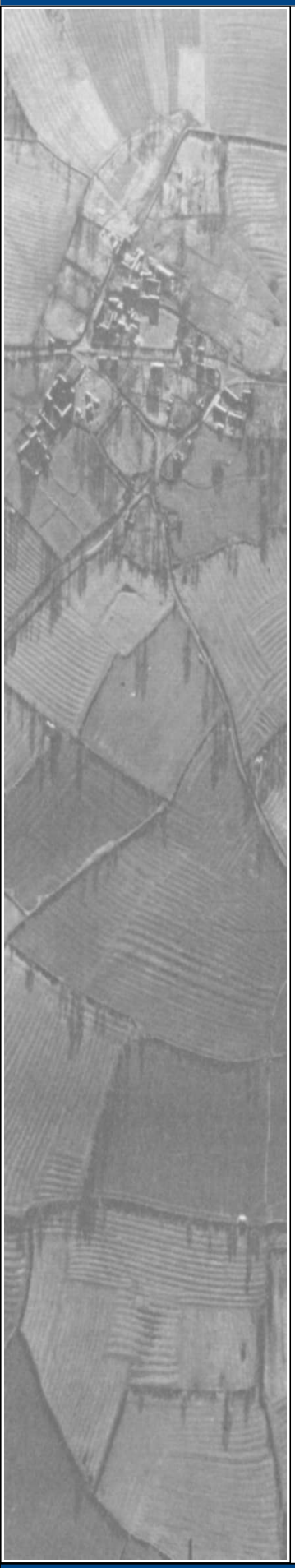

Land south of North Tawton Primary Substation
North Tawton
Devon

MAGNETOMETER SURVEY REPORT

for

Pegasus Group

on behalf of

Balance Power Projects Limited

Kerry Donaldson & David Sabin

June 2022

Ref. no. J921

ARCHAEOLOGICAL SURVEYS LTD

Land south of North Tawton Primary Substation
North Tawton
Devon

MAGNETOMETER SURVEY REPORT

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on behalf of

Balance Power Projects Limited

Fieldwork by David Sabin BSc (Hons) MCIfA
Report by Kerry Donaldson BSc (Hons) MCIfA
Report checked by David Sabin
Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 16th June 2022
Ordnance Survey Grid Reference – **SS 65275 01280**

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SUMMARY

A geophysical survey was carried out by Archaeological Surveys Ltd ahead of a battery storage facility development to the south of the primary substation at North Tawton, Devon. The results indicate the presence of a possible linear, ditch-like feature and a number of discrete positive responses that appear to relate to pit-like features of uncertain origin. Numerous anomalies of natural origin have also been located along with a previously mapped field boundary, evidence for agricultural activity and magnetic disturbance from ferrous material and services.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Pegasus Group, on behalf of Balance Power Projects Ltd, to undertake a magnetometer survey of an area of land at North Tawton in Devon. The site has been outlined for a proposed development of a battery storage facility and associated infrastructure to the south of the North Tawton primary substation, and the work is being carried out as part of an archaeological investigation under condition of West Devon Borough Council planning application no: 2094/21/FUL.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2022).

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection

1.2.2 Geophysical survey can provide useful information on the archaeological potential of a site; however, the outcome of any survey relies on a number of factors and as a consequence results can vary. The success in meeting the aims and objectives of a survey is, therefore, often impossible to predetermine.

1.3 Standards, guidance and recommendations for the use of this report

1.3.1 Archaeological Surveys Ltd is a Registered Organisation with the Chartered Institute for Archaeologists and both company directors are Members of the Chartered Institute for Archaeologists (MCIfA) and have therefore been

assessed for their technical competence and ethical suitability and abide by the CIfA Codes of Conduct. The survey and report follow the recommendations set out by: European Archaeological Council (2015) *Guidelines for the Use of Geophysics in Archaeology;* Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations.* The work has been carried out to the Chartered Institute for Archaeologists (2014) (updated 2020) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3.2 Archaeological Surveys Ltd provide a detailed geophysical survey report and it is recommended that where possible the contents should be considered in full. The Summary provides a brief overview of the results with more detail available in the Discussion and/or Conclusion. The *List of anomalies* within the Results provides a detailed assessment of the anomalies within separate categories which can be useful in inferring a level of confidence to the interpretation. Quality and factors influencing the interpretation of anomalies is also set out within the results.

1.3.3 It is recommended that the full report should always be considered when using data and interpretation plots; where this is not possible, in the field for example, the abstraction and interpretation plots should retain their colour coding and be used with a corresponding legend.

1.3.4 Where targeting of anomalies by excavation is to be carried out, care should be taken to place trenches over solid lines or features visible on the abstraction and interpretation plots. Archaeological Surveys abstraction and interpretation avoids the use of dashed or dotted line formats, and broken or fragmented lines used in interpretive plots may well correspond closely with truncation of archaeological features.

