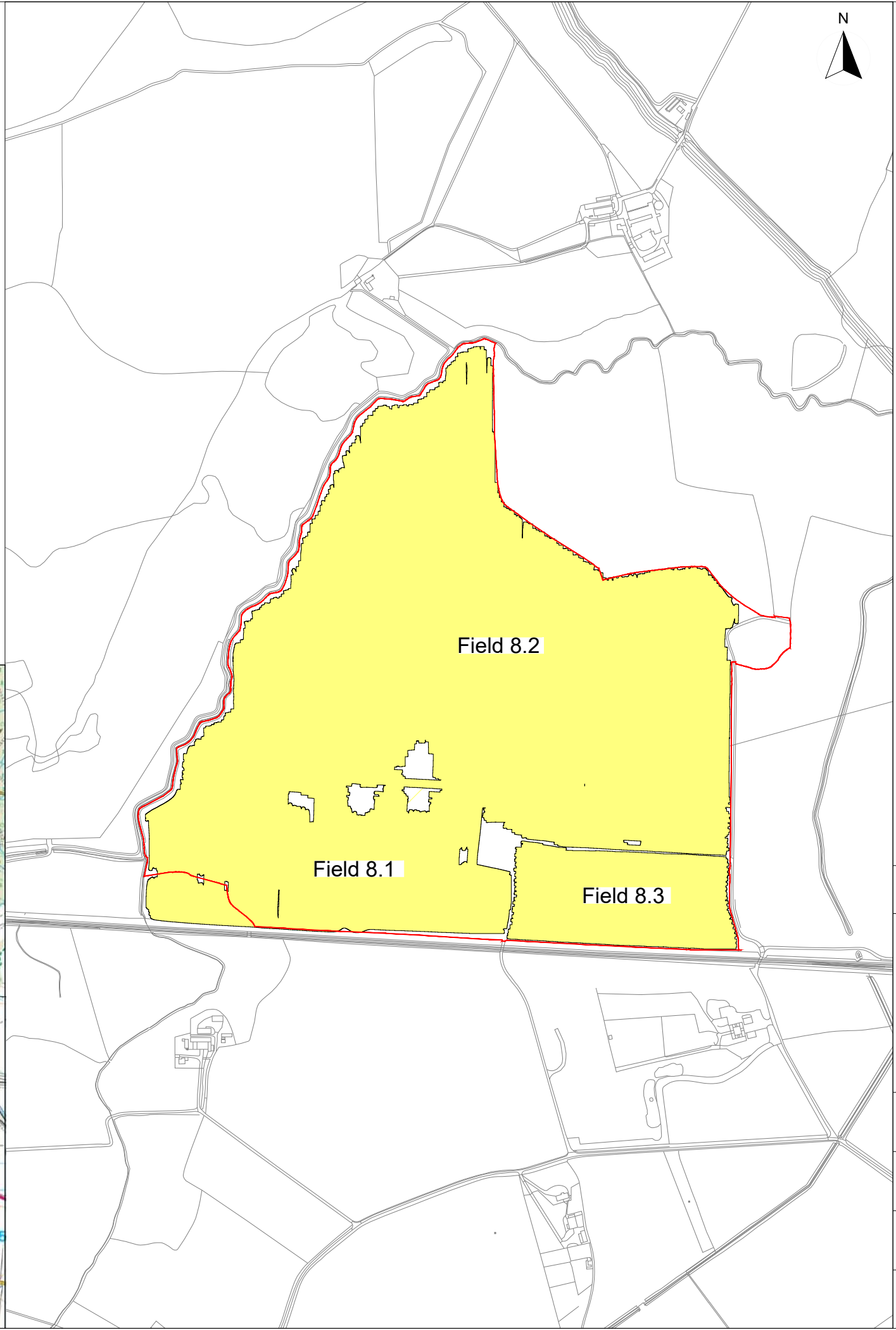
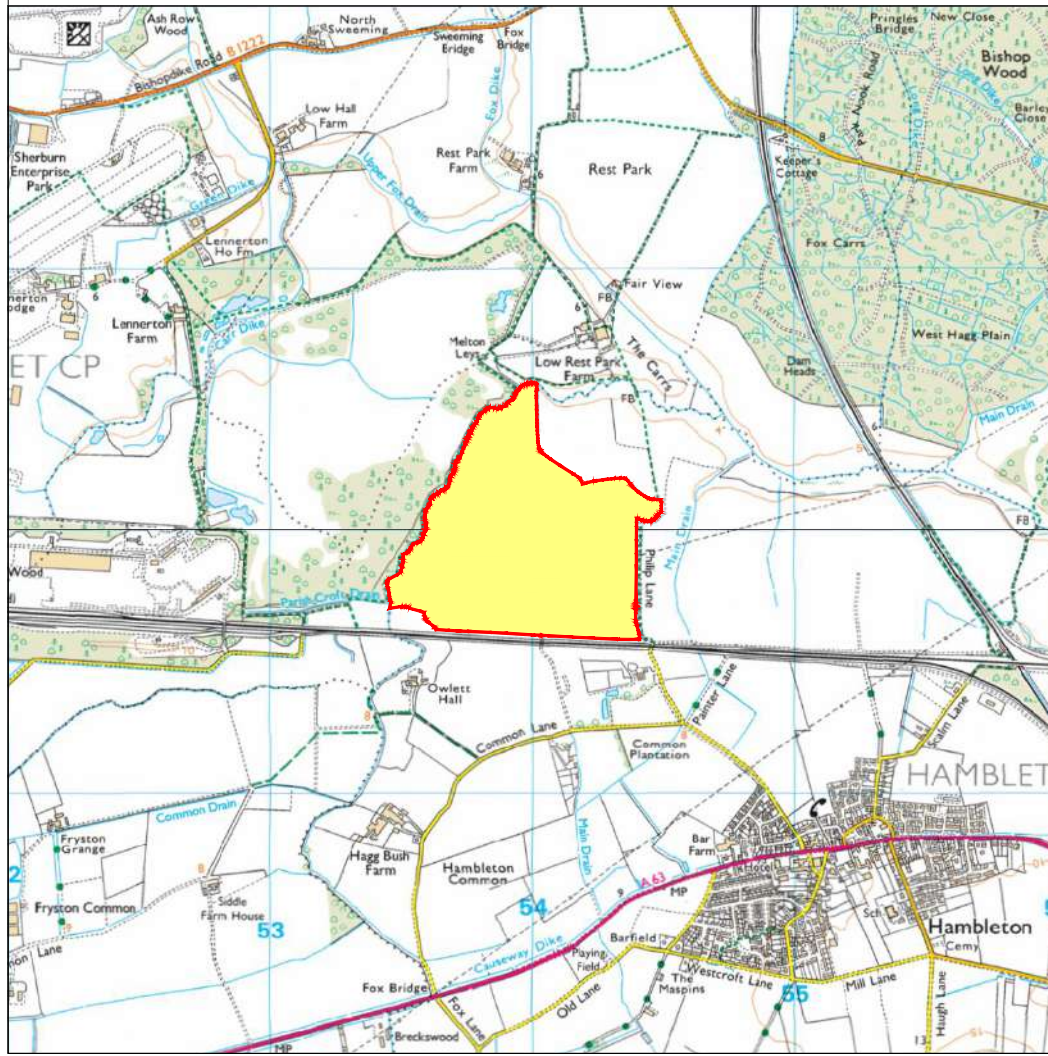
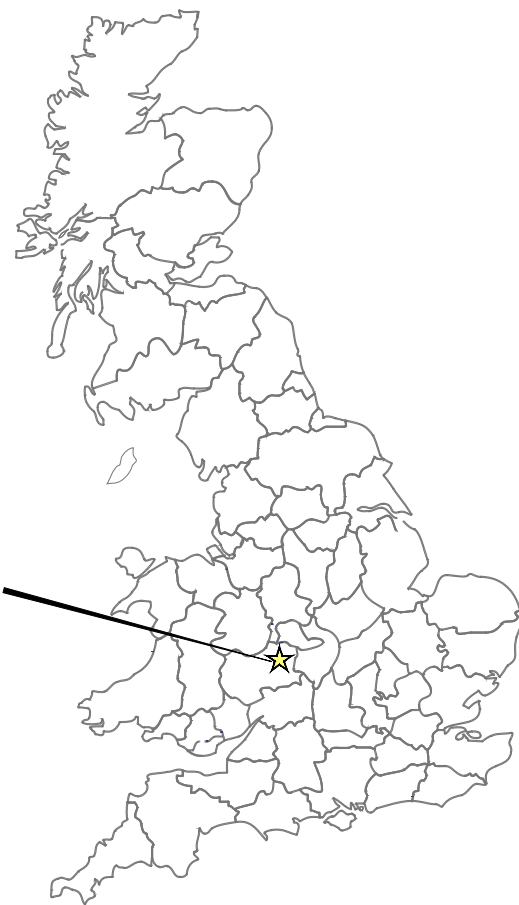
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[REDACTED]
- EAC 2016 *EAC Guidelines for the Use of Geophysics in Archaeology*, European Archaeological Council, Guidelines 2.
- EH 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage, Swindon (now withdrawn, but used for evaluating suitability of soil types)
- HG 2025 *Heritage Gateway Online Viewer*, website:  
[REDACTED]

## 10 ARCHIVE

- 10.1 The minimally processed data, data images, XY traces and a copy of this report are stored in **SUMO GeoSurveys'** digital archive, on an internal RAID configured NAS drive in the Midlands Office. These data are also backed up to the Cloud for off-site storage.
- 10.2 The Grey Literature will be archived with OASIS and the relevant HER within a period of 12 months.



