Heckington Fen Solar Park

EN010123

Environmental Statement | Volume 3: Technical Appendices

Appendix 10.2: Geophysical Survey Results for Energy Park

Applicant: Ecotricity (Heck Fen Solar) Limited

Document Reference: 6.3.10.2

Pursuant to: APFP Regulation 5(2)(a)

February 2023

Planning Act 2008

APPENDIX 10.2 - GEOPHYSICAL SURVEY RESULTS FOR ENERGY PARK

Document Properties		
Regulation Reference	Regulation 5(2)(a)	
Planning Inspectorate Scheme Reference	EN010123	
Application Document Reference	6.3.10.2	
Title	Appendix 10.2 - Geophysical Survey Results for Energy Park	
Prepared By	Heckington Fen Energy Park Project Team (Pegasus) (Sumo) (Headland Archaeology) (ASWYAS) (Magnitude Surveys)	
Version History		
Version	**Date**	**Version Status**
Rev 1	February 2023	Application Version

Area A

N

3452 00

5196 00

5200 00

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 1

Fig. 4

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

Area A

N

452600

519600

519800

520000

Archaeological Services W Y A S,
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Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 1

Fig. 5

Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3

N

Area A

U1

U1

FB1

FB1

3452$_{00}$

5196$_{00}$

5198$_{00}$

5200$_{00}$

Archaeological Services W Y A S,
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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 1

Fig. 6

Title

SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FORMER FIELD BOUNDARY
- UNCERTAIN
- MAGNETIC DISTURBANCE
- FERROUS
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3

Area B

N

345000

519600

519800

520000

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 2

Fig. 7

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

Area B

N

3450$_{00}$

5196$_{00}$

5198$_{00}$

5200$_{00}$

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

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Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 2

Fig. 8

Title

SECTOR BOUNDARY

0 50m

1:1250 @ A3

Area B

FB1

N

345000

5196000

5198000

5200000

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 2

Fig. 9

Title

- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL
- MAGNETIC DISTURBANCE

0 50m

1:1250 @ A3

Area C

N

344800

519600

519800

520000

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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 3

Fig. 10

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

Area C

N

3418000

5196000

5198000

5200000

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Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 3

Fig. 11

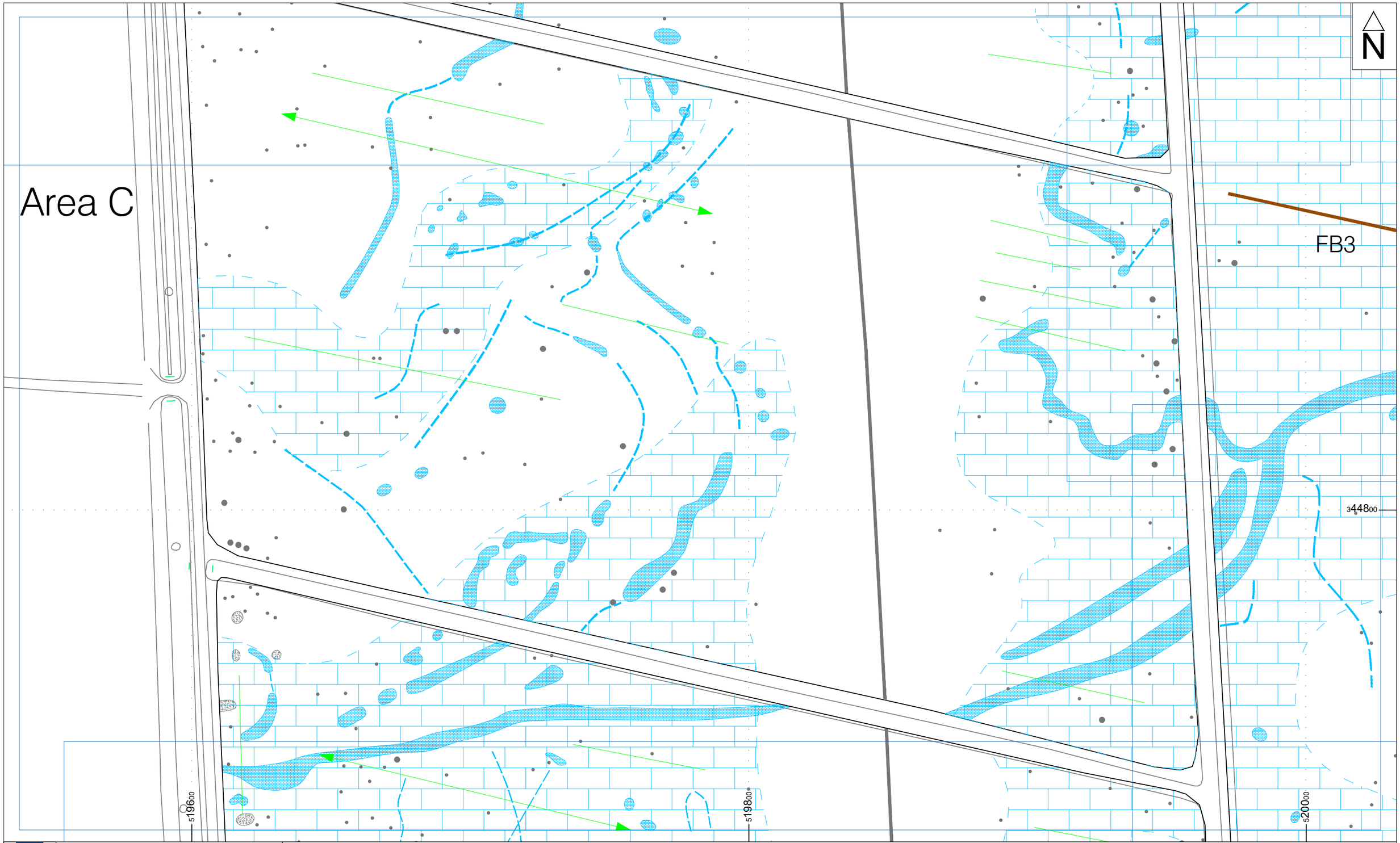
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 3

Fig. 12

Title

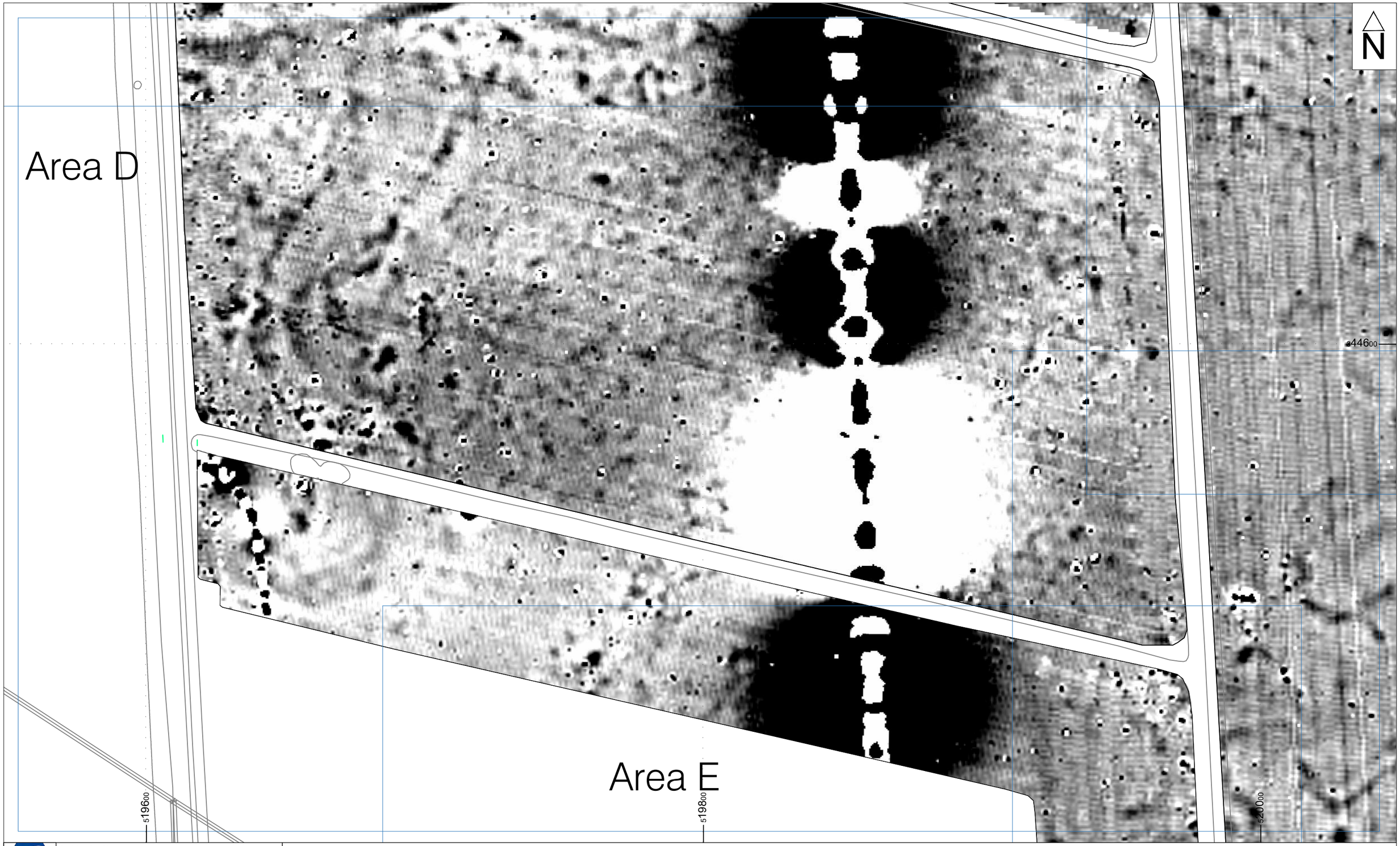
- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 4

Fig. 13

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

Area D

U2

FB1

FB1

Area E

N

3446$_{00}$

5196$_{00}$

5198$_{00}$

5200$_{00}$

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Project ID: XD59_HECS22

XY trace plot of minimally processed greyscale magnetometer data; Sector 4

Fig. 14

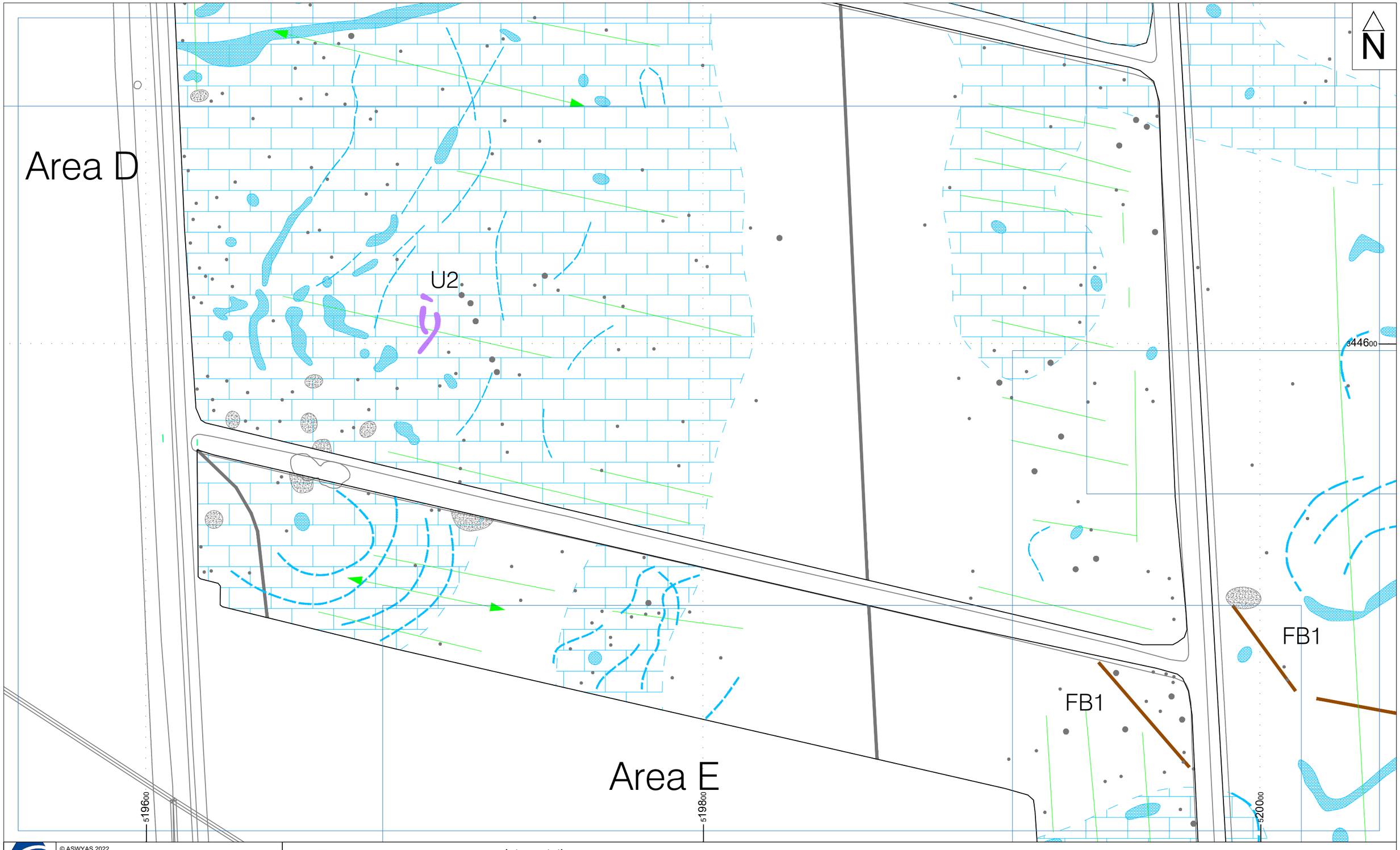
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 4