1.4 Site location, description and survey conditions

1.4.1 The site is located to the south of the electricity substation to the south west of North Tawton in Devon. The new battery storage facility is centred on Ordnance Survey National Grid Reference (OS NGR) SS 65275 01280, with the survey area including a wider corridor over the access track to the west and centred on SS 65185 01205, see Figs 01 and 02.

1.4.2 The geophysical survey covers approximately 1.5ha with approximately 0.75ha over the proposed battery storage facility in the east and another 0.75ha covering a 25-35m wide corridor to the west over the proposed access track where possible and a wider zone to aid interpretation.

1.4.3 At the time of survey the field contained recently mown grass. The area generally slopes down towards the east from an elevated position on the track crossing the western side of the field. The north western corner of the field, near the entrance, contained dumped material, a mound of soil and a small excavator. The western side of the field is traversed by a deeply rutted

agricultural track with manure and tall vegetation in the south west corner. Survey was not possible within these zones.

1.4.4 With the exception of the zones in the western part of the field mentioned above, the ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. However, steel railings bounding the factory immediately to the east of the site, and tall silos and other steel objects just beyond the railings, were considered likely to produce a significant zone of magnetic disturbance within the survey area. Weather conditions during the survey were fine.

Plate 1: Proposed battery storage area looking east

1.5 Site history and archaeological potential

1.5.1 The Devon Historic Environment Record outlines that a post medieval ditch was recorded ahead of construction of the substation just to the north of the site (MDV68447). A late medieval wayside cross (MDV1055) is a scheduled monument (Week Barn Cross List entry no: 1013717) and is located 185m to the north east. In the wider vicinity there are cropmarks of a possible late Iron Age or Romano-British rectilinear enclosure situated 400m south west (MDV1081), with a ditch (MDV71286) and a post hole (MDV71287) located 250m and 270m to the south east. The findspot of two Neolithic stone axes (MDV1057) is recorded 200m to the north east. The site of the last battle of the Prayer Book Rebellion that took place in August 1549 is located on land to the north of the substation (MDV12578). Cropmark features including a possible Neolithic mortuary enclosure (MDV16792) and a ring ditch (MDV39998) are located 500m to the north west and are scheduled

monuments (List entry no: 1020071). The possible location of the medieval settlement of Greatweek/Hamstonwick (MDV16061) has been postulated 350m to the east. The Roman military complex at North Tawton (Roman forts, marching camps and associated monuments) (List entry no: 1021151 / MDV103778) covers over 36ha and is located 780m-1.6km to the south east.

1.6 Geology and soils

1.6.1 The underlying solid geology across the site is from the Bow Breccia Formation (Permian Breccia) (BGS, 2017).

1.6.2 The overlying soil across the survey area is from the Crediton association and is a typical brown earth. It consists of a well drained, gritty, reddish, loamy soil over breccia (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry survey carried out across similar soils has produced variable results with naturally formed anomalies being, at times, difficult to distinguish from those with an anthropogenic origin. The underlying geology and soils are, however, considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance (also known as thermoremanence) are factors associated with the formation of localised fields.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T). Additional details are set out in 2.2 below and within Appendix A.

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20Hz. The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a measurement range of ±8000nT, although the recorded range is ±3000nT, and resolution is around 0.1nT. They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.

2.2.3 Data are collected along a series of parallel survey transects to achieve 100% coverage of the surveyable land. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

2.2.4 Fluxgate sensors are highly sensitive to temperature change and this manifests as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift, data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <100s.

2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero

the sensors; however, this is a short term measure that is prone to drift through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.

2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of the offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse function it is not possible to create a meaningful data plot as all sensors have a different offset value. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.

2.3.3 The minimally processed data are collected between limits of ±3000nT and clipped for display at ±3nT. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.

2.3.4 Additional data processing has been carried out in the form of high pass filtering. This effectively removes low frequency variation along a traverse that has been caused by large magnetic bodies, cultivation or rapid temperature change. Data treated to additional processing have been compared to unprocessed data to ensure that no significant anomalies have been removed.

2.3.5 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on processing.

2.3.6 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data are considered by the manufacturer to be data that are compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to the very high density of data collection. In addition, traceplots cannot be meaningfully plotted against base mapping and in areas of complexity traces may be lost or highly confused. Traceplots may be used to demonstrate characteristic magnetic profiles across discrete features where it is considered beneficial.

2.3.7 The raster images are combined with base mapping using ProgeCAD Professional 2021, creating DWG (2018) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality.

The CAD plots are effectively georeferenced facilitating relocation of features using GNSS, resection method, etc.