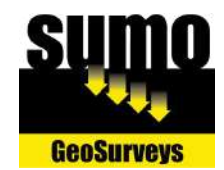
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Reproduced from Ordnance Survey's 1:25 000 map of 1998 with the permission of the controller of Her Majesty's Stationery Office. Crown Copyright reserved. Licence No: 100018665



Survey Areas



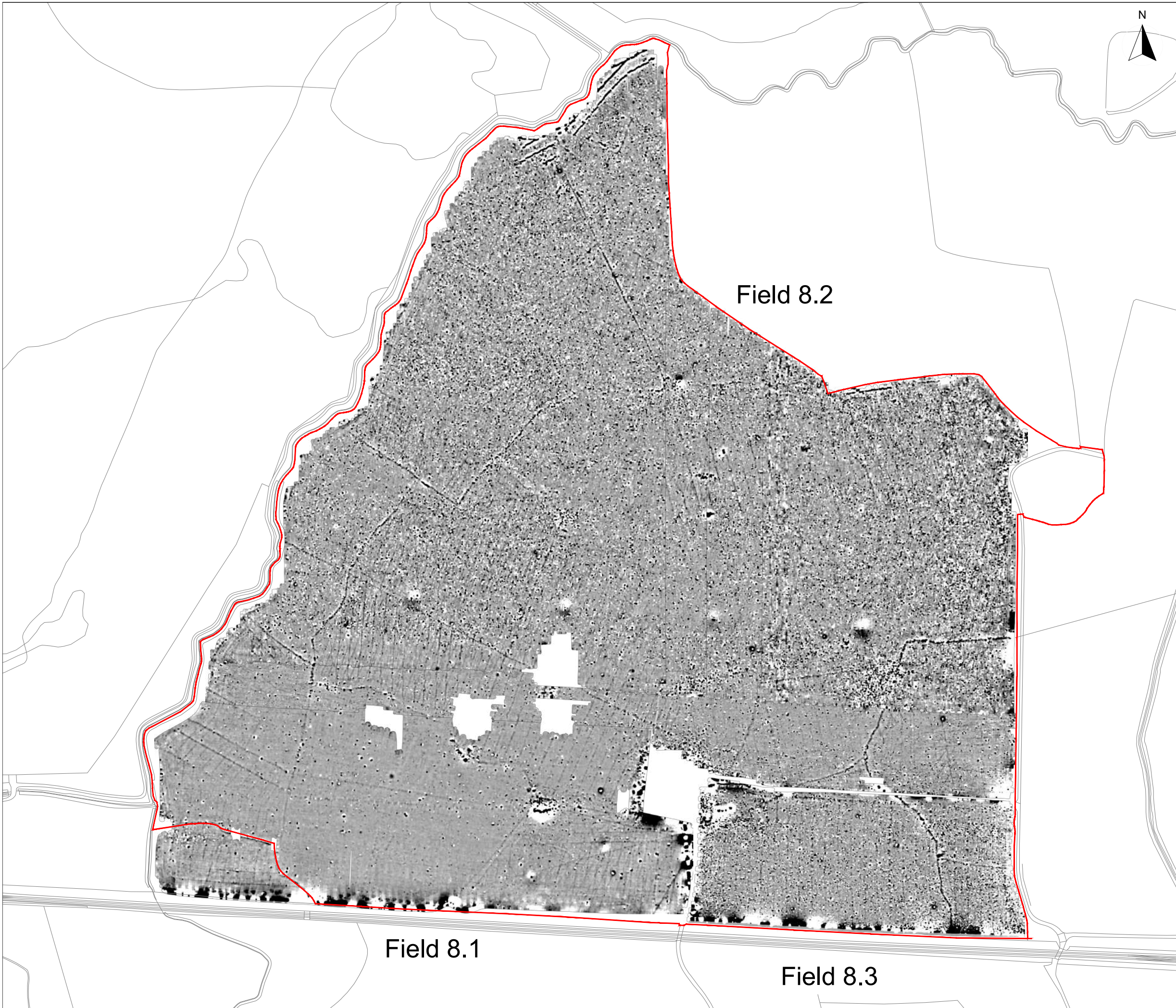
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Client: Island Green Power UK Limited

Project: 16614-8 - Light Valley Solar Project: Site 8

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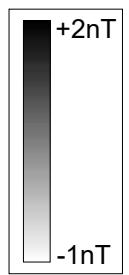
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Field 8.2

Field 8.1

Field 8.3



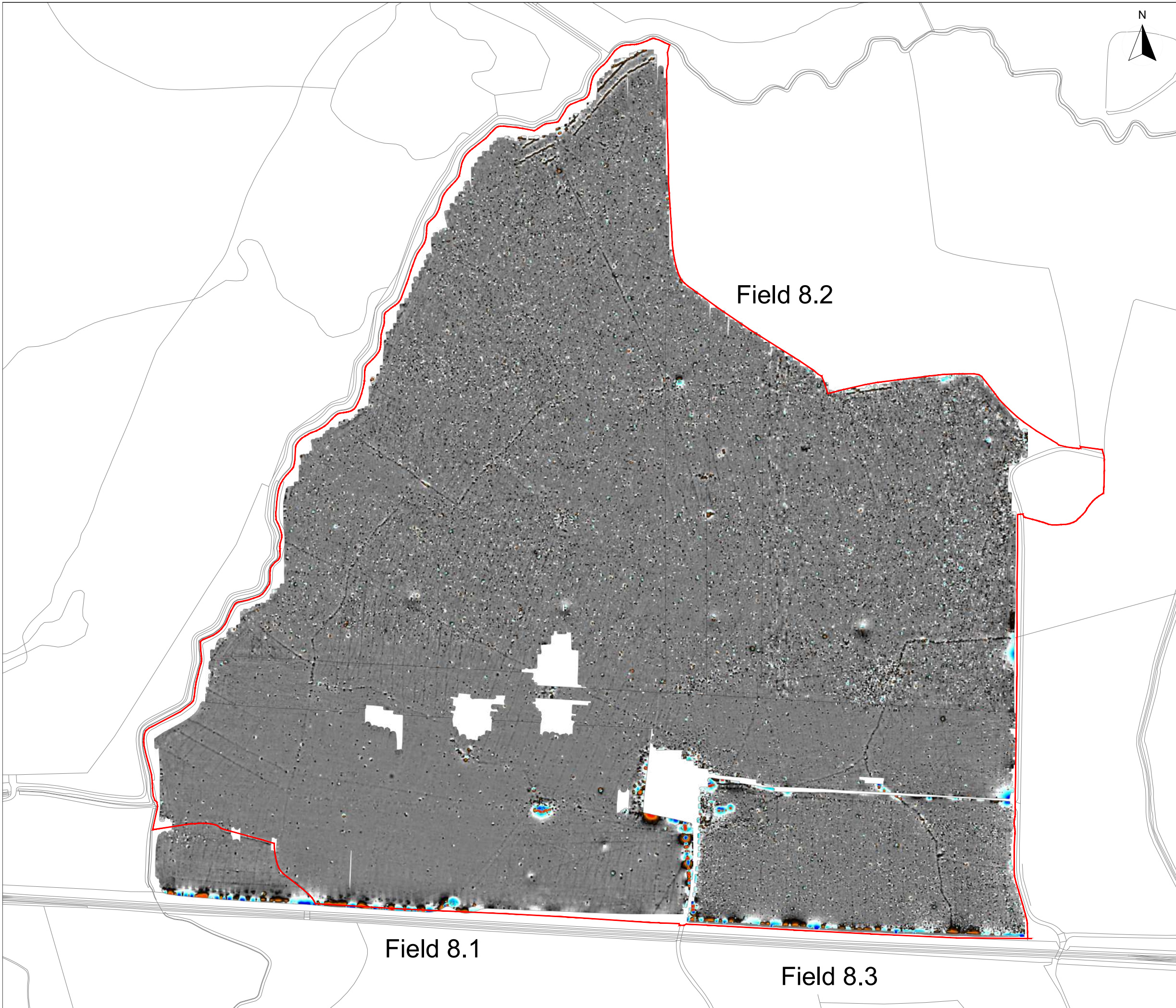
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Client:  
Island Green Power UK Limited

Project:  
16614-8 - Light Valley Solar Project: Site 8

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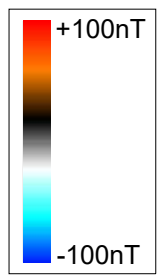
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Field 8.2

Field 8.1

Field 8.3



Title:  
Magnetometer Survey - Colour Plots

Client:  
Island Green Power UK Limited

Project:  
16614-8 - Light Valley Solar Project: Site 8

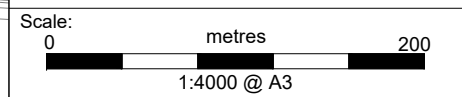
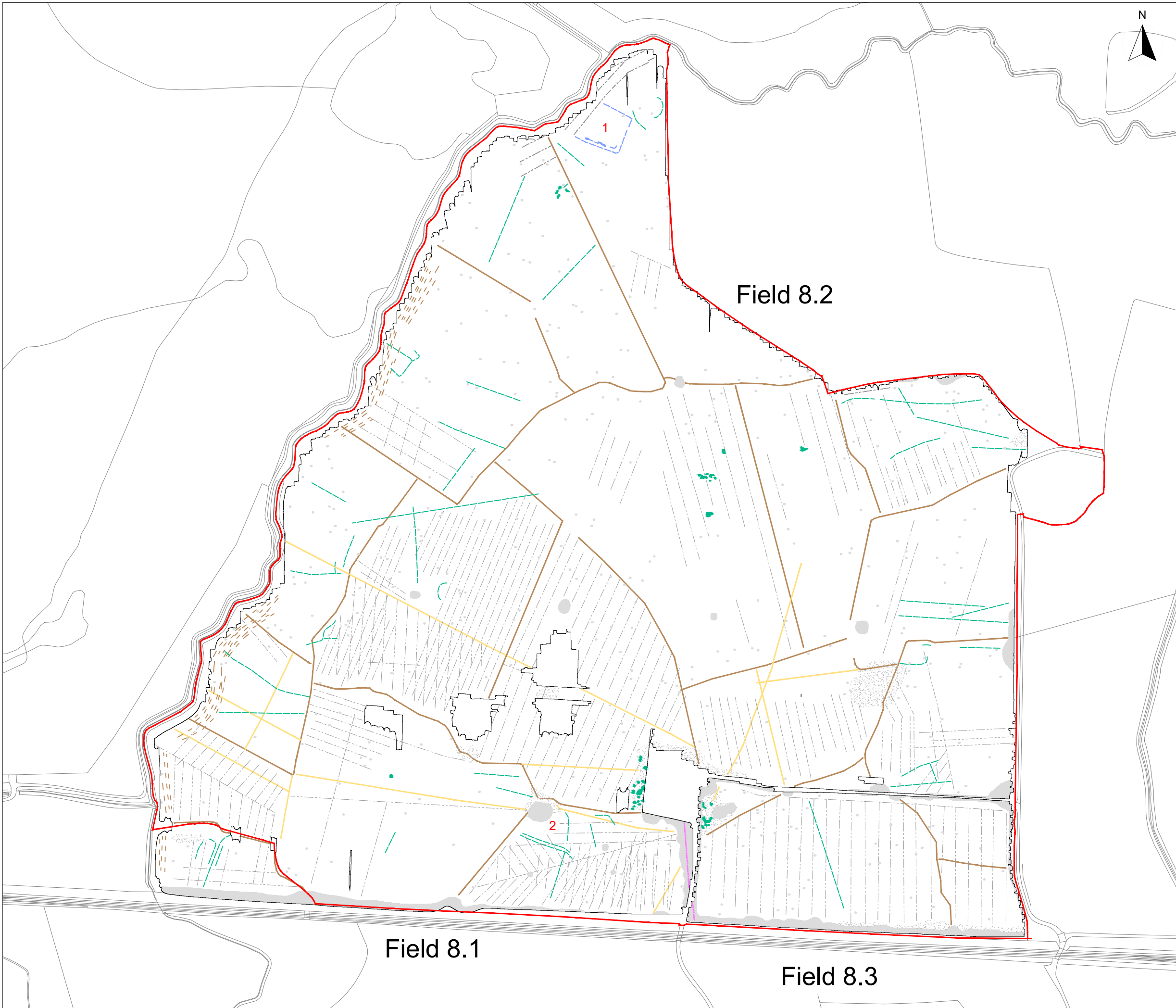