Fig. 15

Title

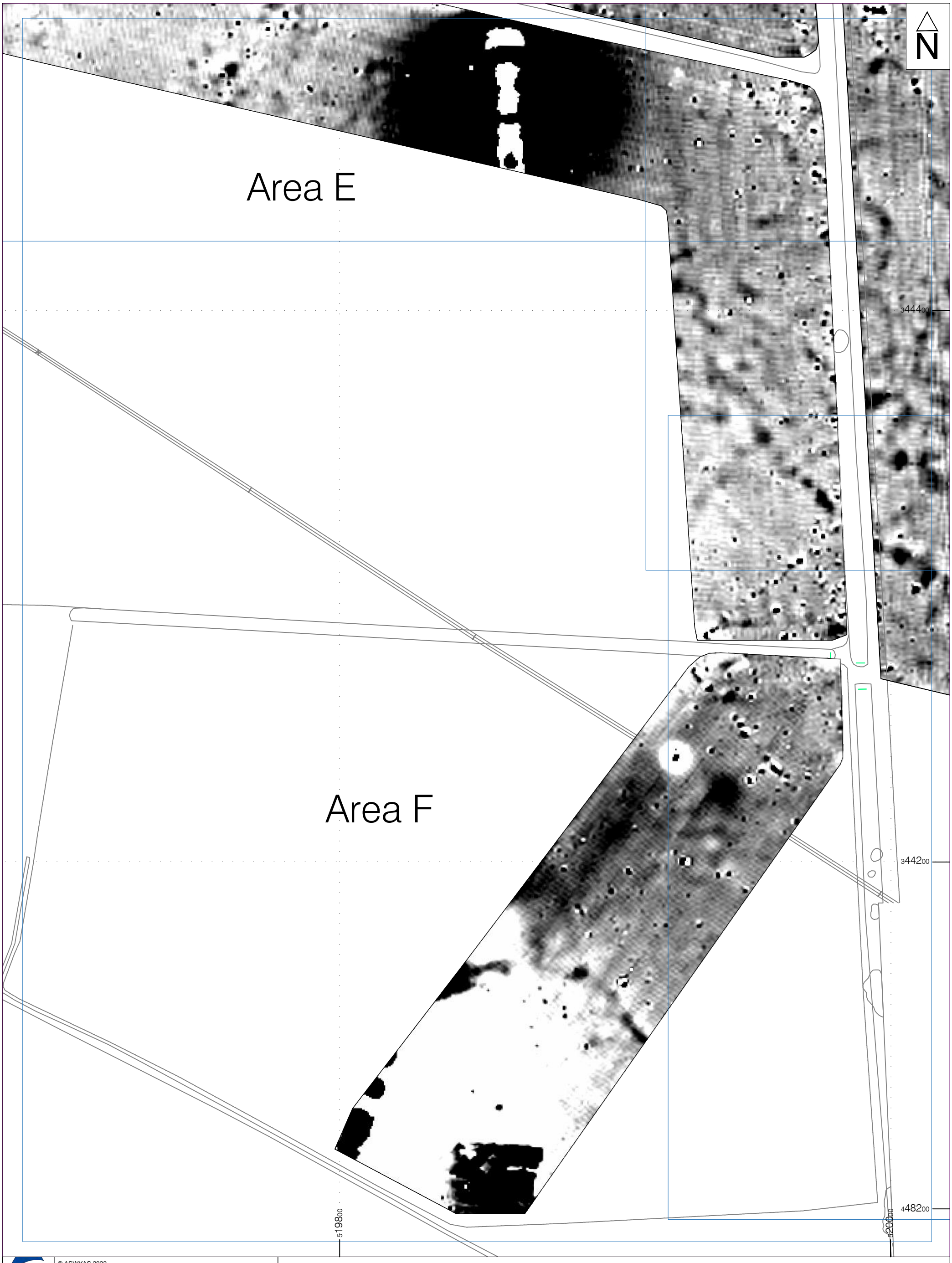
- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- MAGNETIC DISTURBANCE
- FORMER FIELD BOUNDARY
- FERROUS
- UNCERTAIN
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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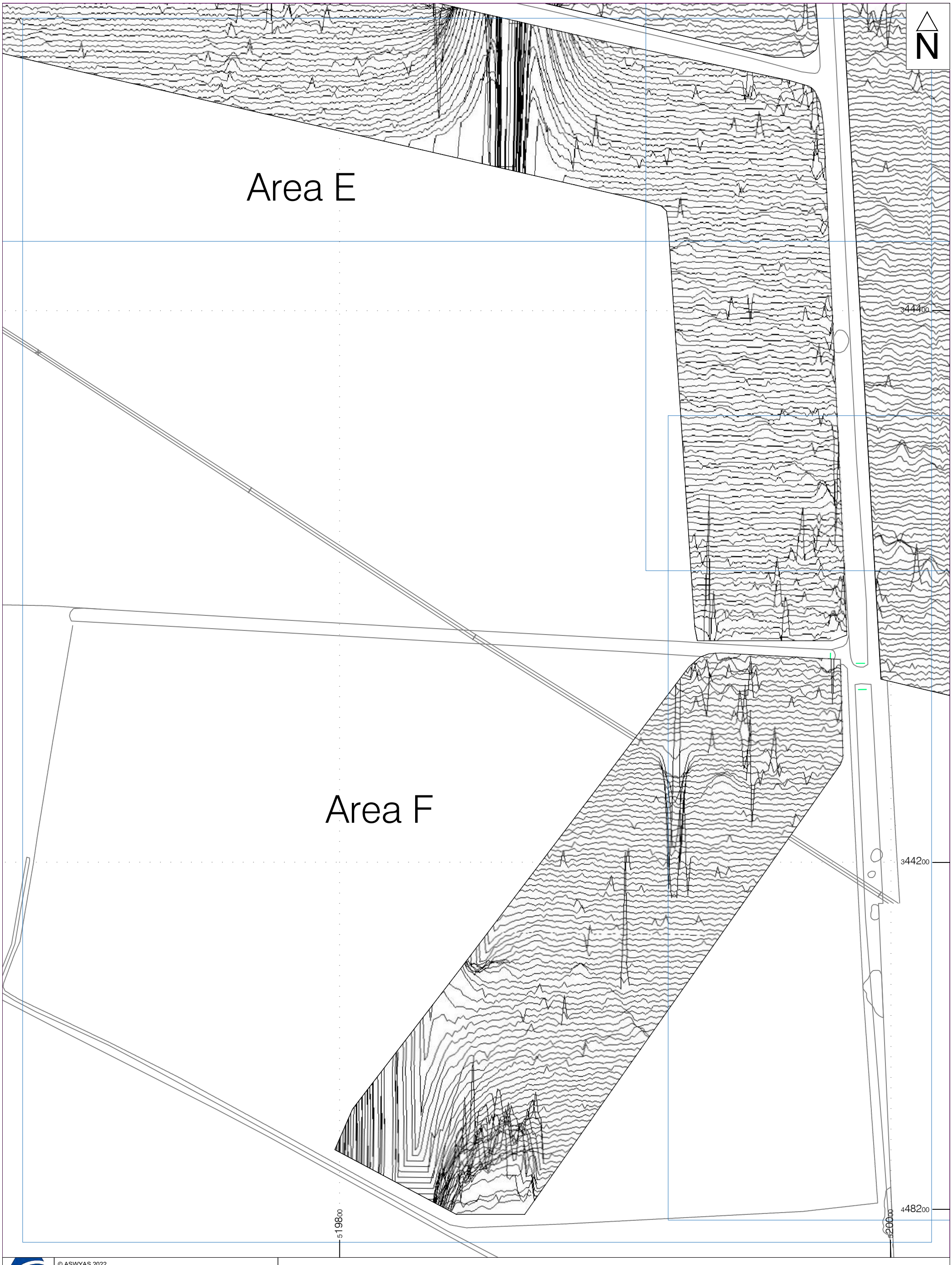
Processed greyscale magnetometer data; Sector 5

Fig. 16

nT -1.0 2.0

0 50m

1:1250 @ A3



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Nepshaw Lane South, Morley, LS27 7JQ

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Project ID: XD59_HECS22

XY trace plot of minimally processed greyscale magnetometer data; Sector 5

Fig. 17

15.0 nT/cm

0 50m

1:1250 @ A3

Area E

FB1

Area F

FB1

FB1

U3

N

3444 00

3442 00

5198 00

5200 00

4482 00

Archaeological Services W Y A S,
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Interpretation of magnetometer data; Sector 5

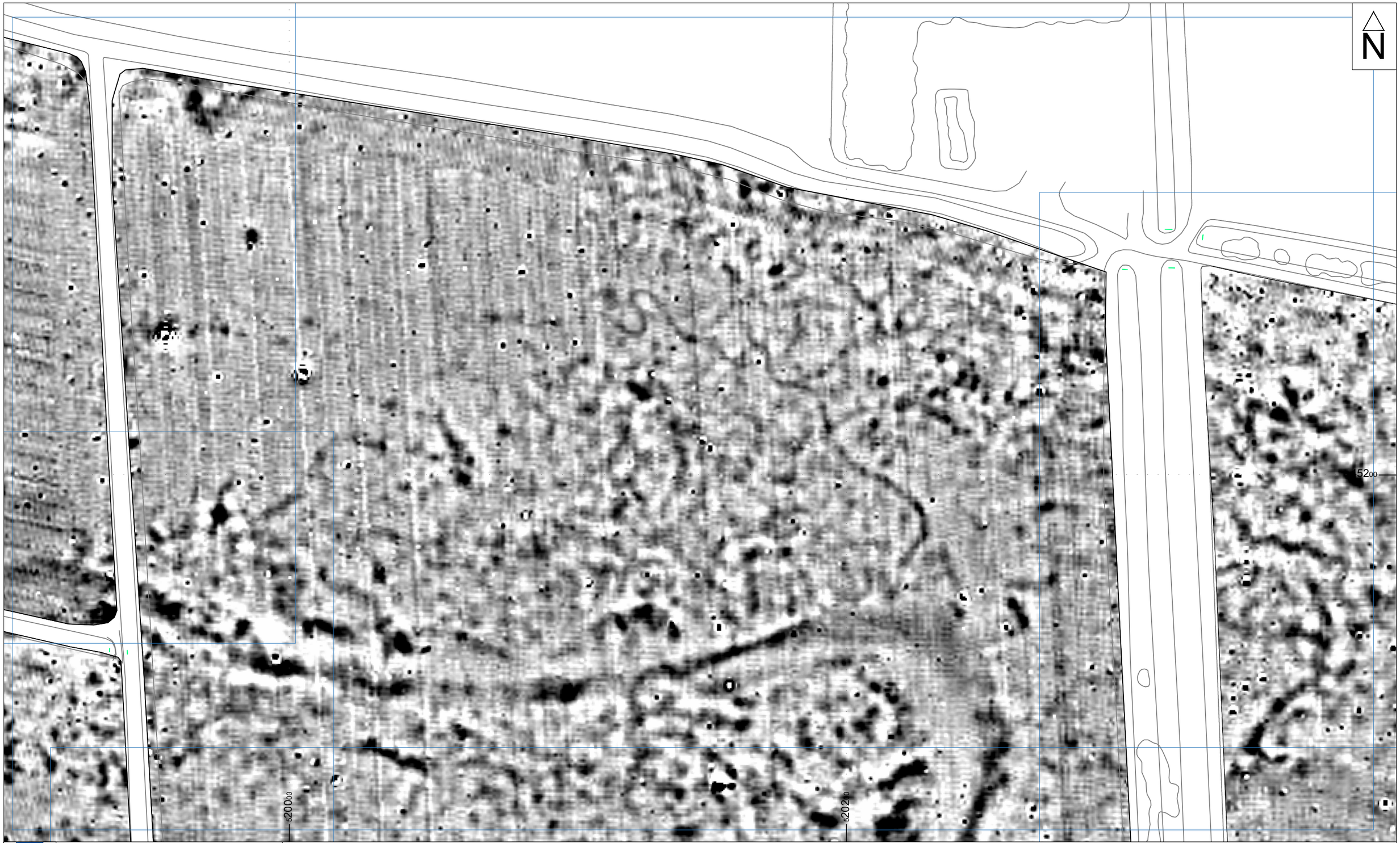
Fig. 18

Interpretation

- AGRICULTURE (PLOUGH)
- MAGNETIC DISTURBANCE
- FORMER FIELD BOUNDARY
- FERROUS
- UNCERTAIN
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 6