2.3.8 An abstraction and interpretation is drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing. Appendix E sets out CAD layer names with colour and graphic content for each interpretation category, see 3.3.

2.3.9 A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within the survey area.

2.3.10 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd but the digital data will also be archived with the Archaeology Data Service (ADS).

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over approximately 1.5ha.

3.1.2 Magnetic anomalies located can be generally classified as positive and linear anomalies of an uncertain origin, anomalies associated with land management, linear anomalies of an agricultural origin, anomalies with a natural origin, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines. Anomalies located within each survey area have been numbered and are described in 3.4 below.

3.2 Statement of data quality and factors influencing the interpretation of anomalies

3.2.1 Data are considered representative of the magnetic anomalies present within the site. Severe magnetic disturbance was encountered within a zone approximately 20m wide along the eastern side of the survey area. The disturbance relates to steel fencing, silos, pipes etc. and possible underground services associated with the adjacent factory. Additional data processing in the form of high pass filtering was carried out in order to suppress the disturbance and allow the abstraction of other anomalies. Filtered and unfiltered data are assessed in order to ensure that more significant anomalies are not removed or significantly altered by the additional processing.

3.2.2 The data indicate generally useful magnetic contrast between the fill of former cut features and the adjacent subsoil or solid geology. However, numerous naturally formed linear anomalies also display useful magnetic contrast, and it can be very difficult to separate these from features of anthropogenic origin,

particularly where the survey area is narrow and their full extent is not visible. The morphology of these natural features appears consistent with thermal-contraction polygons formed in periglacial conditions, their polygonal nature and size is often similar to archaeological features such as ditched enclosures.

3.2.3 Parallel, weak linear anomalies relate to modern cultivation and attest to the useful magnetic contrast between topsoil and subsoil.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A general explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, see Table 1.

Interpretation category	Description and origin of anomalies
Anomalies with an uncertain origin	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Morphology may be unclear or uncharacteristic and there may be a lack of additional supporting information. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates ceramic land drains.
Anomalies with an agricultural origin	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing. This category does not include agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
Anomalies associated with magnetic debris	Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc. Often a significant area around these features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.
Anomalies with a natural origin	Naturally formed magnetic anomalies are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are almost impossible to distinguish from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 265275 101250, see Figs 03 – 06.

Anomalies with an uncertain origin

(1) – A positive linear anomaly in the southern part of the survey area could relate to a cut, ditch-like feature; however, a natural origin is possible.

(2) – The survey area contains a number of discrete, positive anomalies. While such anomalies could relate to natural, pit-like features, they tend to have a response of 10-20nT which could indicate an association with burning.

Anomalies associated with land management

(3) – A positive linear anomaly relates to a linear ditch. It appears to correspond to a post-medieval field boundary mapped during the 19th century.

Anomalies with a natural origin

(4) – The site contains numerous positive linear and rectilinear anomalies. The morphology indicates that they relate to the fill of naturally formed features within the underlying geology, likely under periglacial conditions.

Anomalies with an agricultural origin

(5) – A series of parallel linear anomalies seen mainly in the eastern part of the site relate to modern agricultural activity.

Anomalies associated with magnetic debris

(6) – Strong, discrete, dipolar anomalies are a response to ferrous and other magnetically thermoremnant objects within the topsoil.

Anomalies with a modern origin

(7) – Very strong magnetic disturbance is evident along the eastern edge of the site. This is a response to steel fencing, silos, pipes and a possible buried service.

(8) – Magnetic disturbance near the north western corner of the survey area appears to be a response to two buried services extending just within the site, parallel with the road to the north, and a small excavator that was present during the survey.

4 CONCLUSION

4.1.1 The detailed magnetometry survey located a positive linear anomaly that may relate to a cut, ditch-like feature but a natural origin is also possible. A linear ditch that appears to relate to a formerly mapped boundary has also been located. Discrete, pit-like anomalies are magnetically enhanced, perhaps suggesting an association with burnt material, but a natural origin is also possible. Numerous naturally formed anomalies can be seen within the site, probably thermal-contraction polygons formed in periglacial conditions. Magnetic disturbance from adjacent ferrous material is evident along the eastern edge of the site and the location of two services close to the north western corner, and a small excavator, have also resulted in magnetic disturbance.

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Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material. Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field. Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried magnetic field. The difference between the two sensors will relate to the strength of the magnetic field created by the buried feature.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

High Pass Filter

Removes low frequency anomalies within the data that are not considered to be archaeologically significant and may be natural in origin. A window passes over the data, the mean of all the data within the window is subtracted from the centre value. The size of the window is adjusted as is the weighting which may be uniform or Gaussian. The process is used to improve the visibility of anomalies of interest.