Fig No:  
03



**KEY**

	Possible archaeology (discrete anomaly / trend / increased response)
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Interpretation

Client: Island Green Power UK Limited

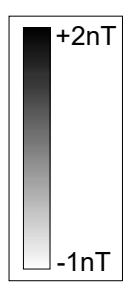
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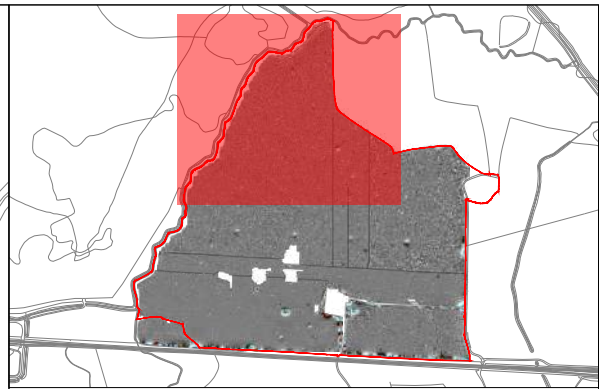
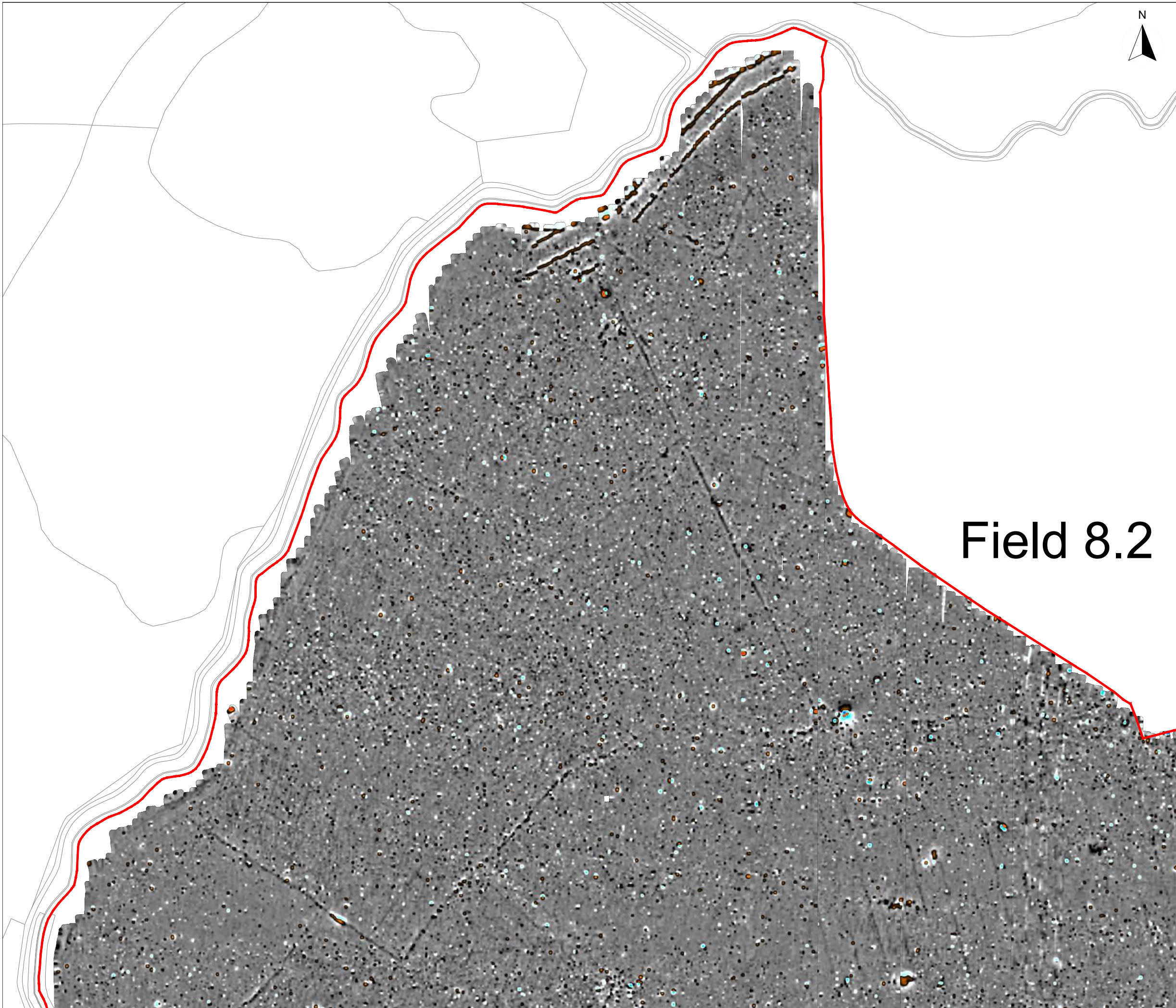
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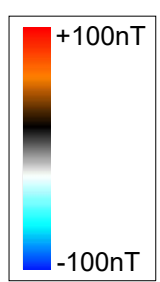
Field 8.2



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Client: Island Green Power UK Limited	
Project: 16614-8 - Light Valley Solar Project: Site 8	
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Field 8.2



Title: Magnetometer Survey - Colour Plots

Client: Island Green Power UK Limited

Project: 16614-8 - Light Valley Solar Project: Site 8

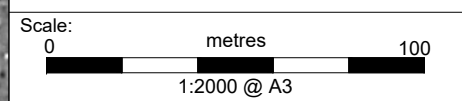
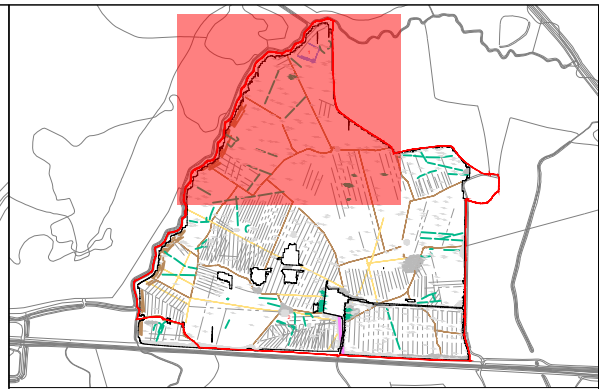
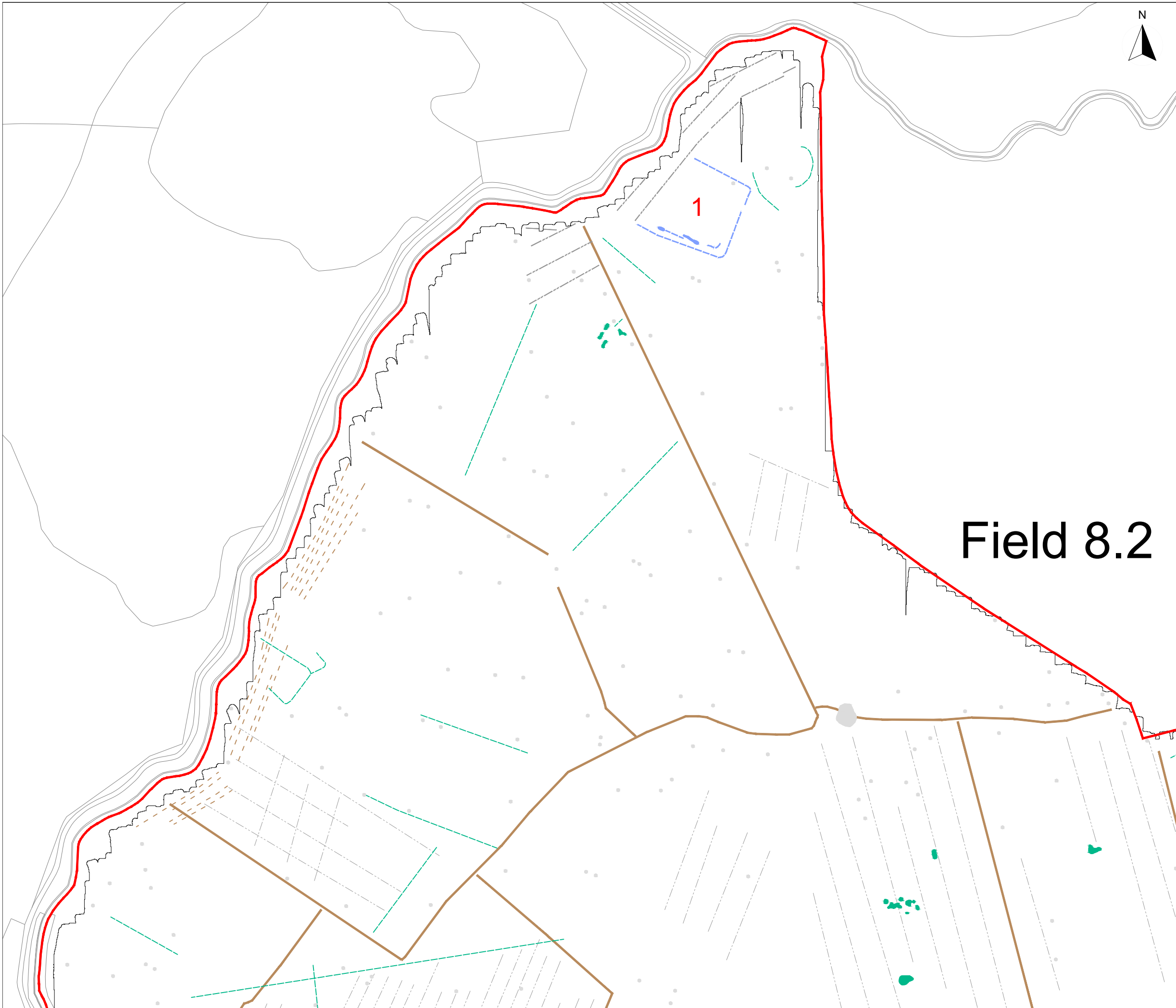