Fig. 19

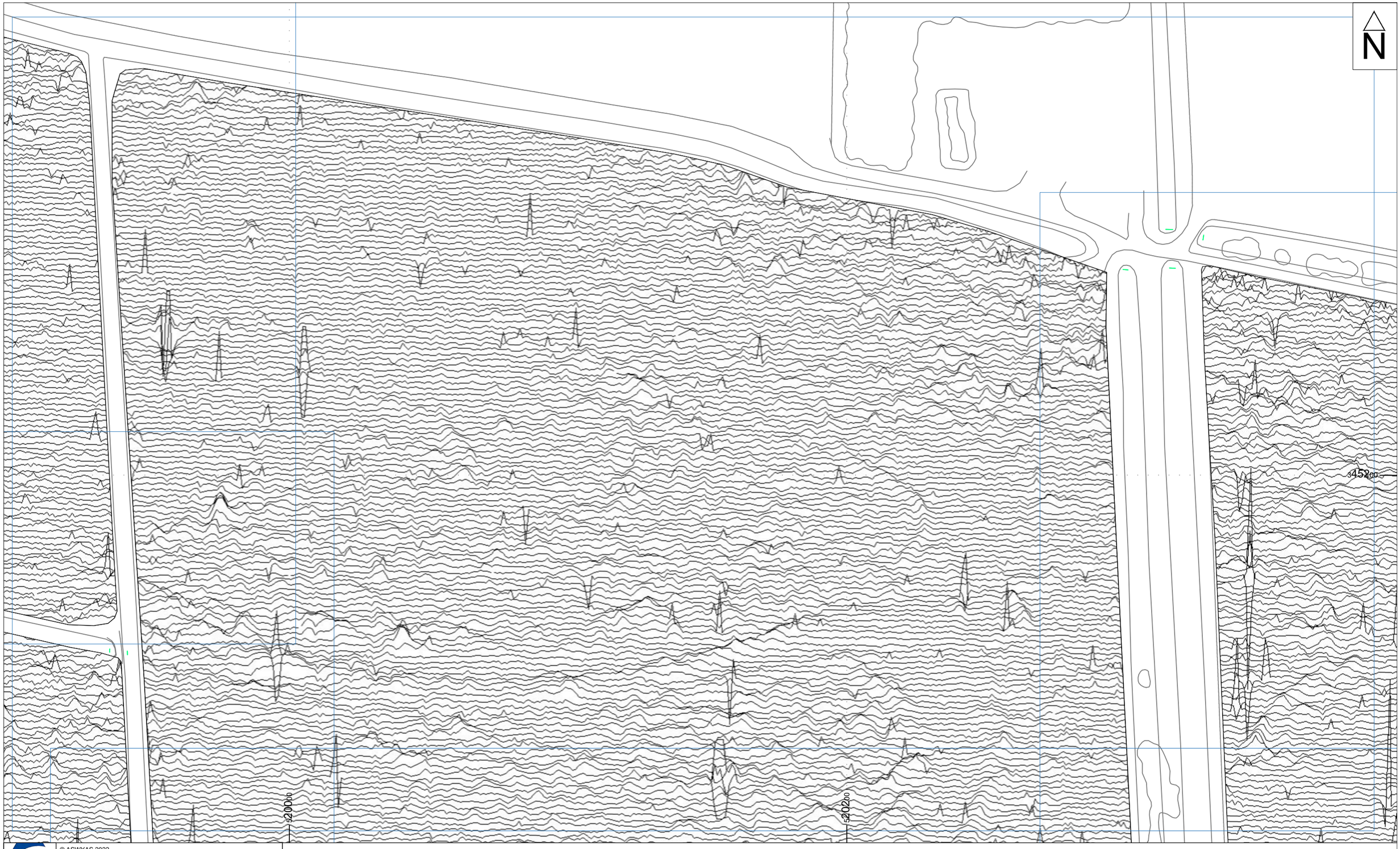
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



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Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 6

Fig. 20

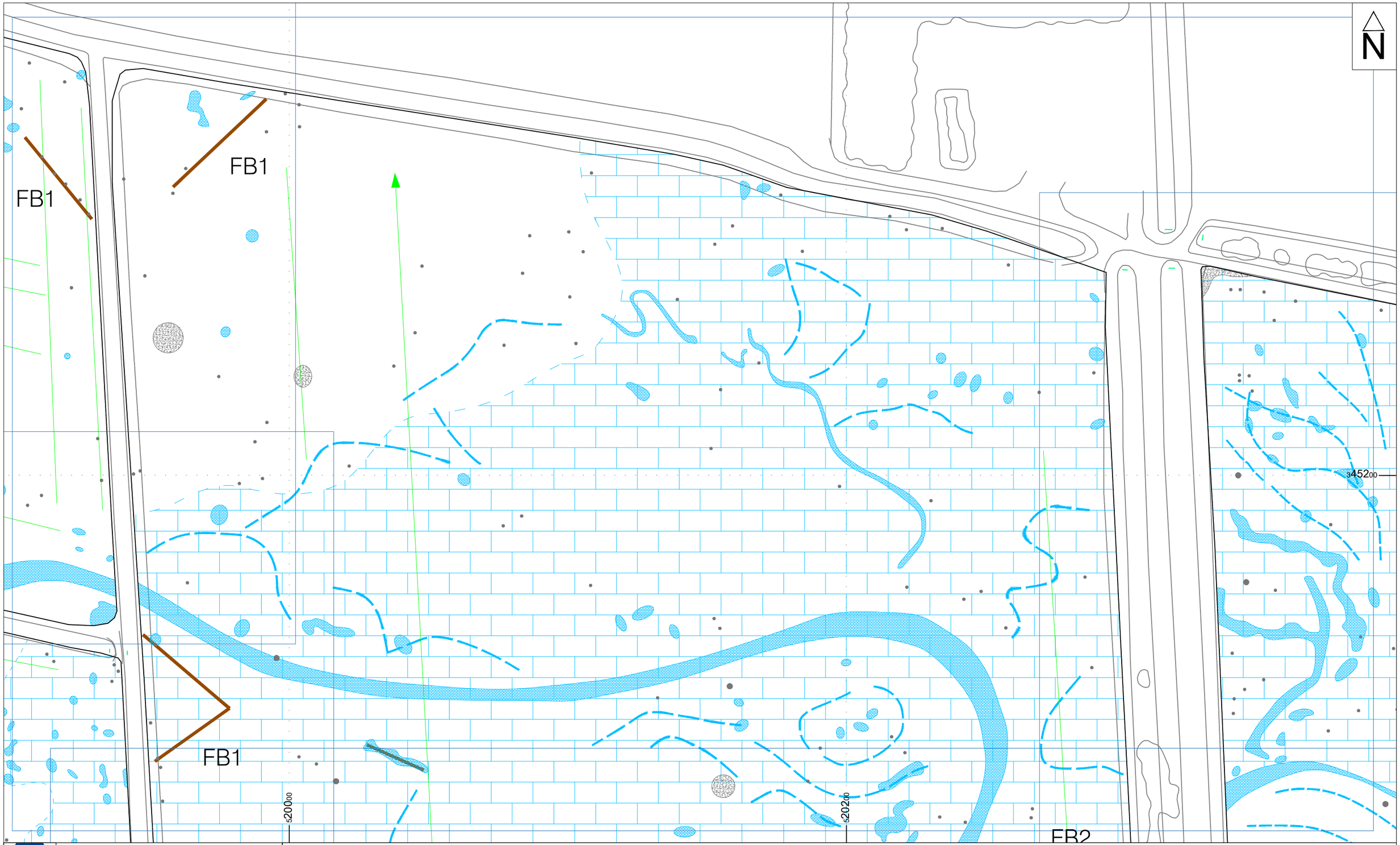
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 6

Fig. 21

Title

- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL
- MAGNETIC DISTURBANCE

0 50m

1:1250 @ A3

N

345000

620000

620200

620400

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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 7

Fig. 22

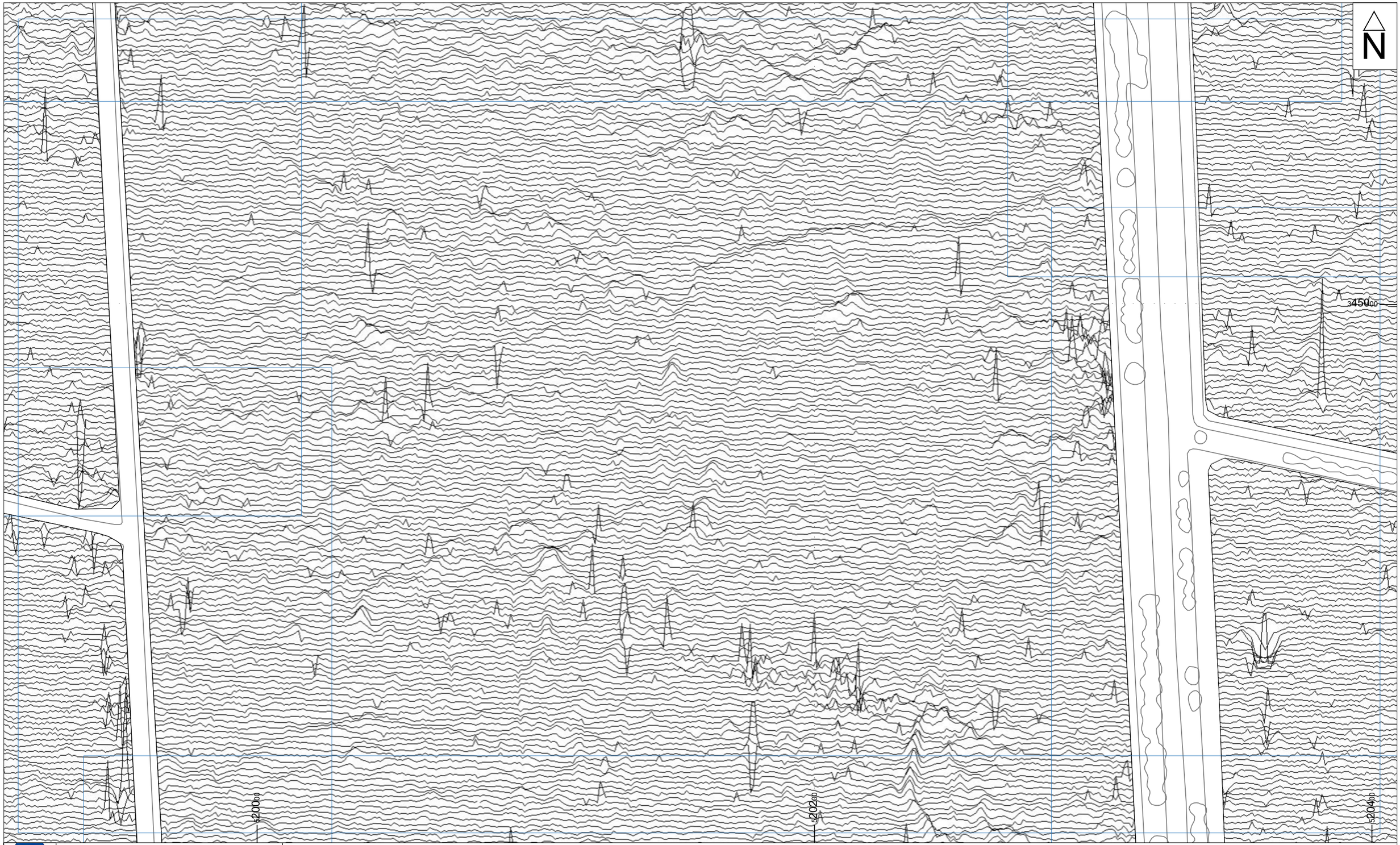
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