Zero Median/Mean Traverse

The median (or mean) of data from each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the offset values of the gradiometer sensors. The process can remove archaeological features that run along a traverse but with the high resolution datasets created by the Sensys FGM650 sensors and the method of data collection this has not been a notable problem. In fact, the removal of offsets using software avoids carrying out a balancing procedure on site, which inevitably can never be done in magnetically clean

conditions and results in improperly aligned fluxgate sensors and/or electronic adjustment values.

Appendix C – survey and data information

Filename: J921-mag-proc.xcp
Description: Imported as Composite from: J921-mag.asc
Instrument Type: Sensys DLMGPS
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 265041.90, 101337.71 m
Southeast corner: 265320.90, 101158.01 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Dimensions
Survey Size (meters): 279 m x 180 m
X&Y Interval: 0.15 m
Source GPS Points: Active: 483898, Recorded: 483898
Stats
Max: 3.32
Min: -3.30
Std Dev: 1.34
Mean: -0.05
Median: 0.01
Composite Area: 5.0136 ha
Surveyed Area: 1.5718 ha
PROGRAM
Name: TerraSurveyorPre
Version: 3.0.36.24
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -3.00 to 3.00

Filename: J921-mag-proc-hpf.xcp
Stats
Max: 3.32
Min: -3.30
Std Dev: 0.99
Mean: 0.02
Median: 0.00
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 High pass Uniform (median) filter: Window dia: 130
5 Clip from -3.00 to 3.00

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site. Additionally the digital data will be archived with the Archaeology Data Service (ADS).

A PDF copy will be supplied to the Devon Historic Environment Record with greyscale images and abstraction layers made available on request. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

Archive contents:

File type	Naming scheme	Description
Data	J921-mag.asc J921-mag.xcp J921-mag-proc.xcp J921-mag-proc-hpf.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J921-mag-proc.tif J921-mag-proc-hpf.tif	Image in TIF format
Drawing	J921-**[version number]**.dwg	CAD file in 2018 dwg format
Report	J921 report.odt	Report text in LibreOffice odt format

Table 2: Archive metadata

Appendix E – CAD layers for abstraction and interpretation plots

The table below sets out Archaeological Surveys Ltd CAD layer names with associated colours and graphical content. Where CAD files are available layers may be extracted for further CAD/GIS use. Note: hatched polygon boundaries are contained within layers with the RGB colour code 254, 255, 255 (near white) in order to prevent their visibility.

Report sub-heading and associated CAD layer names	Colour with RGB index		Layer content
Anomalies with an uncertain origin			
AS-ABST MAG POS LINEAR UNCERTAIN		255,127,0	Line, polyline or polygon (solid)

AS-ABST MAG POS DISCRETE UNCERTAIN		255,127,0	Solid donut, point or polygon (solid)
Anomalies relating to land management			
AS-ABST MAG BOUNDARY		127,0,0	Line, polyline or polygon (solid or cross hatched ANSI37)
Anomalies with an agricultural origin			
AS-ABST MAG AGRICULTURAL		Green 0,255,0	Line or polyline
Anomalies associated with magnetic debris			
AS-ABST MAG STRONG DIPOLAR		132, 132, 132	Solid donut, point or polygon (solid)
Anomalies with a modern origin			
AS-ABST MAG DISTURBANCE		132, 132, 132	Polygon (hatched ANSI31)
AS-ABST MAG SERVICE		132, 132, 132	Line or polyline
Anomalies with a natural origin			
AS-ABST MAG NATURAL FEATURES		Yellow 255,255,0	Polygon (cross hatched ANSI37)

Table 3: CAD layering

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Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land south of North Tawton Primary Substation
Devon