Fig No: 06



**KEY**

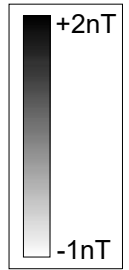
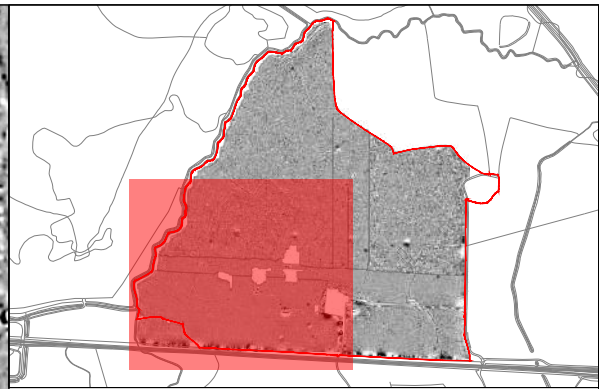
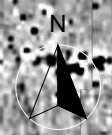
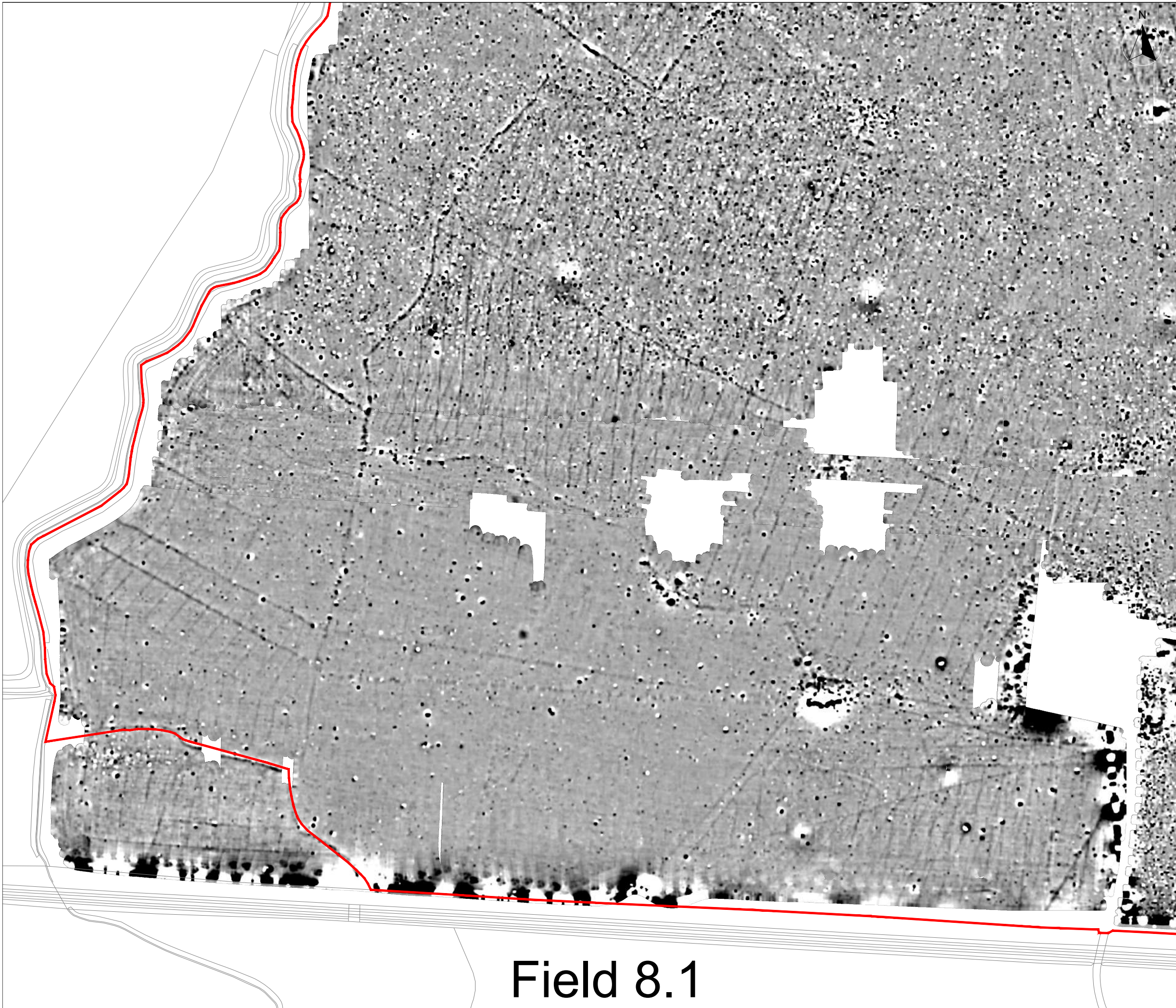
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	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

**Field 8.2**



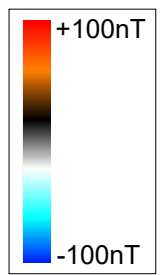
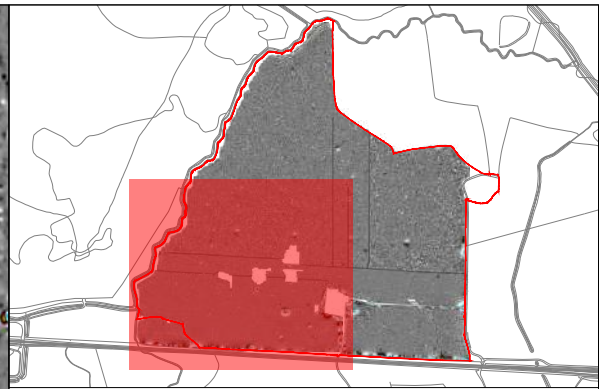
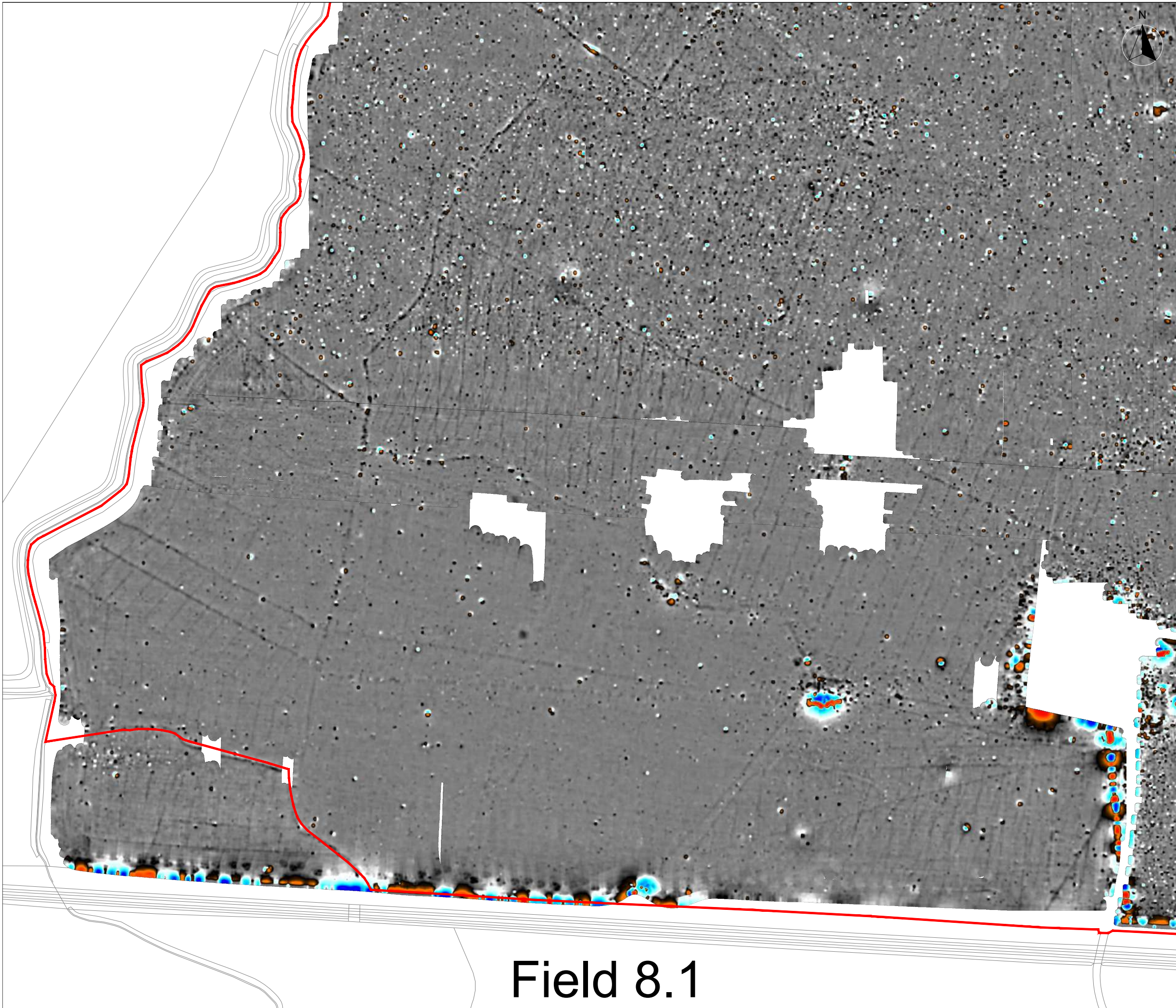
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 Client: Island Green Power UK Limited  
 Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: 0 metres 100  
 1:2000 @ A3  
 Fig No: 07



Title:	Magnetometer Survey - Greyscale Plots	
Client:	Island Green Power UK Limited	
Project:	16614-8 - Light Valley Solar Project: Site 8	
Scale:	0 metres 100 1:2000 @ A3	Fig No: 08

Field 8.1



Title: Magnetometer Survey - Colour Plots  
Client: Island Green Power UK Limited  
Project: 16614-8 - Light Valley Solar Project: Site 8