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Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 7

Fig. 23

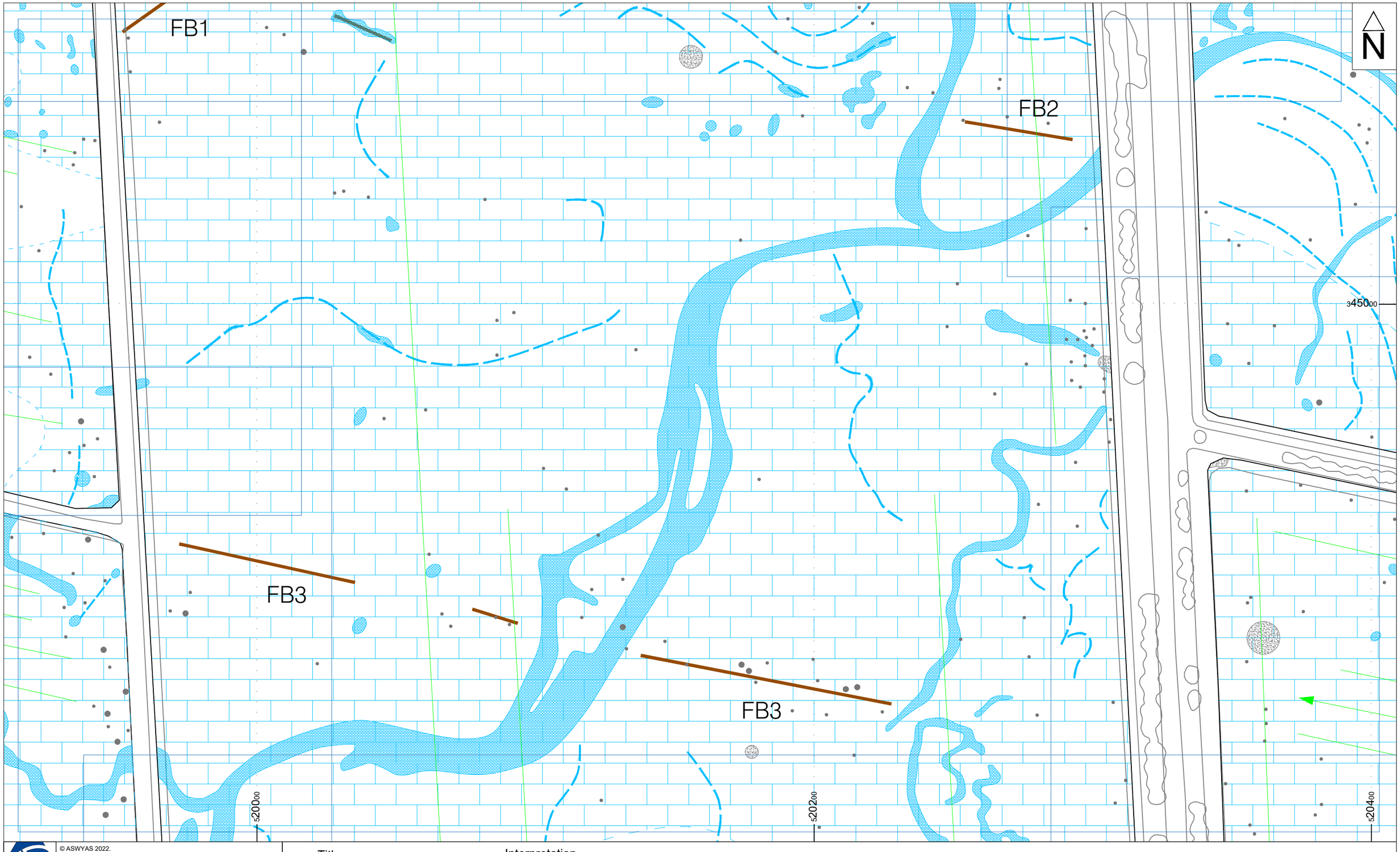
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 7

Fig. 24

Title

- SECTOR BOUNDARY

Interpretation

- AGRICULTURAL
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL
- MAGNETIC DISTURBANCE

0 50m

1:1250 @ A3

N

344800

346000

520000

520200

520400

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 8

Fig. 25

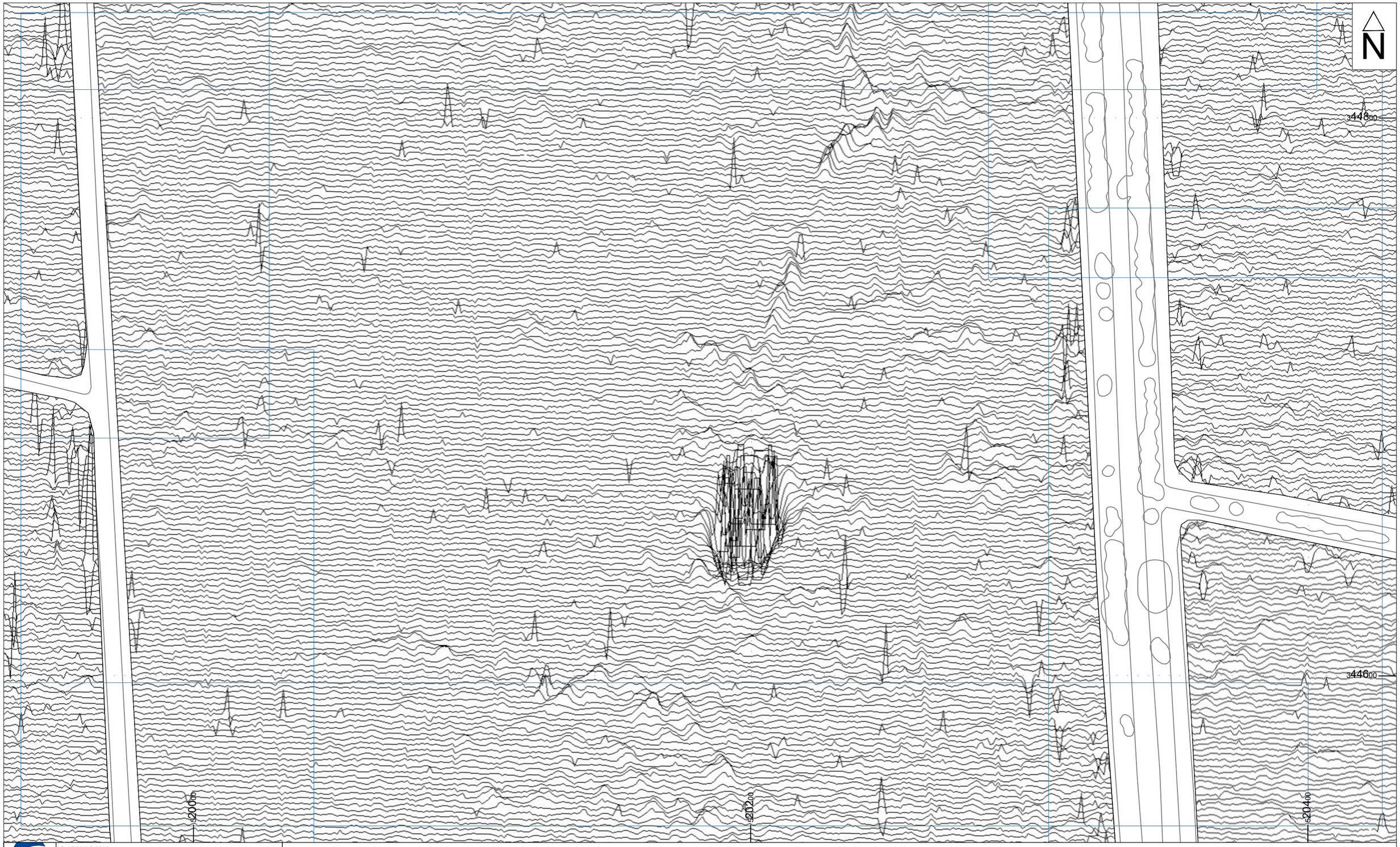
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



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Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 8

Fig. 26

Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3

N

344800

FB4

344600

520000

520200

520400

Archaeological Services W Y A S,
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Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 8

Fig. 27

Title

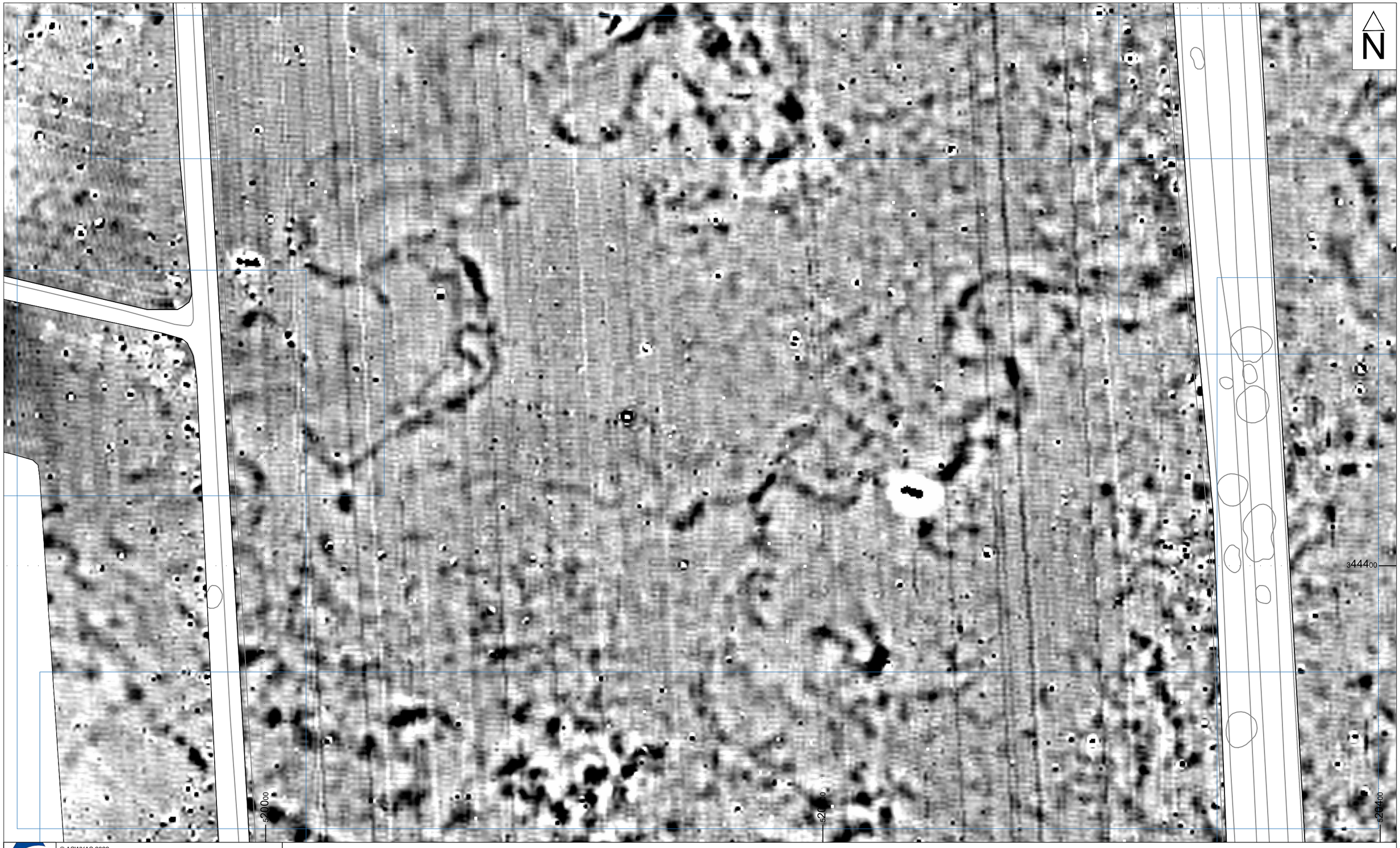
- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FORMER FIELD BOUNDARY
- MAGNETIC DISTURBANCE
- FERROUS
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 9