Map of survey area

Survey location

Battery storage area centred on OS NGR SS 65275 01280

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 01

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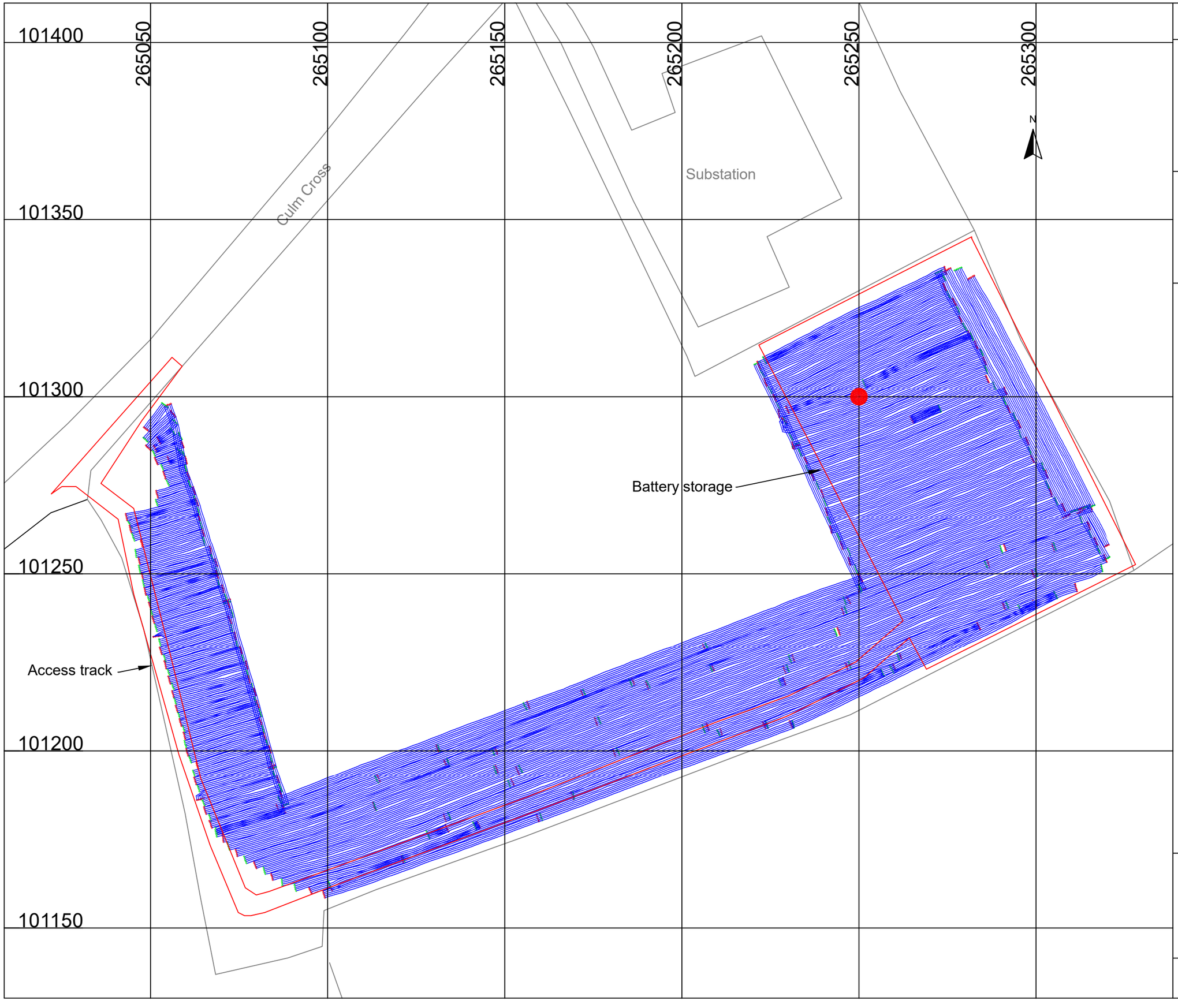
Referencing information