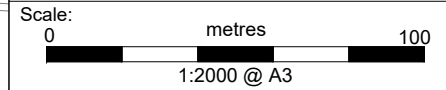
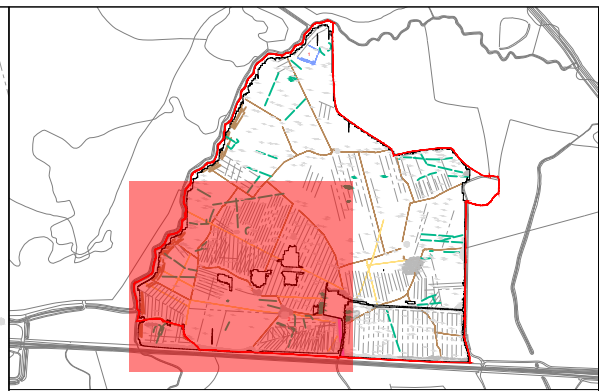
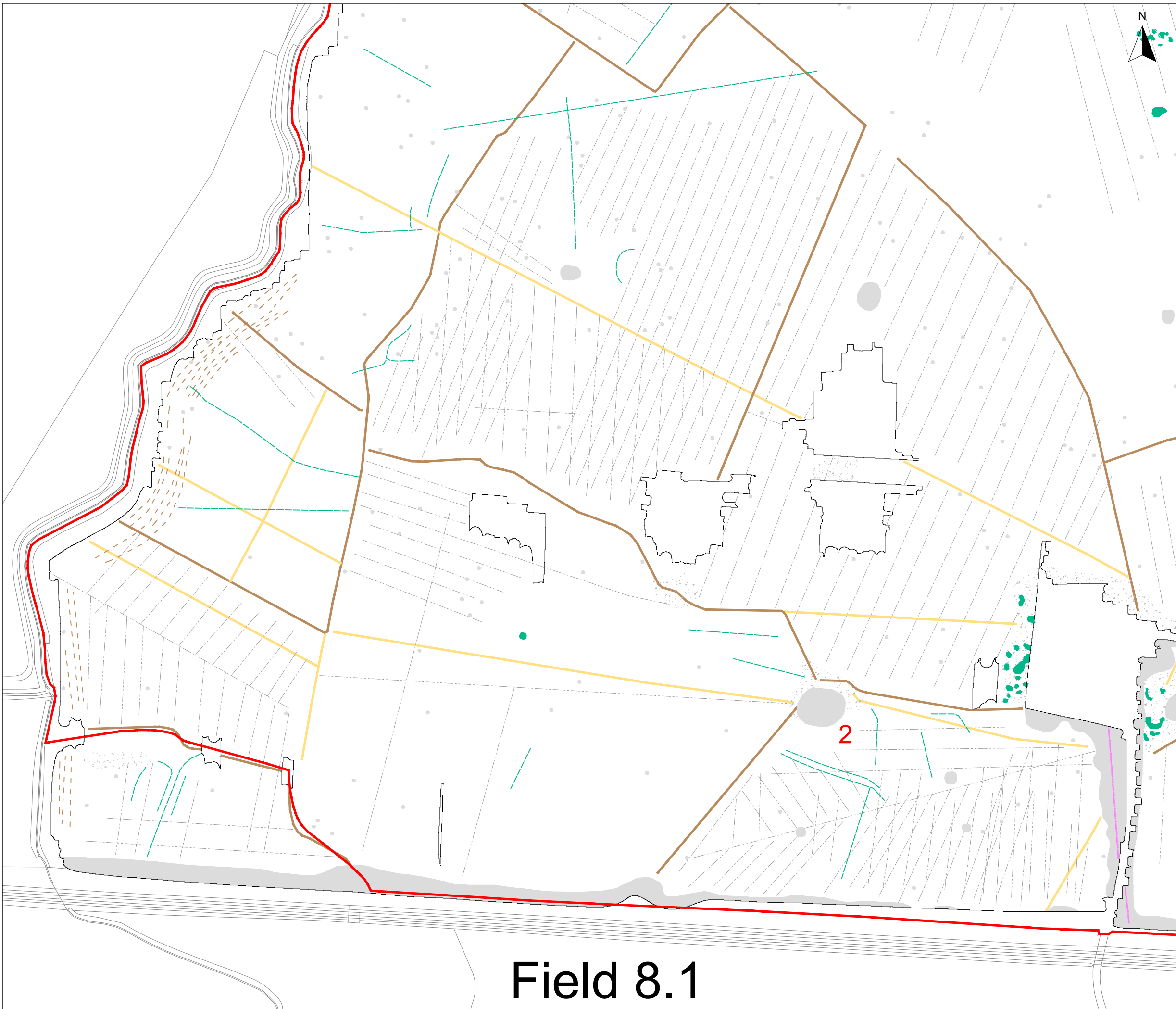


Fig No: 09

Field 8.1



**KEY**

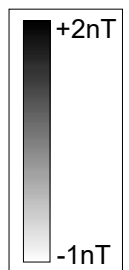
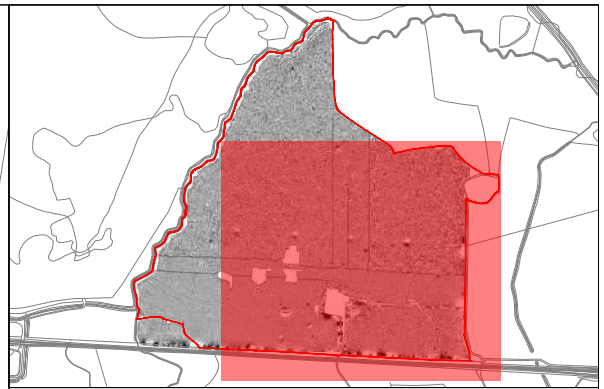
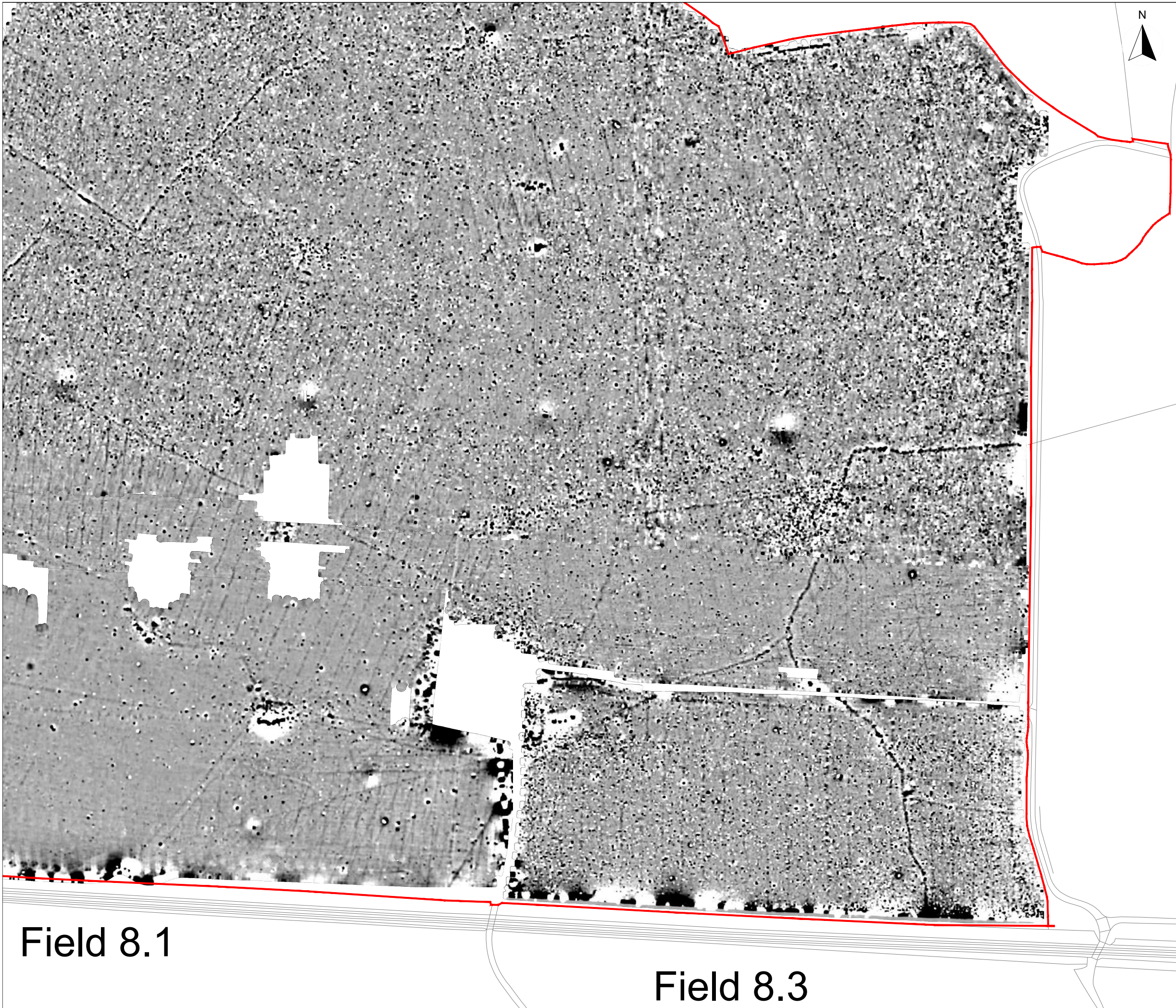
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	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Interpretation  
 Client: Island Green Power UK Limited  
 Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: 0 metres 100  
 1:2000 @ A3  
 Fig No: 10

**Field 8.1**



Field 8.1

Field 8.3

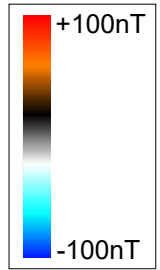
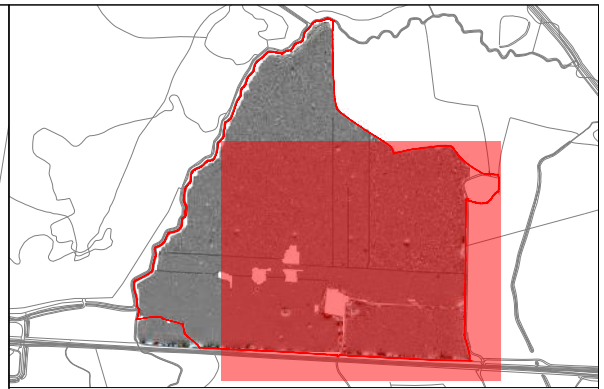
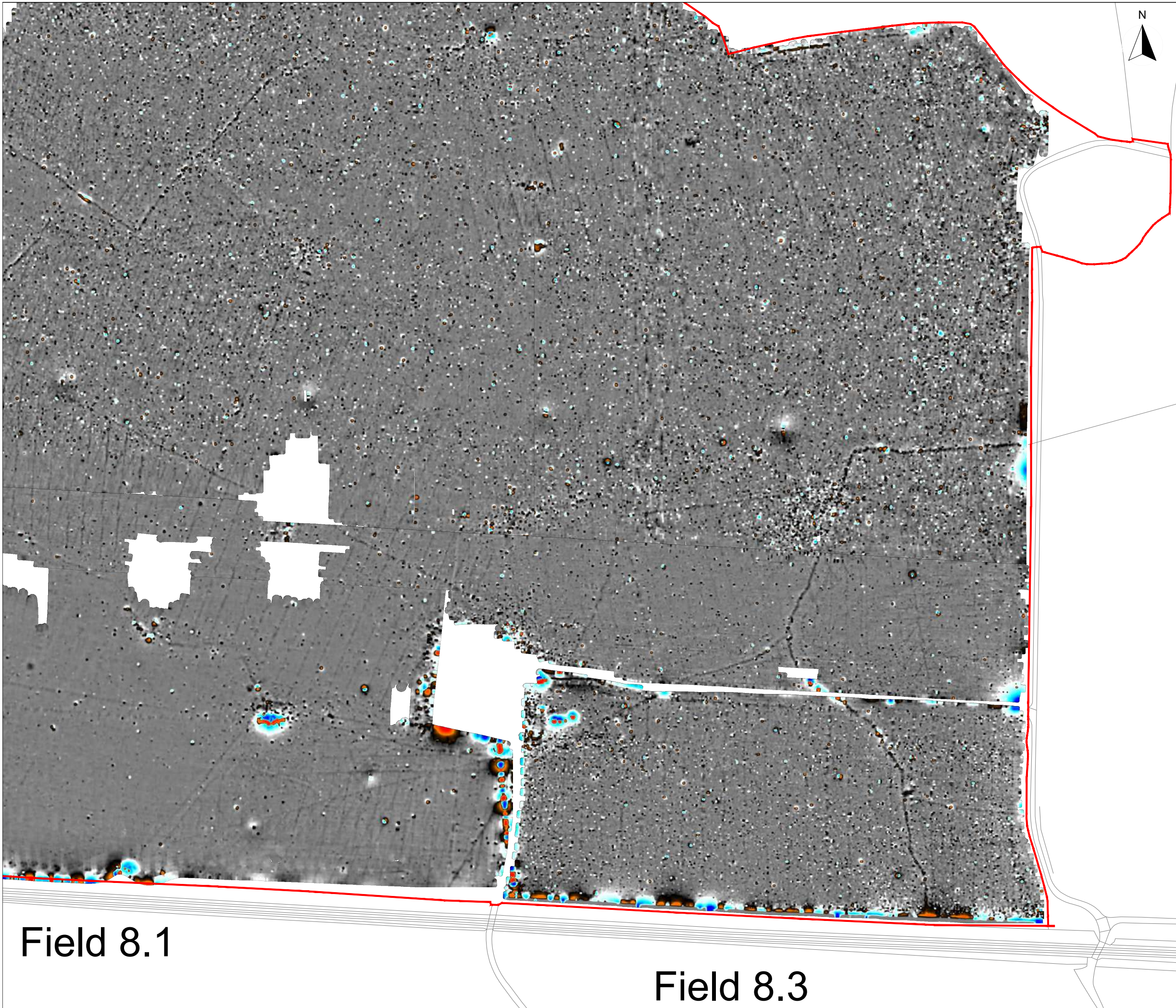
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Client:  
Island Green Power UK Limited