Fig. 28

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

N

344400

620000

620200

620400

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 9

Fig. 29

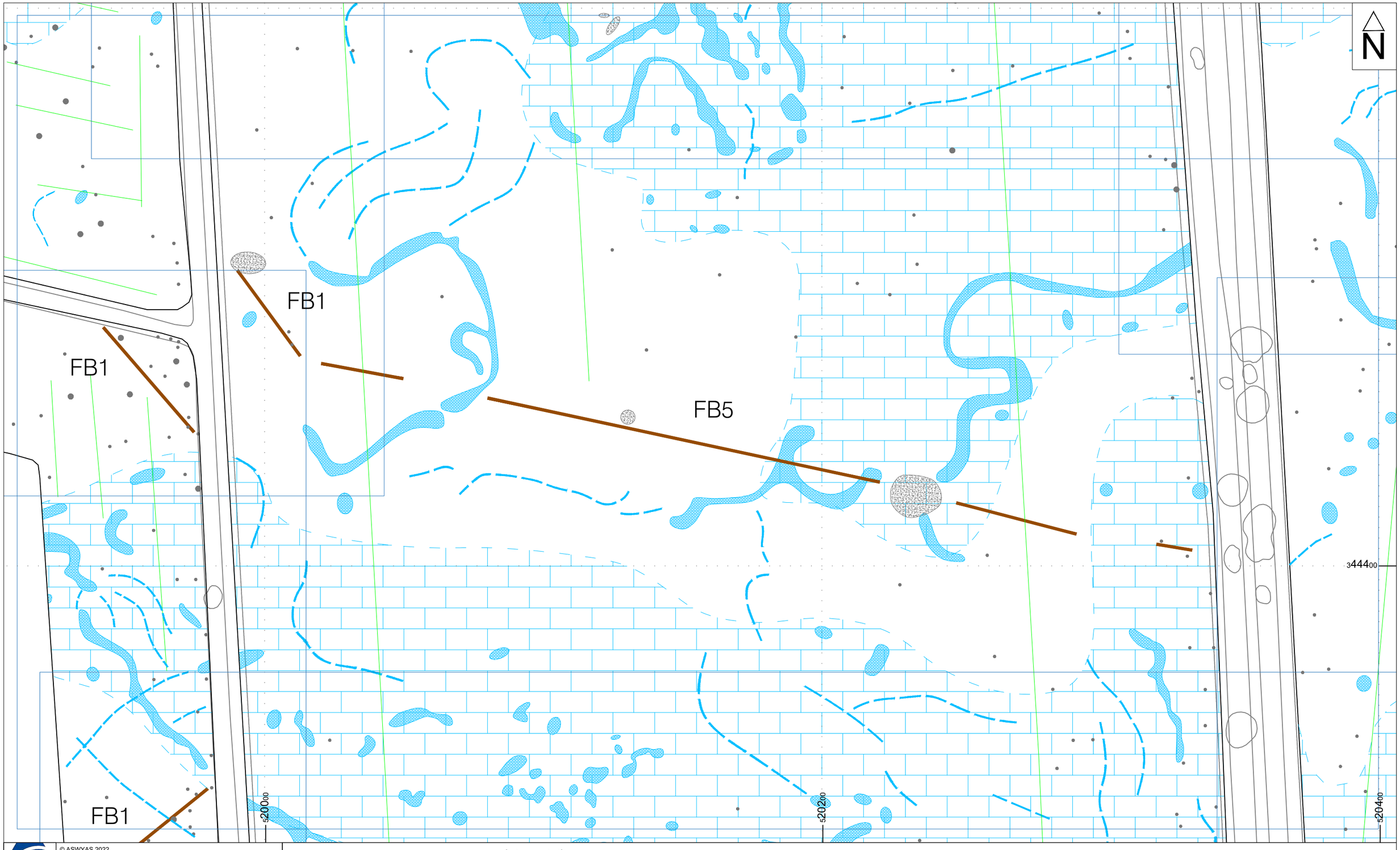
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 9

Fig. 30

Title

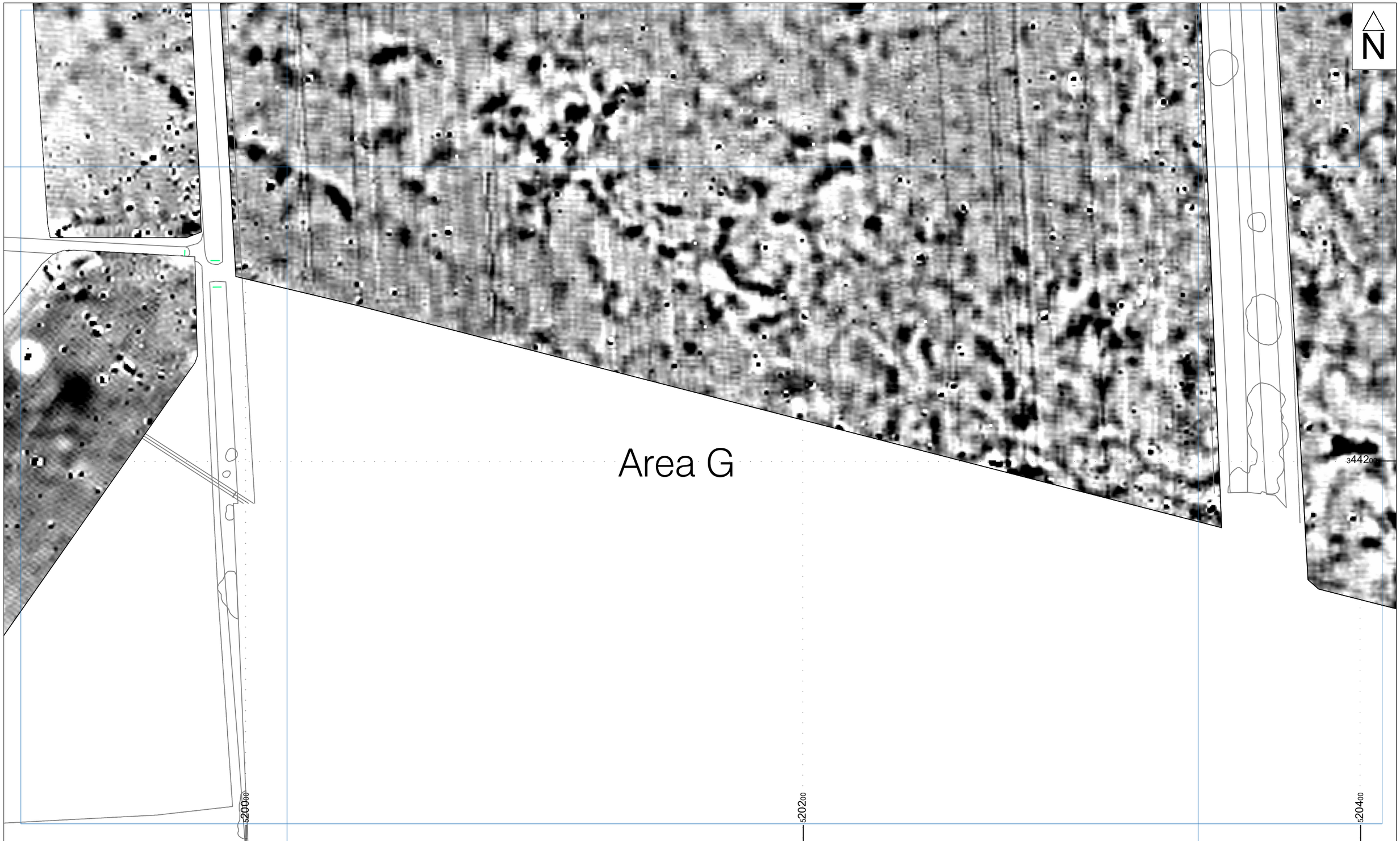
- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FORMER FIELD BOUNDARY
- MAGNETIC DISTURBANCE
- FERROUS
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 10

Fig. 31

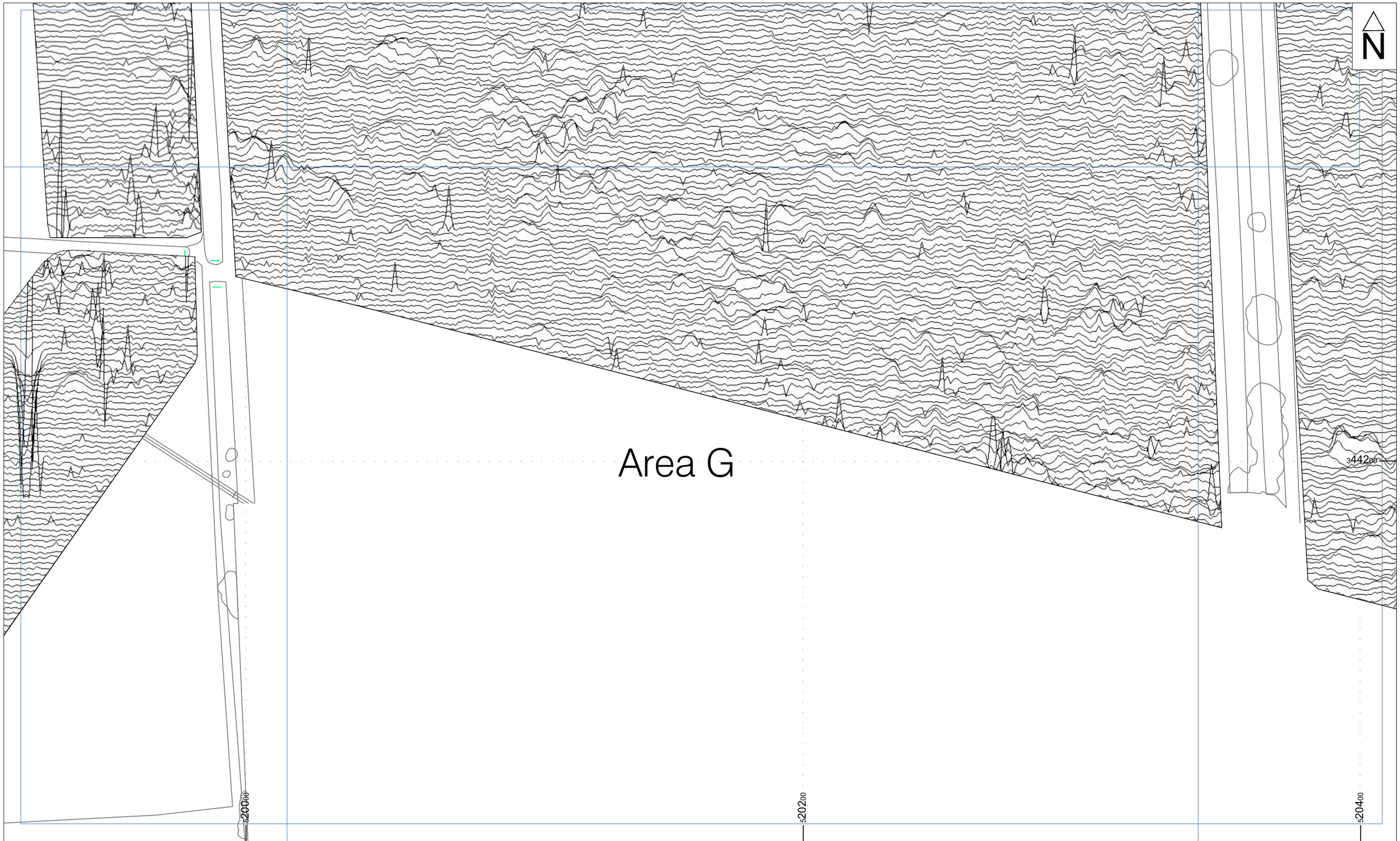
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 10