Referencing grid to OSGB36 datum at 50m intervals

265250 101300

Survey tracks

Survey track start

Survey track stop

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

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KTD	DJS	FIG 02

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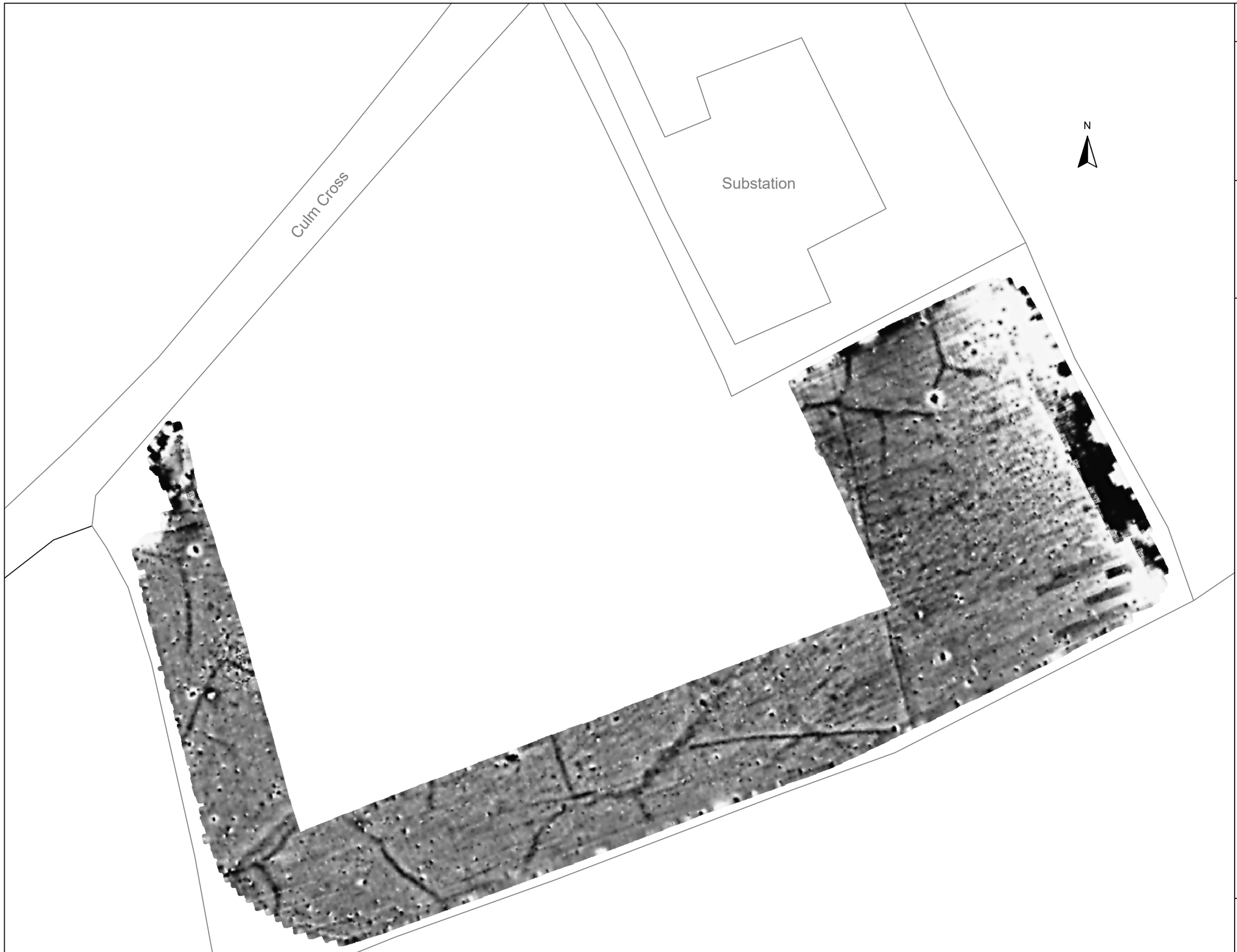