Project:  
16614-8 - Light Valley Solar Project: Site 8

Scale:  
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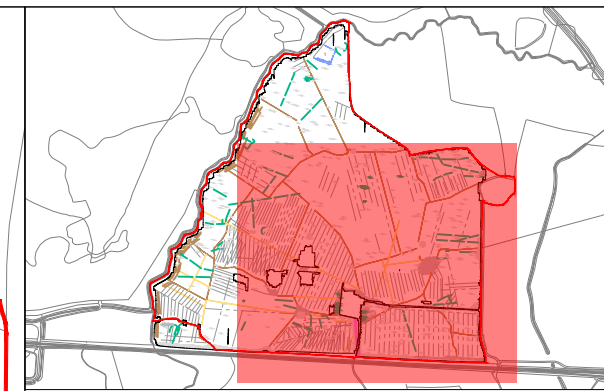
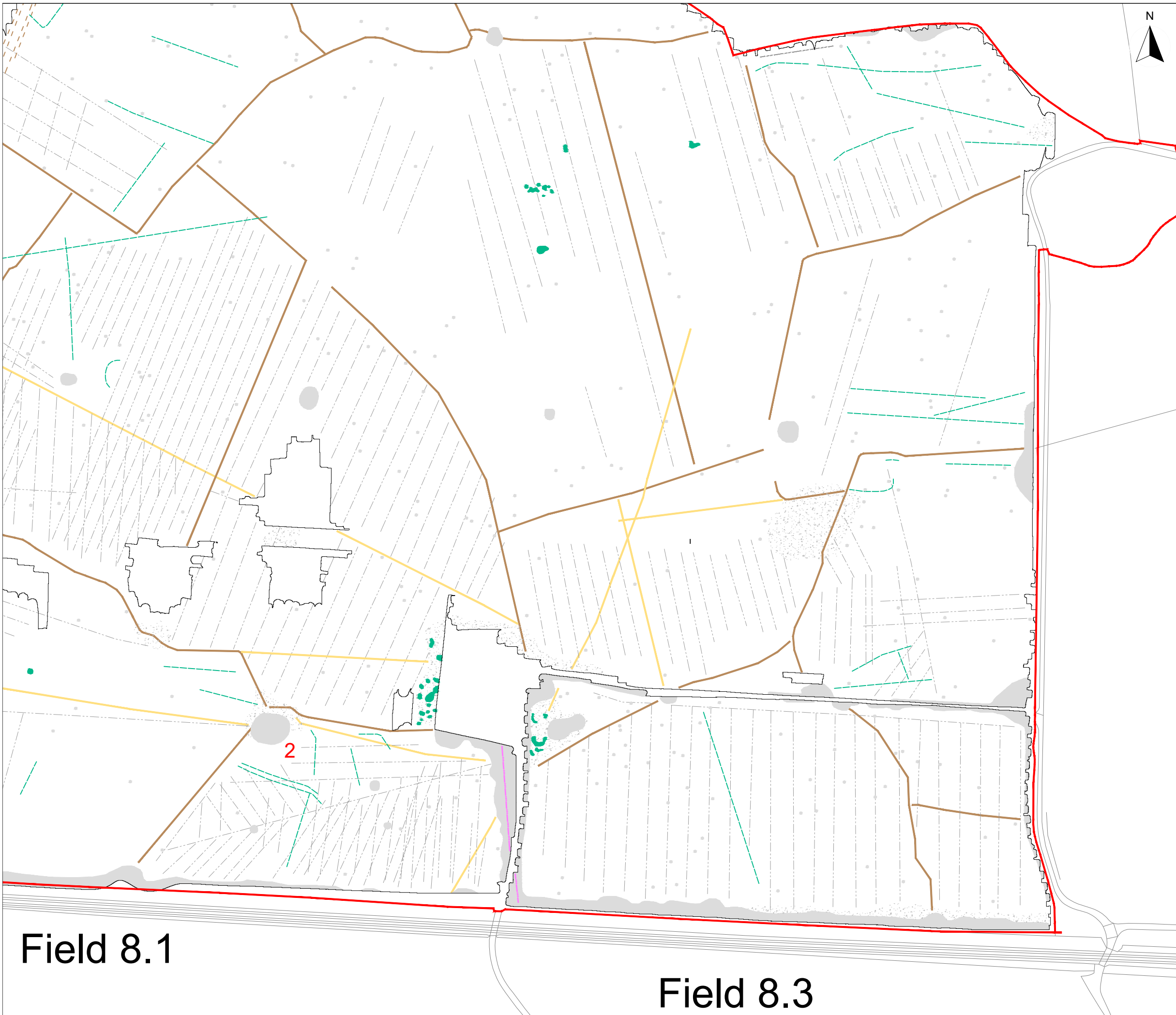
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Title:		Magnetometer Survey - Colour Plots
Client:		Island Green Power UK Limited
Project:		16614-8 - Light Valley Solar Project: Site 8
Scale:	0 metres 125	Fig No: 12
		1:2500 @ A3

Field 8.1

Field 8.3



**KEY**

	Possible archaeology (discrete anomaly / trend / increased response)
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Interpretation