Fig. 32

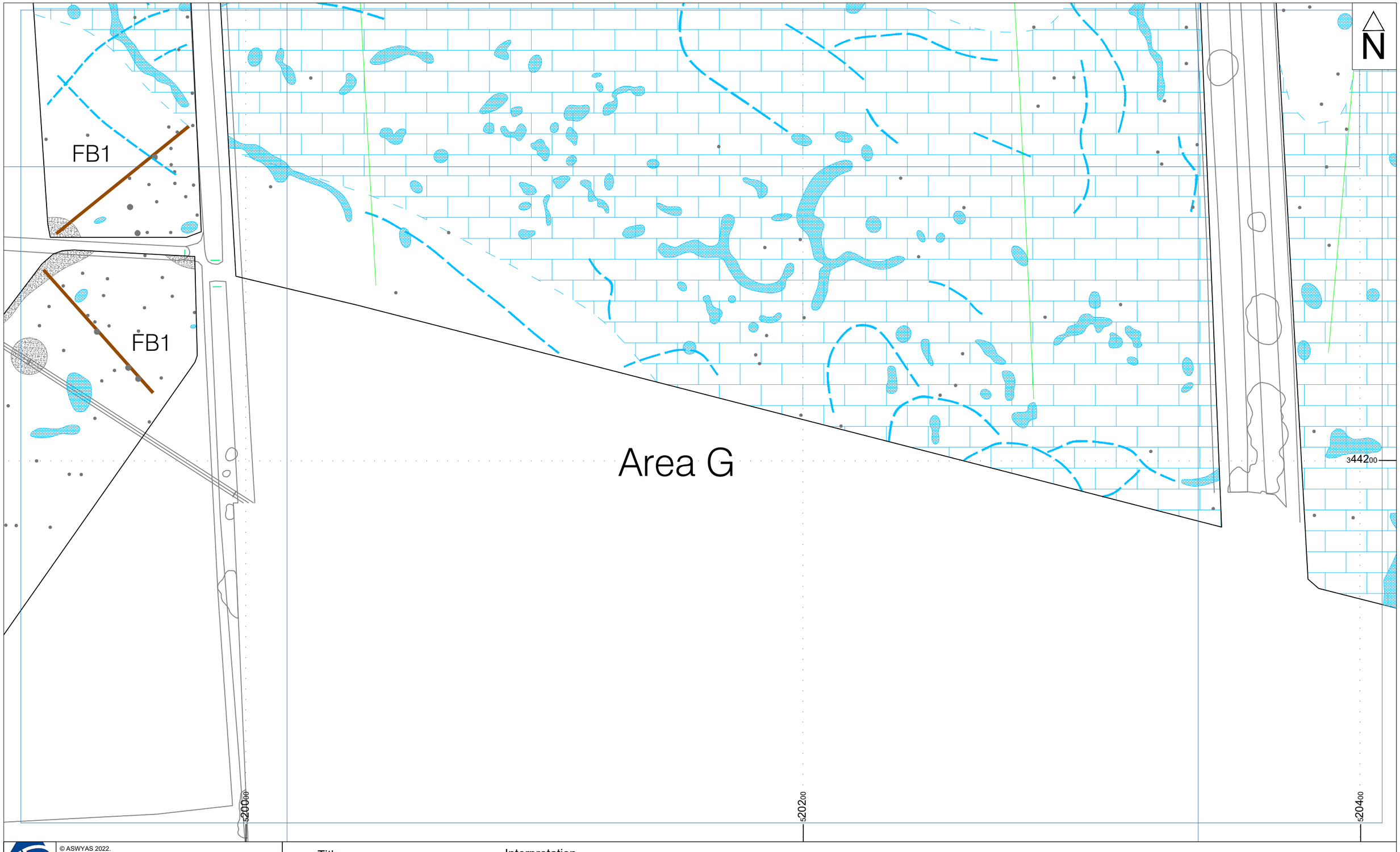
Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 10

Fig. 33

Title

- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL
- MAGNETIC DISTURBANCE

0 50m

1:1250 @ A3

N

Area H

3452 00

5204 00

5206 00

Archaeological Services W Y A S,
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Processed greyscale magnetometer data; Sector 11

Fig. 34

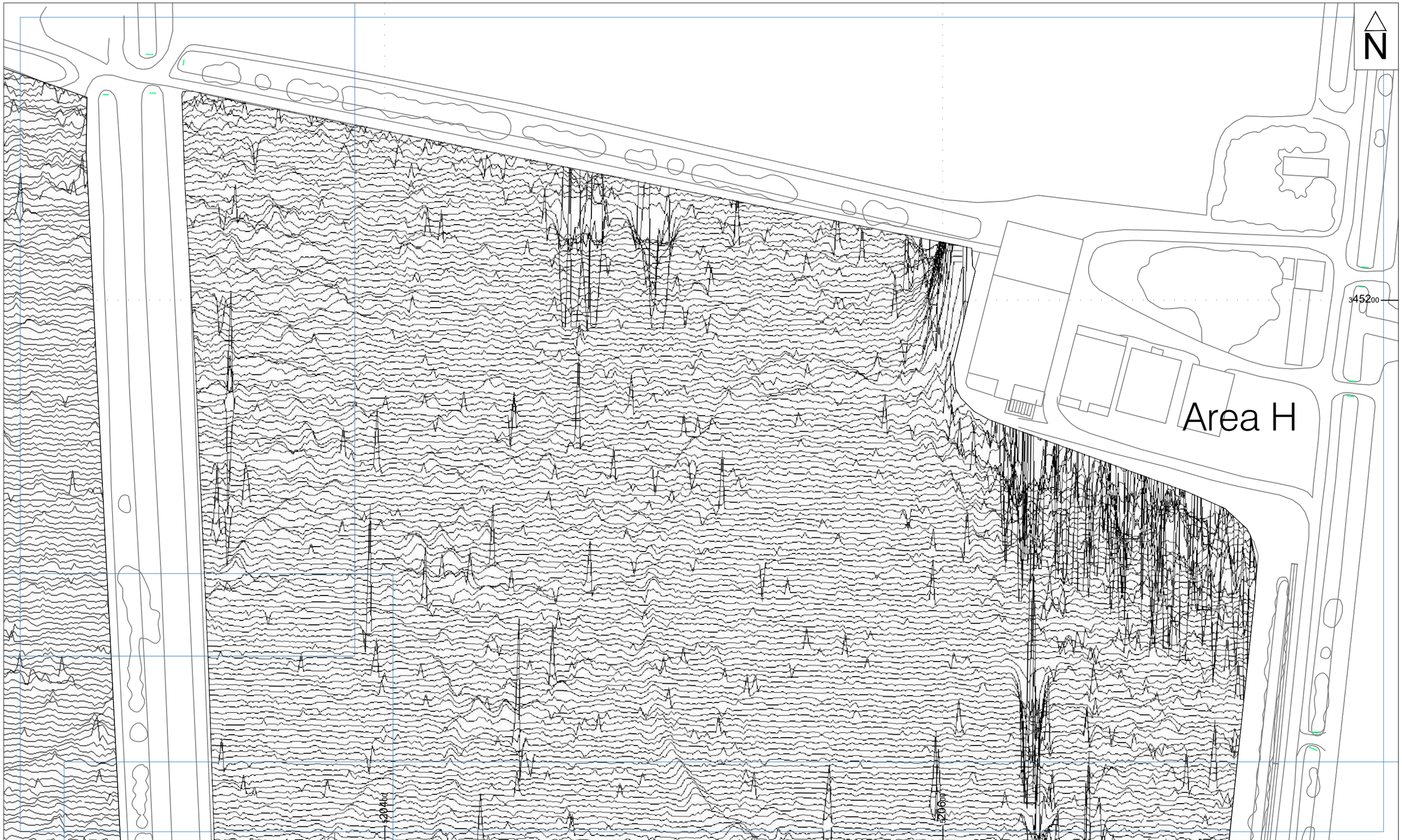
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



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XY trace plot of minimally processed magnetometer data; Sector 11

Fig. 35

Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3

N

Area H

FB2

3452$_{00}$

5204$_{00}$

5206$_{00}$

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 11

Fig. 36

Title

- SECTOR BOUNDARY

Interpretation

- AGRICULTURE (PLOUGH)
- FERROUS
- FORMER FIELD BOUNDARY
- NATURAL/GEOLOGICAL
- MAGNETIC DISTURBANCE

0 50m

1:1250 @ A3

N

3450$_{00}$

3448$_{00}$

5204$_{00}$

5206$_{00}$

Archaeological Services W Y A S,
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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 12

Fig. 37

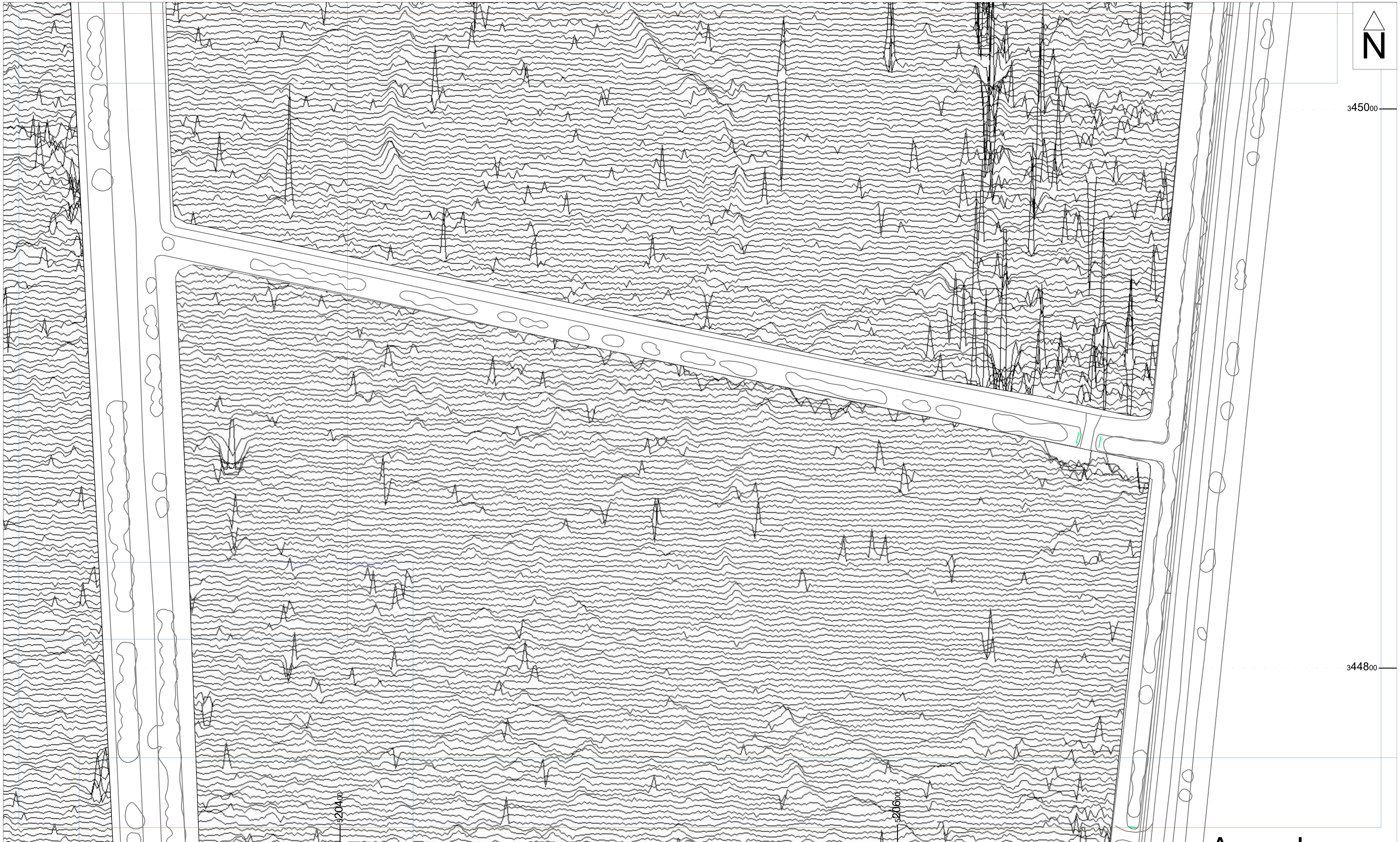
Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3



Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ

Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 12

Fig. 38

Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3

N

345000

344800

520400

520600

Archaeological Services W Y A S,
Nepshaw Lane South, Morley, LS27 7JQ
Tel: 0113 535 0163 Email: archaeology@wyjs.org.uk www.aswyas.com

Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 12

Fig. 39

Title

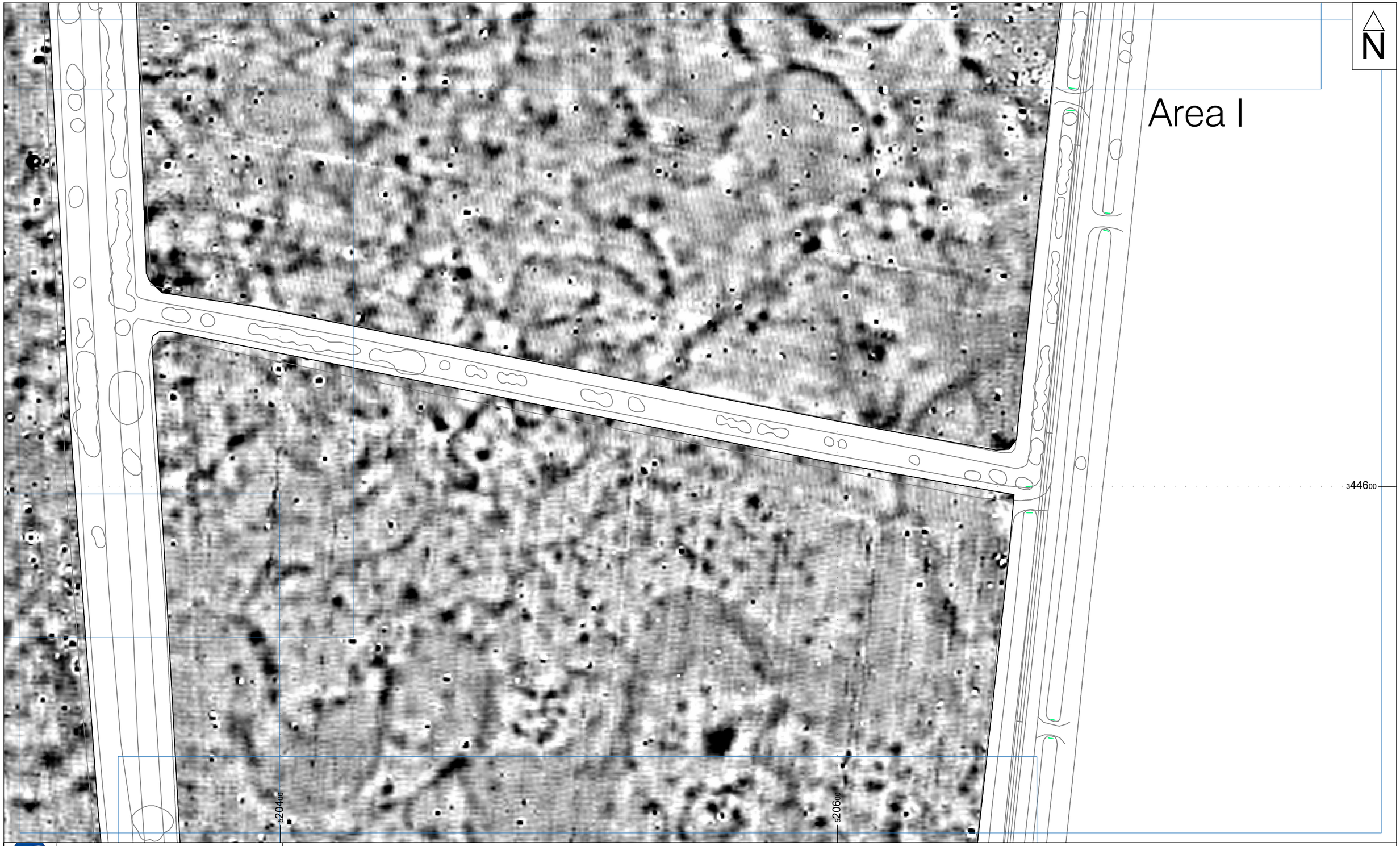
SECTOR BOUNDARY

Interpretation

AGRICULTURE (PLOUGH)
FERROUS
MAGNETIC DISTURBANCE
NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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Project ID: XD59_HECS22

Processed greyscale magnetometer data; Sector 13

Fig. 40

Title

SECTOR BOUNDARY

nT -1.0 2.0

0 50m

1:1250 @ A3

N

Area I

3446 00

5204 00

5206 00

Archaeological Services W Y A S,
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Project ID: XD59_HECS22

XY trace plot of minimally processed magnetometer data; Sector 13

Fig. 41

Title

SECTOR BOUNDARY

15.0 nT/cm

0 50m

1:1250 @ A3

N

Area I

3446$_{00}$

5204$_{00}$

5206$_{00}$

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Project ID: XD59_HECS22

Interpretation of magnetometer data; Sector 13

Fig. 42

Title

SECTOR BOUNDARY

Interpretation

AGRICULTURE (PLOUGH)

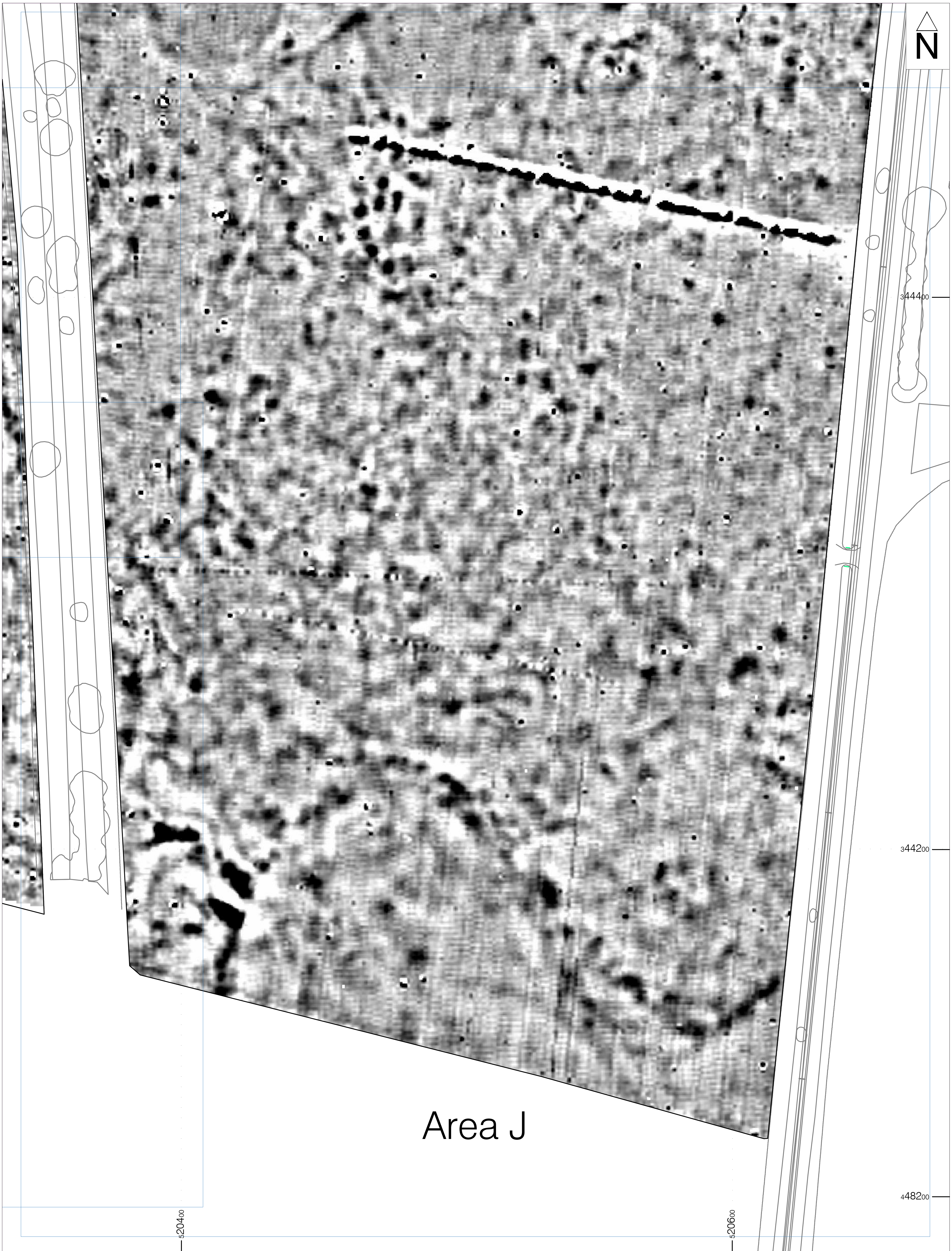
FERROUS

MAGNETIC DISTURBANCE

NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3



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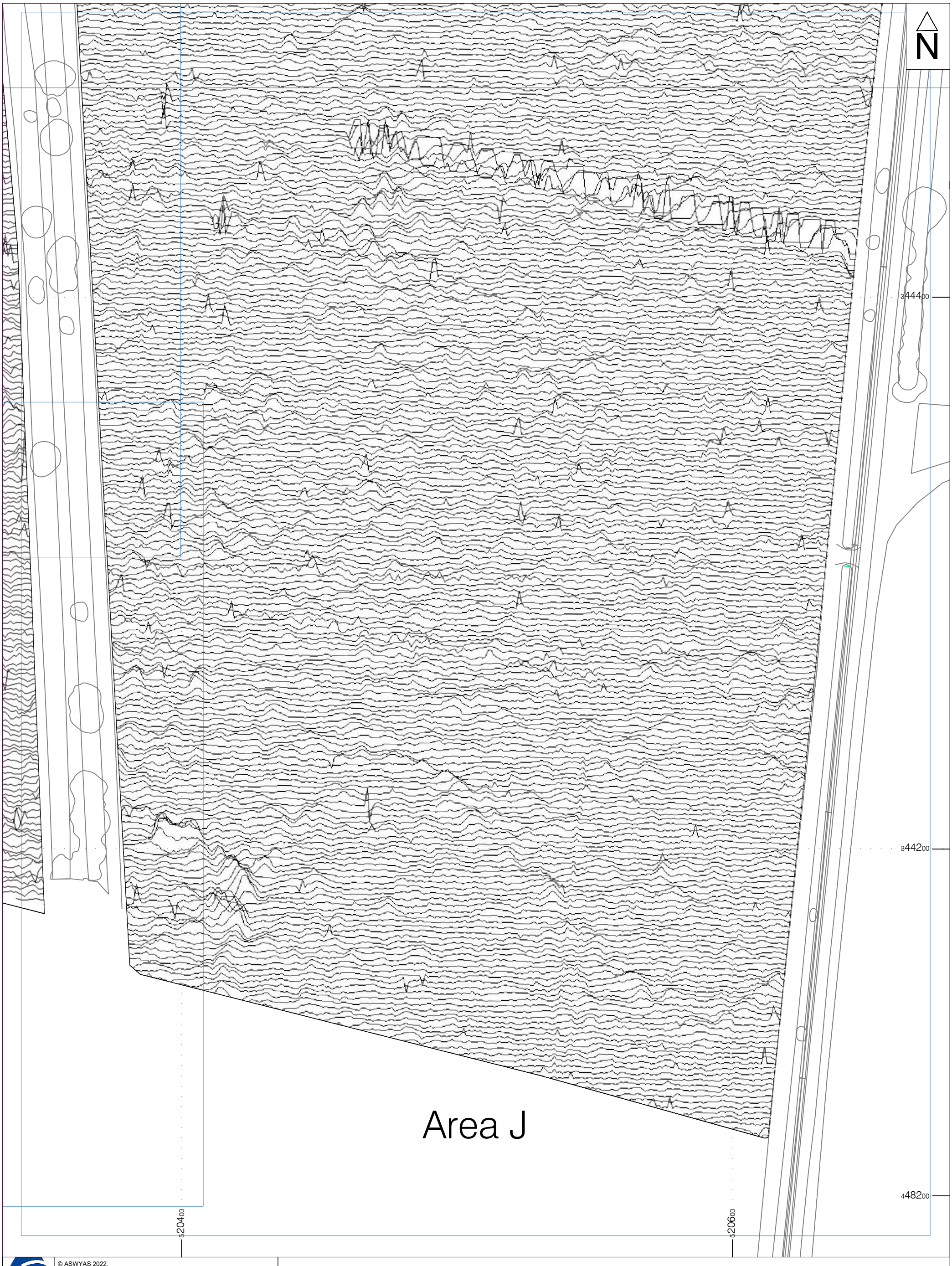
Processed greyscale magnetometer data; Sector 14