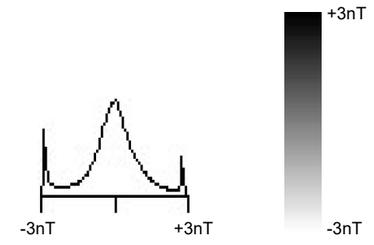
Greyscale plot of minimally processed magnetometer data





SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

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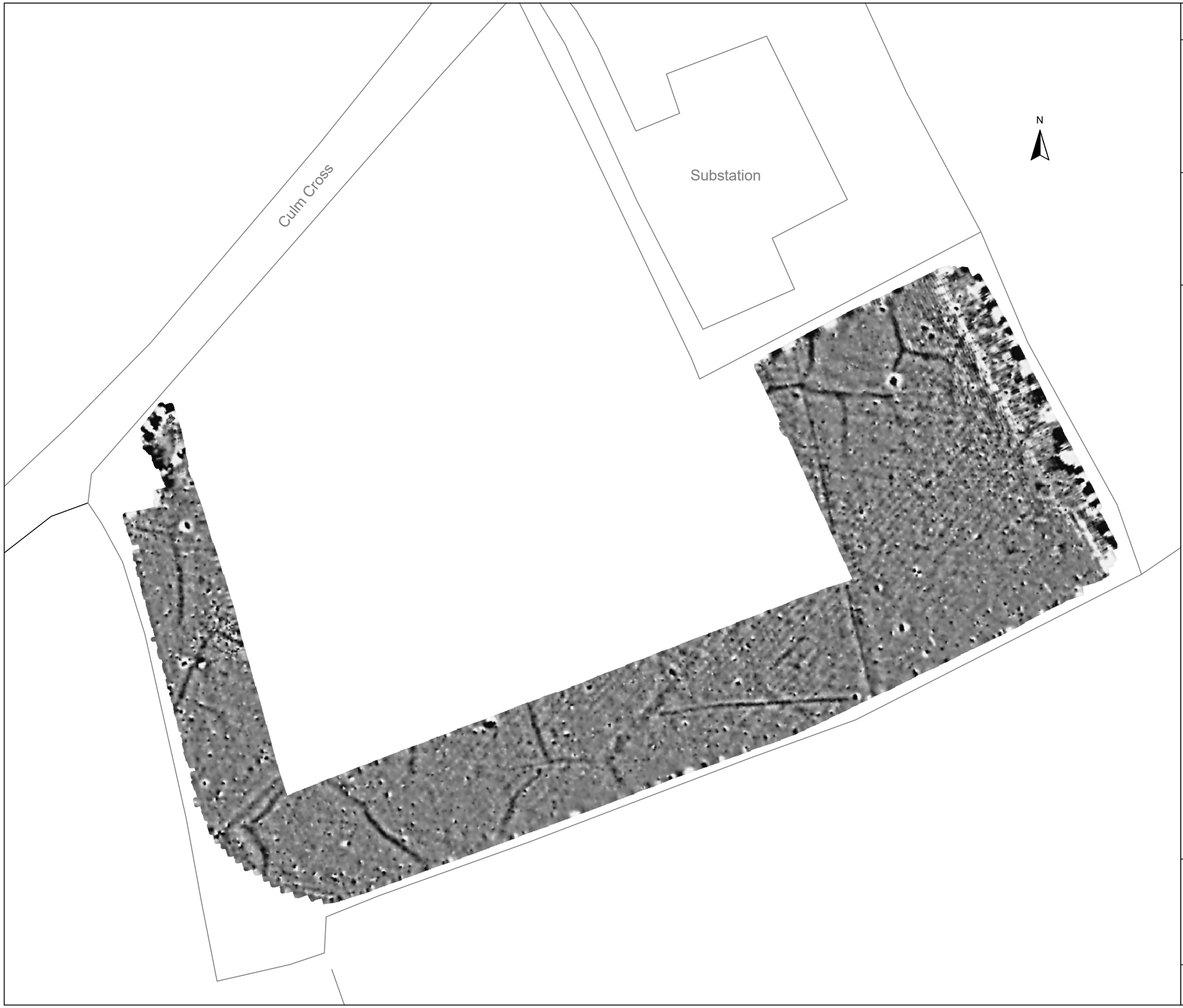
Greyscale plot of filtered magnetometer data