Client: Island Green Power UK Limited

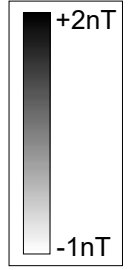
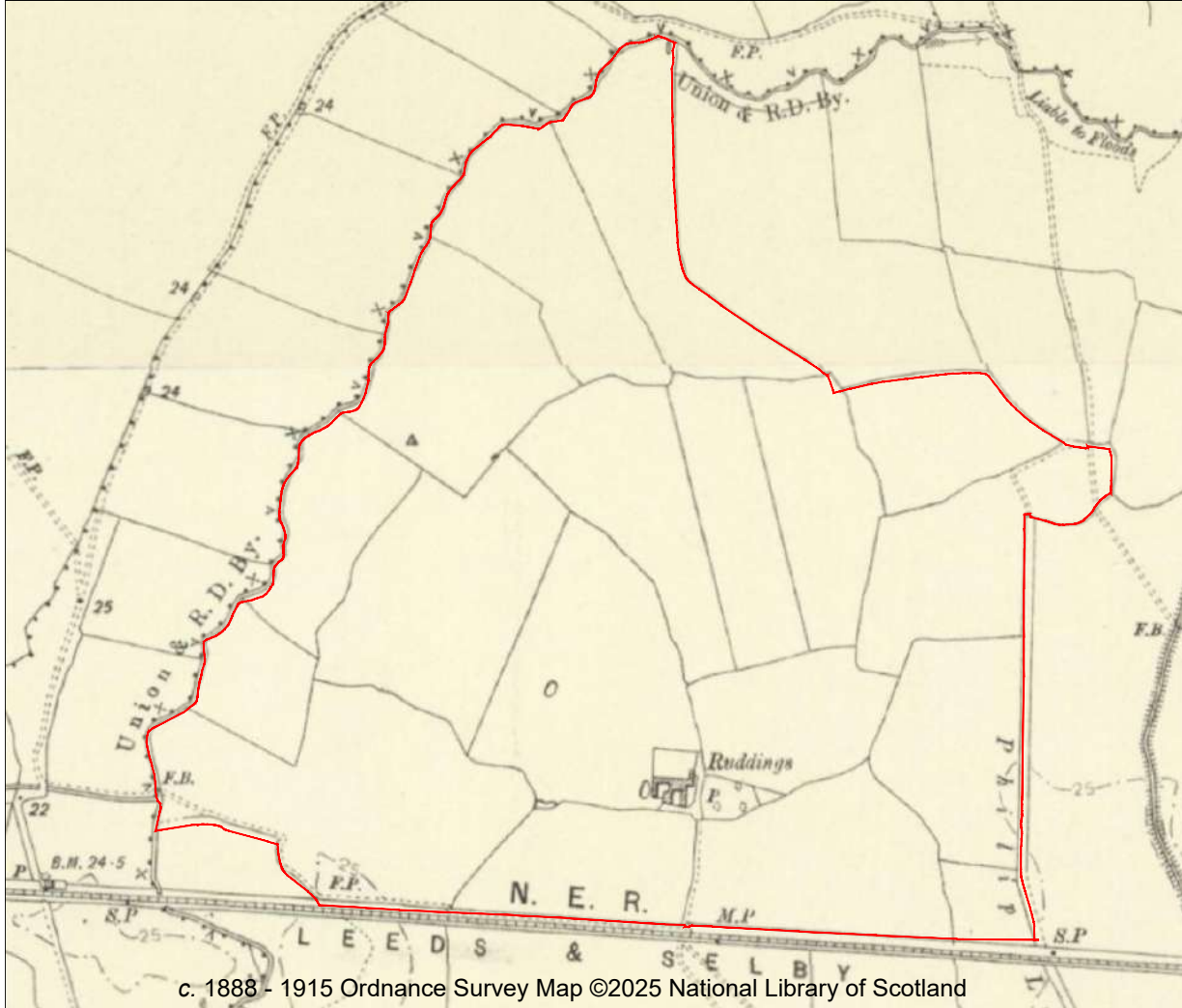
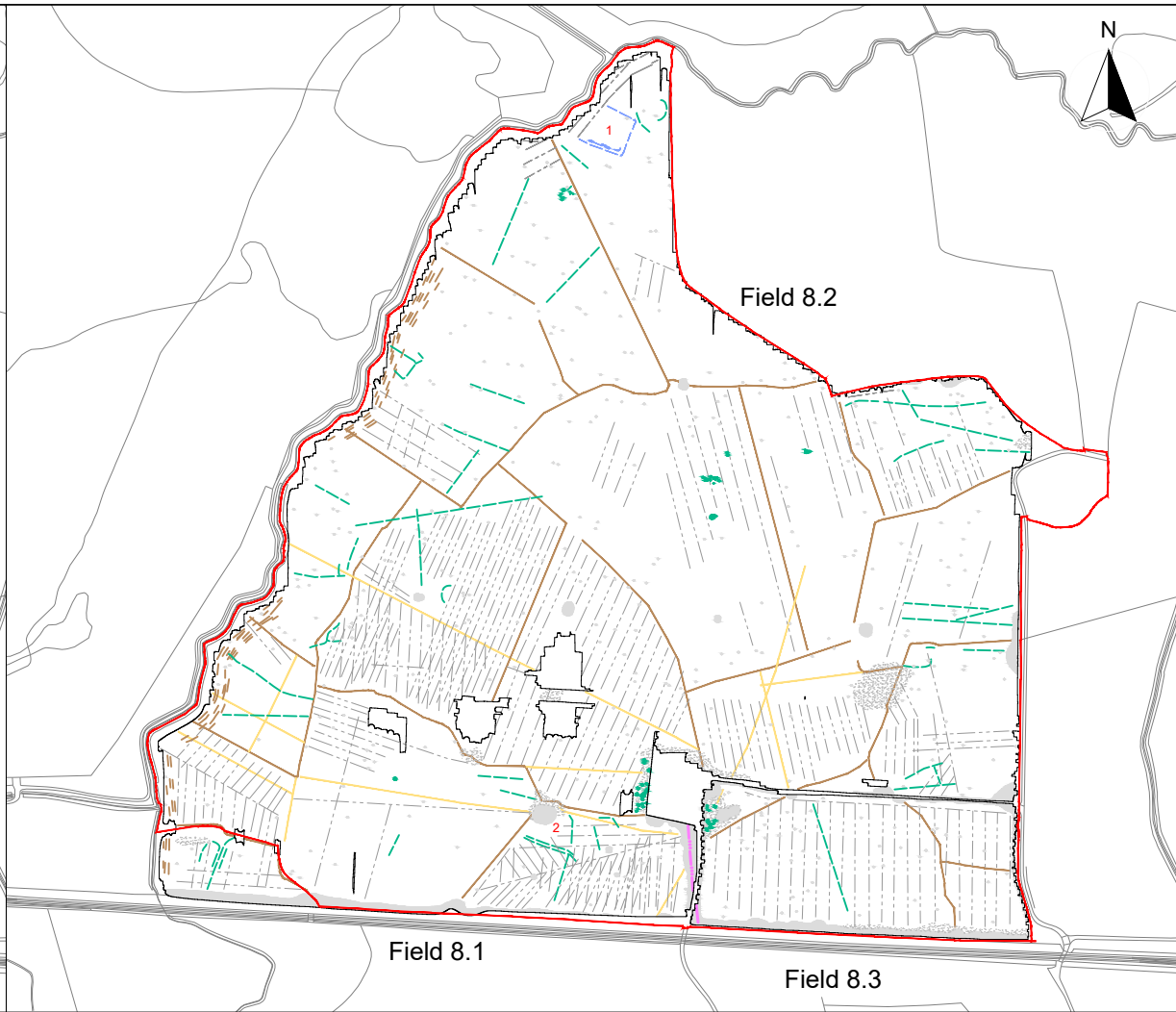
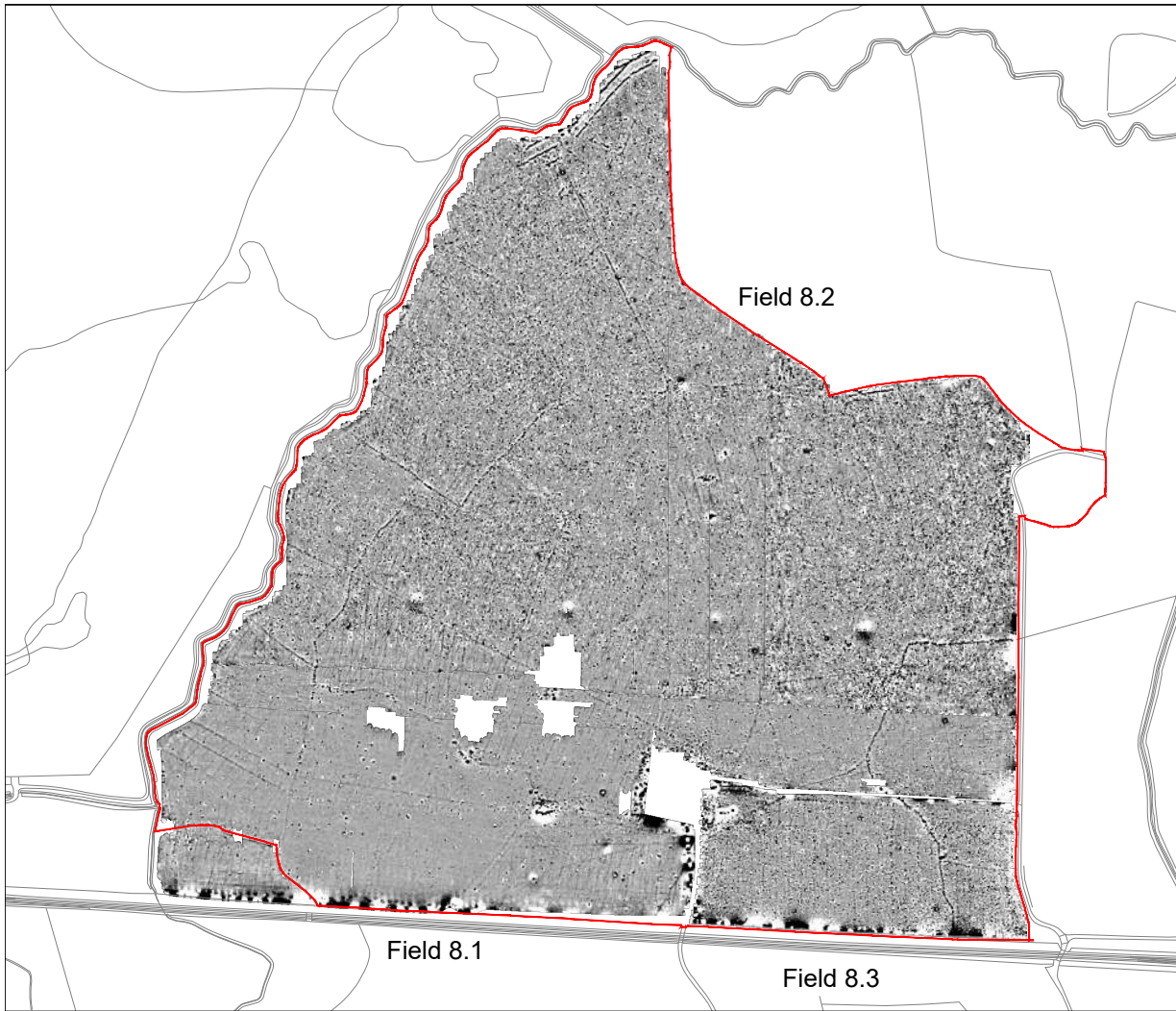
Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: 0 metres 125  
1:2500 @ A3

Fig No: 13

Field 8.1

Field 8.3



**KEY**

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	Uncertain Origin (discrete anomaly / trend / increased response)
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	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous



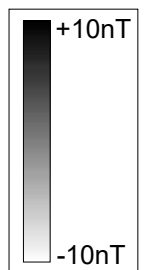
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Client: Island Green Power UK Limited

Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: NOT TO SCALE

Fig No: 14



Title:  
Minimally Processed Data - Greyscale Plots

Client:  
Island Green Power UK Limited

Project:  
16614-8 - Light Valley Solar Project: Site 8

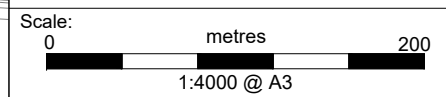
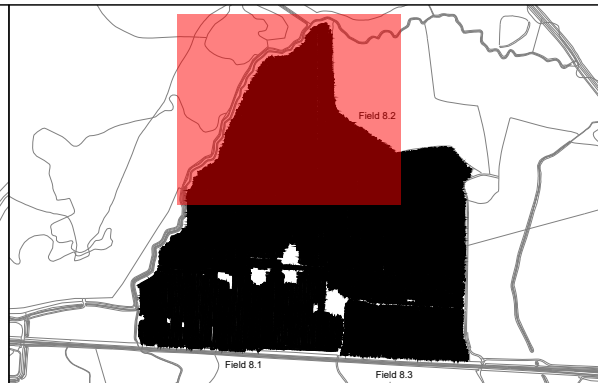
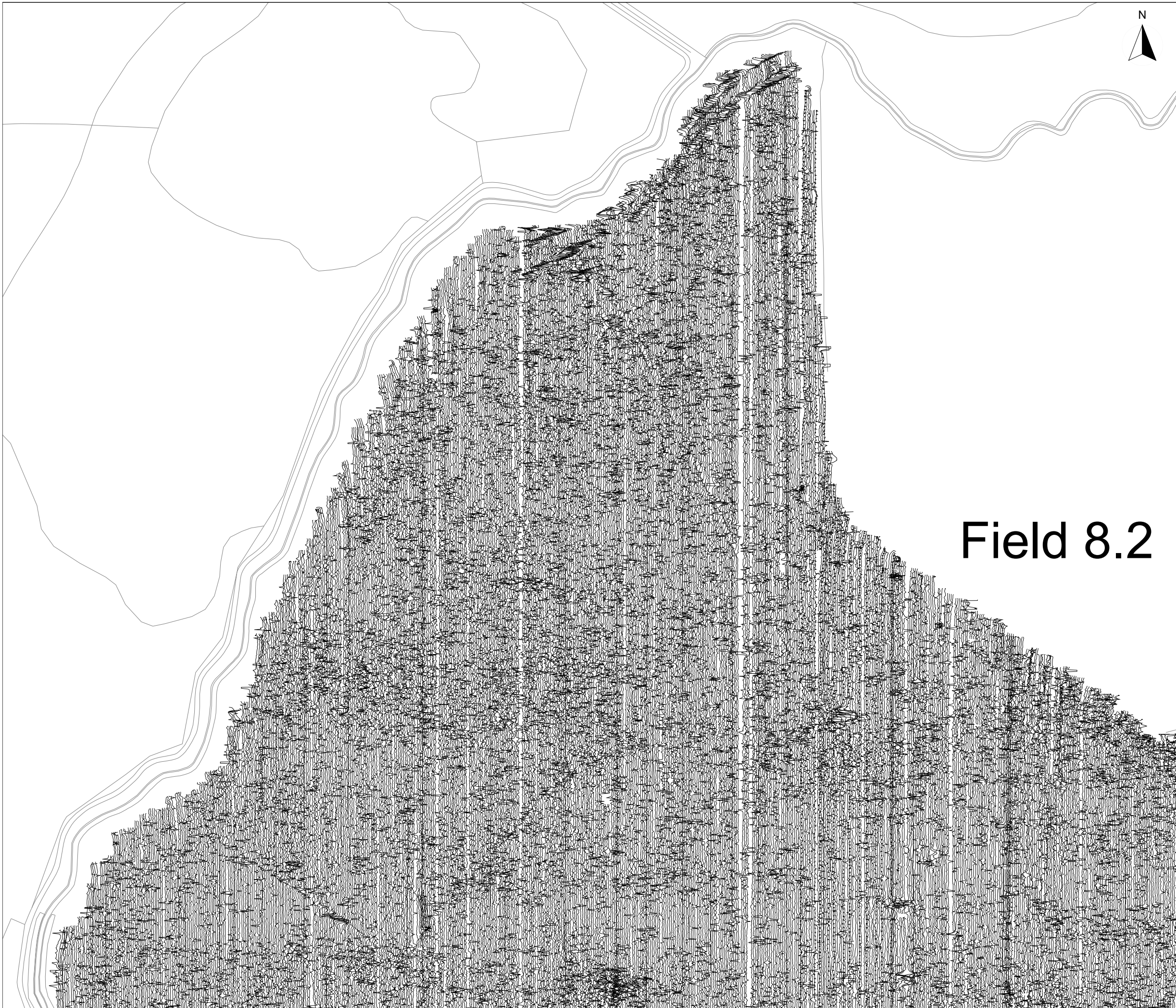