nT -1.0 2.0

0 50m

1:1250 @ A3

Fig. 43



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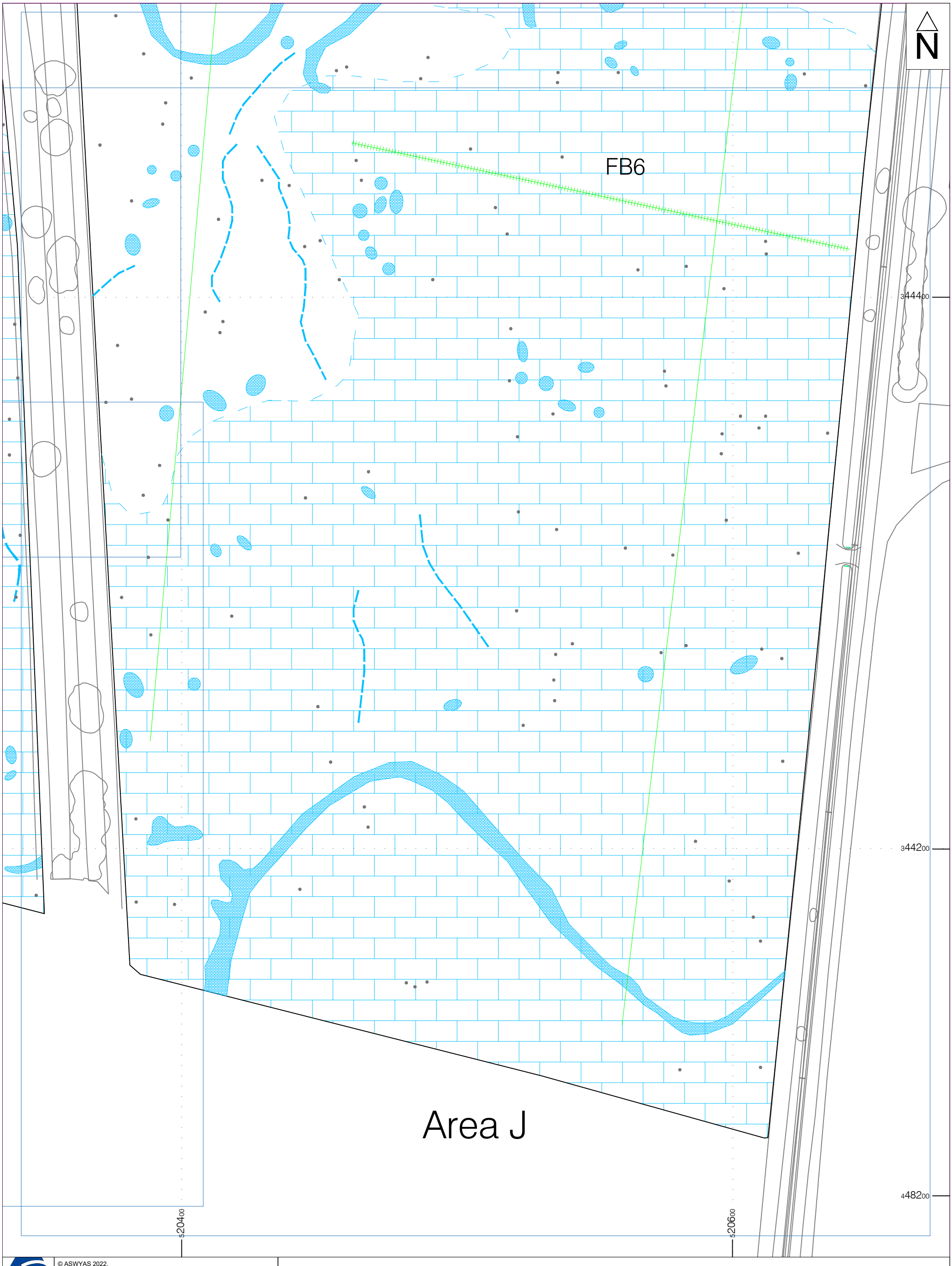
XY trace plot of minimally processed magnetometer data; Sector 14

Fig. 44

15.0 nT/cm

0 50m

1:1250 @ A3



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Interpretation of magnetometer data; Sector 14

Fig. 45

Interpretation

- AGRICULTURE (PLOUGH)
- FIELD DRAIN
- FORMER FIELD BOUNDARY
- FERROUS
- NATURAL/GEOLOGICAL

0 50m

1:1250 @ A3

Plate 1. General view of Area A, looking south

Plate 2. General view of Area C, looking northeast

Plate 3. General view of Area E, looking northwest

Plate 4. General view of Area G, looking southeast

Plate 5. General view of Area G, looking northeast

Plate 6. General view of Area H, looking east

Plate 7. General view of Area I, looking west

Plate 8. General view of Area J, looking south

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haemetite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms. Areas of human occupation or settlement can then be identified by measuring the magnetic susceptibility of the topsoil because of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough.

Types of Magnetic Anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

Methodology: Gradiometer Survey

The main method of using the fluxgate gradiometer for commercial evaluations is referred to as ***detailed survey*** and requires the surveyor to walk at an even pace carrying the instrument within a grid system. A sample trigger automatically takes readings at predetermined points, typically at 0.25m intervals, on traverses 1m apart. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation.

During this survey an eight channel Sensys MX V3 system containing eight FGM650 sensors was also used which was towed across the area using an ATV. Readings were taken every 20MHz (between 0.05 and 0.1m). Data was be recorded onto a device, using a Carlson GNSS Smart antenna, for centimetre accuracy. These readings were stored in the memory of the instrument and downloaded for processing and interpretation.

The gradiometer data have been presented in this report in processed greyscale format. The data in the greyscale images have been interpolated and selectively filtered to remove the effects of drift in instrument calibration and other artificial data constructs and to maximise the clarity and interpretability of the archaeological anomalies.

Appendix 2: Survey location information

An initial survey station was established using a Trimble VRS differential Global Positioning System (Trimble R6 model). The data was geo-referenced using the geo-referenced survey station with a Trimble RTK differential Global Positioning System (Trimble R6 model). The accuracy of this equipment is better than 0.01m. The survey grids were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if co-ordinates are measured off hard copies of the mapping rather than using the digital co-ordinates.

Archaeological Services WYAS cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

Appendix 3: Geophysical archive and metadata

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2000), and graphics files (Adobe Illustrator CS2 and AutoCAD 2008) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the Lincolnshire Historic Environment Record).

Area A

filename	XD59_1.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519566.9427, 345148.8239
dummy value	2047.5
source GPS points	4814407
survey size	375 m x 280 m
x and y interval	1m
stats:	
max	2293.70
min	-2282.40
std dev	171.86
mean	-1.45
median	-0.07
composite area	10.5 ha
surveyed area	7.6135 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area B

filename	XD59_2.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519578.0586, 344928.4515
dummy value	2047.5
source GPS points	4271374
survey size	376 m x 288 m
x and y interval	1m
stats:	
max	2293.70
min	-2293.55
std dev	164.82
mean	1.26
median	-0.09
composite area	10.829 ha
surveyed area	7.6246 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area C

filename	XD59_3.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519590.5025, 344708.9866
dummy value	2047.5
source GPS points	4828082
survey size	374 m x 288 m
x and y interval	1m
stats:	
max	2293.70
min	-2292.40
std dev	161.49
mean	-0.76
median	-0.08
composite area	10.771 ha
surveyed area	7.5794 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area D

filename	XD59_4.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519601.3422, 344494.6188
dummy value	2047.5
source GPS points	4727189
survey size	375 m x 285 m
x and y interval	1m
stats:	
max	2293.70
min	-2291.78
std dev	161.00
mean	-0.61
median	-0.08
composite area	10.688 ha
surveyed area	7.4204 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area E

filename	XD59_5.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519609.5234, 344283.2509
dummy value	2047.5
source GPS points	1988687
survey size	377 m x 282 m
x and y interval	1m
stats:	
max	2293.70
min	-2272.19
std dev	139.21
mean	0.33
median	-0.13
composite area	10.631 ha
surveyed area	3.022 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area F

filename	XD59_6.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519795.7196, 344070.4596
dummy value	2047.5
source GPS points	1339852
survey size	192 m x 212 m
x and y interval	1m
stats:	
max	2293.70
min	-2268.71
std dev	236.63
mean	3.31
median	0.06
composite area	4.0704 ha
surveyed area	1.7535 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area G

filename	XD59_7.xcp

instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	519914.8062, 343960.3942
dummy value	2047.5
source GPS points	22025787
survey size	461 m x 1.39E003 m
x and y interval	1m
stats:	
max	1091.81
min	-1020.45
std dev	5.08
mean	0.02
median	-0.03
composite area	64.125 ha
surveyed area	40.188 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area H

filename	XD59_8.xcp
instrument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	520318.1762, 344892.1522
dummy value	2047.5
source GPS points	7107201
survey size	395 m x 386 m
x and y interval	1m
stats:	
max	1248.88
min	-279.53
std dev	14.21
mean	0.53
median	-0.08
composite area	15.247 ha
surveyed area	11.148 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area I

filename	XD59_9.xcp
instument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	520691.5916, 344867.5233
dummy value	2047.5
source GPS points	5789520
survey size	357 m x 333 m
x and y interval	1m
stats:	
max	760.19
min	-116.53
std dev	2.97
mean	-0.05
median	-0.09
composite area	11.888 ha
surveyed area	9.1249 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Area J

filename	XD59_10.xcp
instument	Sensys DLMGPS
units	nT
survey coordinates:	
SW	520341.3094, 344095.0723
dummy value	2047.5
source GPS points	9068866
survey size	318 m x 565 m
x and y interval	1m
stats:	
max	107.13
min	-118.38
std dev	2.04
mean	-0.03
median	-0.09
composite area	17.967 ha
surveyed area	14.035 ha
program	TerraSurveyorPre Version:3.0.37.12
GPS based processes	Base Layer
	Interpolate: X & Y Doubled.

Appendix 4: Oasis form

Summary for archaeol11-506198

OASIS ID (UID)	archaeol11-506198
Project Name	Geophysical Survey at Heckington Fen Solar Farm - Site 3
Sitename	
Activity type	Geophysical Survey, MAGNETOMETRY SURVEY
Project Identifier(s)	
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	Archaeological Services WYAS
Project Dates	21-Mar-2022 - 29-Mar-2022
Location	Heckington Fen Solar Farm - Site 3 NGR : TF 20110 44660 LL : 52.9858254612031, -0.212269302634139 12 Fig : 520110,344660
Administrative Areas	Country : England County : Lincolnshire District : North Kesteven Parish : Heckington
Project Methodology	The cart-based survey was undertaken using an eight channel SenSYS MX V3 system containing eight FGM650 sensors. Readings are taken every 20MHz (between 0.05 and 0.1m). Data were recorded onto a device, using a Carlson GNSS Smart antenna, for centimetre accuracy. These readings were stored in the memory of the instrument and downloaded for processing and interpretation. DLMGPS and MAGNETO software, alongside bespoke in-house software was used to process and present the data.
Project Results	A geophysical (magnetometer) survey was undertaken on approximately 112 hectares of land located to the north of the A17 in East Heckington, Lincolnshire. Anomalies associated with natural and geological responses dominate the dataset and show former palaeochannels or water courses and possible oxbow lakes. There are no anomalies associated with an archaeological origin although a handful of anomalies have been categorised as uncertain which may have some potential. Former field boundaries have been recorded along with modern ploughing trends. A service pipe has also been recorded in the west of the survey area. Based on the geophysical survey the archaeological potential of the Site is deemed to be low.
Keywords	
Funder	
HER	Lincolnshire HER - unRev - STANDARD
Person Responsible for work	Emma, Brunning
HER Identifiers	
Archives	Digital Archive - to be deposited with The Collection: Art and Archaeology in Lincolnshire

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