+3nT
-3nT
-3nT
+3nT

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

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KTD	DJS	FIG 04

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Abstraction and interpretation of magnetic anomalies

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - former field boundary
- Linear anomaly - of natural origin
- Linear anomaly - of agricultural origin
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

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KTD	DJS	FIG 05

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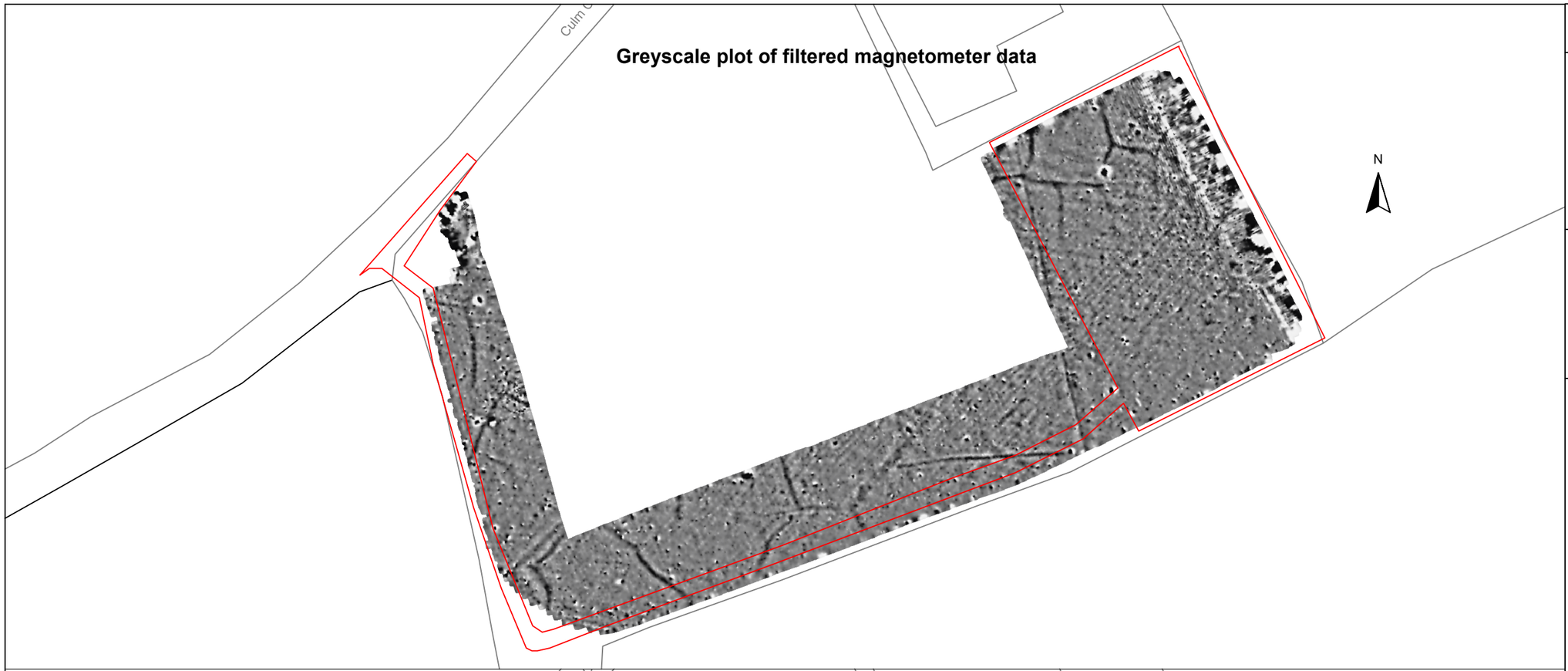
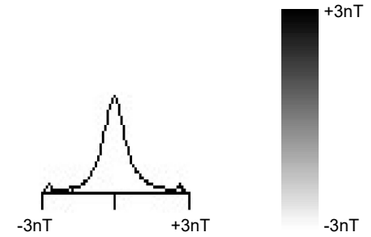
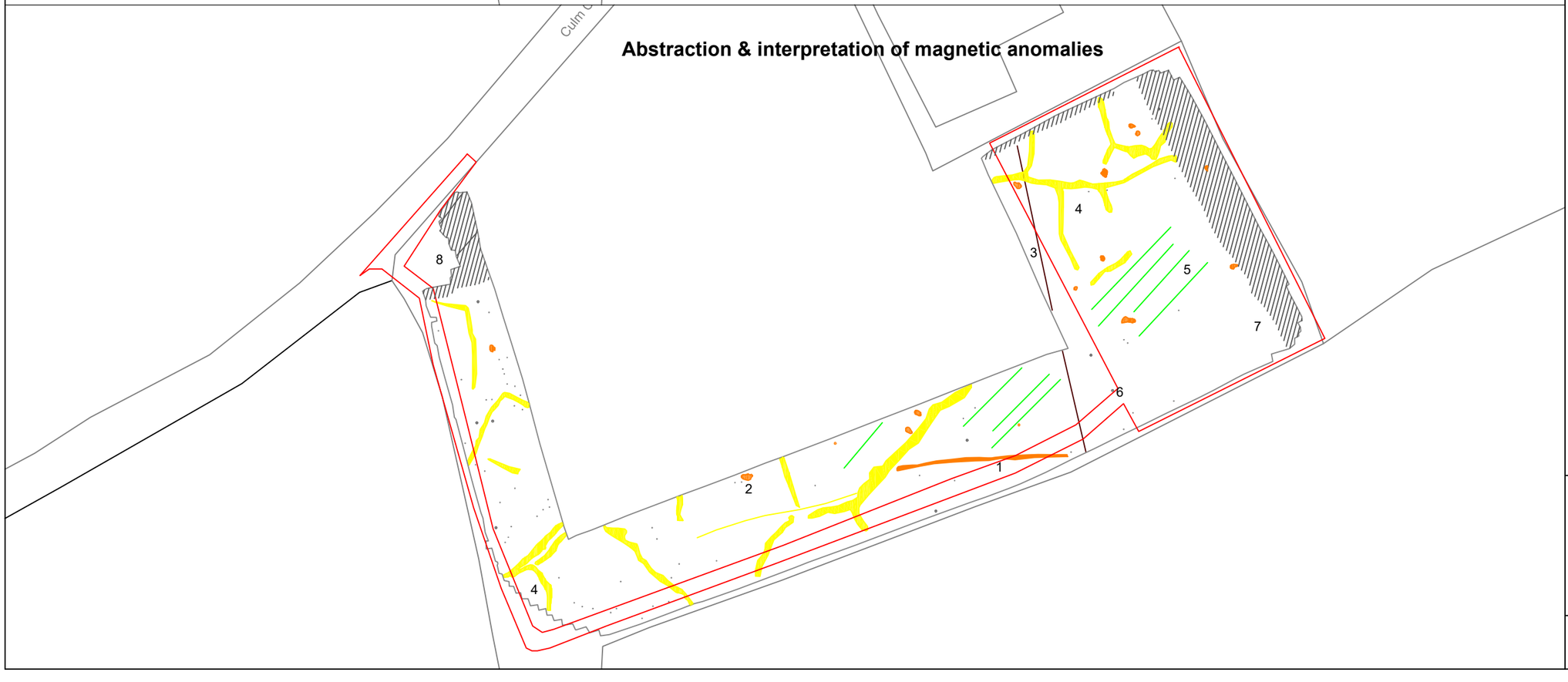
Greyscale plot of filtered magnetometer data



Greyscale plot of filtered magnetometer data & abstraction & interpretation of magnetic anomalies



Abstraction & interpretation of magnetic anomalies



- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - former field boundary
- Linear anomaly - of natural origin
- Linear anomaly - of agricultural origin
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

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