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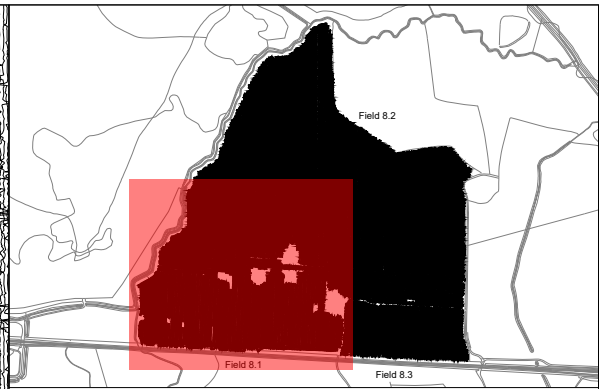
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Client: Island Green Power UK Limited  
Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: 0 metres 100  
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Fig No: 16

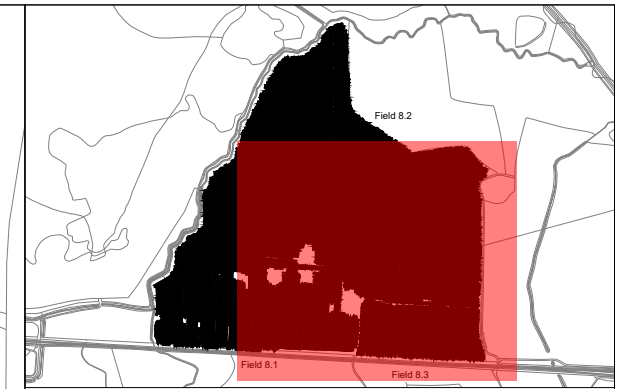
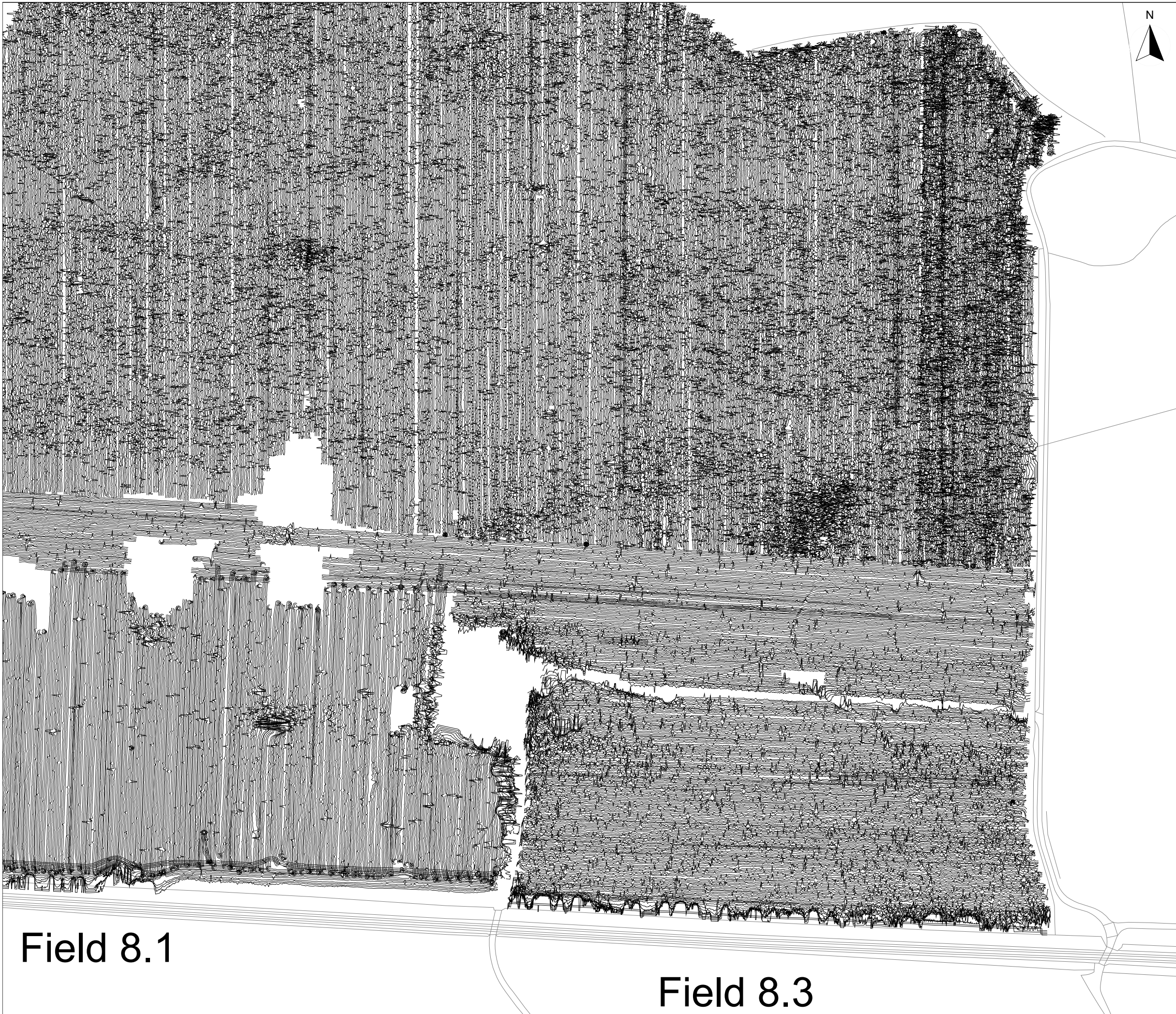


Field 8.1



Title: XY Trace Plots (clipped at +/-15nT)  
Client: Island Green Power UK Limited  
Project: 16614-8 - Light Valley Solar Project: Site 8

Scale: 0 metres 100  
1:2000 @ A3  
Fig No: 17



Title:  
XY Trace Plots (clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-8 - Light Valley Solar Project: Site 8

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
18

Field 8.1

Field 8.3

## Appendix A - Technical Information: Magnetometer Survey Method

### Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m
Magnetometer	MACS Cart System (Foerster)	1.0m	0.125m

### Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

### Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

### Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### MACS Cart System (Foerster)

A multi-sensor array cart system (MACS) utilising 4 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 1m intervals, with a control unit and data logger was used for the magnetic survey. Each data point is geographically referenced using an on-board RTK GNSS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

### Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

## Display

Greyscale/  
Colourscale Plot

This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

## Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall, etc.*) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology / Probable Archaeology</i>	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable &amp; possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge &amp; Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern.

Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

*Uncertain Origin*

Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology / Natural* or (in the case of linear responses) *Possible Archaeology / Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

## Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.

## Appendix C - OASIS Summary

<b>OASIS ID (UID)</b>	sumogeop1-532823
<b>Project Name</b>	Geophysical Survey at Light Valley Solar Project: Site 8
<b>Sitename</b>	Light Valley Solar Project: Site 8
<b>Sitecode</b>	16614-8
<b>Project Identifier(s)</b>	16614-8
<b>Activity type</b>	Geophysical Survey, MAGNETOMETRY SURVEY
<b>Planning Id</b>	
<b>Reason For Investigation</b>	Planning requirement
<b>Organisation Responsible for work</b>	SUMO Geophysics Ltd.
<b>Project Dates</b>	27-Jan-2025 - 20-Mar-2025
<b>Location</b>	<b>Light Valley Solar Project: Site 8</b> NGR: SE 53987 31962 LL: 53.781193157362935, -1.182181927357497 12 Fig: 453987,431962
<b>Administrative Areas</b>	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: Hambleton Parish: South Milford
<b>Project Methodology</b>	Data was collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings were taken at 0.125m centres along traverses 1.0m apart. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
<b>Project Results</b>	The magnetometer survey recorded a few magnetic responses which have been interpreted as being of possible archaeological interest. A tentative partial enclosure has been marked in the north of Field 8.1 / 8.2; parallel trends on the southern side could be evidence of a double ditches while a gap in the eastern ditch may also mark the location of an entrance. Numerous uncertain pit-like responses and trends have been detected in the survey which have probably been caused by agricultural processes or buried ferrous debris. Former field boundaries, ploughing, land drains and service pipes have all been marked in the dataset. Zones of magnetic disturbance have been detected throughout the site

	which have been caused by spreads of modern debris or ground disturbance, some associated with former buildings on the site. A strong ferrous anomaly in Field 8.1 / 8.2 has been caused by an infilled pond.
<b>Keywords</b>	Ditched Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Plough Marks - 20TH CENTURY - FISH Thesaurus of Monument Types Drainage System - 20TH CENTURY - FISH Thesaurus of Monument Types Pipeline - 20TH CENTURY - FISH Thesaurus of Monument Types
<b>Funder</b>	Private or public corporation Island Green Power UK Limited
<b>HER</b>	North Yorkshire HER - unRev - STANDARD
<b>Person Responsible for work</b>	Thomas Cockcroft
<b>HER Identifiers</b>	
<b>Archives</b>	

Report generated on: 31-03-2025:1404

## Appendix D – Data Management Plan & Archive Selection Strategy

### Data Management Plan

Project ID / OASIS ID

SUMO- 16614-5 / sumogeop1-532823

Project Name

Light Valley Solar Project: Site 8

Project Description

Detailed magnetic survey over approx.60ha

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

William Vernon / Liam Brice-Bateman / Craig Wakefield

Date DMP created

26.03.2024

Date DMP last updated

31.03.2025

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart magnetometers

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).

- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

## **Archive Selection Strategy**

### **Digital Data**

#### Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

#### De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

### **Documents**

Not applicable – no archive

### **Materials**

Not applicable – no archive



- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.  
SUMO Services Ltd, incorporated under the laws of England and Wales,  
Company Registration No.4275993.  
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL



Light Valley  
**Solar**

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E: [info@lightvalleysolar.co.uk](mailto:info@lightvalleysolar.co.uk)