

GEOPHYSICAL SURVEY REPORT

STRATASCAN™



Project name:
A350 Chippenham, Wiltshire

Client:
Atkins Heritage

July 2015

Job ref:
J8583

Report author:
Rebecca Davies BSc (Hons)

GEOPHYSICAL SURVEY REPORT

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A350 Chippenham, Wiltshire

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Job ref:

J8583

Techniques:

**Detailed magnetic survey –
Gradiometry**

Survey date:

18th & 24th June, 1st July 2015

Site centred at:

ST 902 747

Post code:

SN14 6RH

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1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 3.1 hectares of grassland. No features of probable or possible archaeological origin have been identified, despite the moderate potential for prehistoric, Roman and medieval remains. A number of linear anomalies of unknown origin may be related to agricultural activity. The remaining features are natural or modern in origin and include a service, scattered magnetic debris, and magnetic disturbance from nearby ferrous objects.

2 INTRODUCTION

2.1 *Background synopsis*

Stratascan were commissioned to undertake a geophysical survey of an area outlined as part of a dual-carriageway development. This survey forms part of an archaeological investigation being undertaken by Atkins Heritage.

2.2 *Site location*

The site is located to the west of Chippenham, Wiltshire at OS ref. ST 902 747. The land is bound by agricultural land on its western edge, with the A350 to the east.

2.3 *Description of site*

The survey area is approximately 1500m in length and comprises mostly flat grassland adjacent to the A350. An area of approximately 0.5 hectares, a length of 240m, in the centre of the site could not be surveyed due to plant and engineering work. Further small areas could not be surveyed due to overgrown vegetation.

2.4 *Geology and soils*

The underlying geology across the majority of the site is Cornbrash Formation – limestone, with a small area of Forest Marble Formation – mudstone surrounding the northern-most roundabout, and Kellaways Clay Member – mudstone in the north of the site (British Geological Survey website). Superficial deposits of alluvium are recorded around the northern roundabout, with no drift geology recorded across the rest of the site (British Geological Survey website).

The overlying soils across the south of the site are known as Sherborne, which are typical brown redzinas. These consist of shallow well drained brashy calcareous soils over limestone. The soils across the north of the site are known as Wickham 3, which are typical stagnogley soils. These consist of slowly permeable seasonally waterlogged fine loamy over clayey and coarse loamy over clayey soils (Soil Survey of England and Wales, Sheet 5 South West England).

2.5 **Site history and archaeological potential**

A search of Historic England's PastScape (2015) within a 1km radius of the site has identified a number of prehistoric, Roman and medieval remains.

A collection of Mesolithic flints (Monument No. 212466) were discovered to the east of the site, whilst a possible round barrow (Monument No. 1001563) has been identified to the south-west of the survey area. A double-ditched Iron Age enclosure and field system (Monument No. 994156) are visible as cropmarks to the south-east of the site, with a further Iron Age/Roman field boundary (Monument No. 1580876), a curvilinear enclosure and ditches (Monument No. 1456991) visible as cropmarks to the south of the site.

An early medieval boundary ditch and leat, 'Mylen Dic' (Monument No. ST 97 SW 24), is documented in AD 854 and forms part of Hardenhuish Brook to the east of the site, with an additional holloway and field boundary (Monument No. 208290) visible as earthworks on aerial photographs to the north-east of the site. Earthworks related to ridge and furrow cultivation are recorded in the wider surrounding area (Monument Nos. 1578973, 1578974).

While there is no known archaeology recorded on the site itself the large number of prehistoric, Roman and medieval remains recorded in close proximity to the site, indicate that there is a moderate-high potential for remains from these periods.

2.6 **Survey objectives**

The objective of the survey was to locate any features of possible archaeological origin in order that they may be assessed prior to development.

2.7 **Survey methods**

This report and all fieldwork have been conducted in accordance with both the English Heritage guidelines outlined in the document: *Geophysical Survey in Archaeological Field Evaluation, 2008* and with the Chartered Institute for Archaeologists document *Standard and Guidance for Archaeological Geophysical Survey*.

Due to the moderate-high potential for prehistoric, Roman and medieval remains, detailed magnetic survey (gradiometry) was used as an efficient and effective method of locating archaeological anomalies. More information regarding this technique is included in Appendix A.

2.8 Processing, presentation and interpretation of results

2.8.1 Processing

Handheld Collection:

Processing is performed using specialist software. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all minimally processed gradiometer data used in this report:

1. *Destripe* (Removes striping effects caused by zero-point discrepancies between different sensors and walking directions)
2. *Destagger* (Removes zigzag effects caused by inconsistent walking speeds on sloping, uneven or overgrown terrain)

Cart Collected Data:

Data has been processed using an in house software package (CartEasy^N) and a colour plot has been produced using Surfer 8 software. The processes applied were:

- | | |
|--------------------------|--|
| Zero Median Traverse | This process sets the background median of each traverse to zero. Limits are applied to reduce the effect of extreme readings which can skew the statistics. The operation minimises the differences between adjacent sensors. |
| Projection | Greyscale images require data to be sampled at regular intervals on each traverse. Due to the high precision of the RTK GNSS on the CartEasy ^N magnetometer cart small velocity & traverse separation variations result in an irregular sampling interval. Projection involves converting WGS84 coordinates to OSGB36 and re-sampling the collected data at regular intervals during the post processing stage. |
| Colouring extreme values | Surfer 8 software is used to colour extreme values within the dataset. A colour scale is used with plotting parameters set at +100nT and -100nT. |

2.8.2 Presentation of results and interpretation

The presentation of the data for each site involves a print-out of the minimally processed data both as a greyscale plot and a colour plot showing extreme magnetic values. Magnetic

anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site.

3 RESULTS

The detailed magnetic gradiometer survey conducted at Chippenham has identified a single anomaly that has been characterised as being of a *possible* archaeological origin.

The difference between *probable* and *possible* archaeological origin is a confidence rating. Features identified within the dataset that form recognisable archaeological patterns or seem to be related to a deliberate historical act have been interpreted as being of a probable archaeological origin.

Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but are difficult to classify as being archaeological or natural.

The following list of numbered anomalies refers to numerical labels on the interpretation plots.

3.1 *Probable Archaeology*

No probable archaeology has been identified within the survey area.

3.2 *Possible Archaeology*

No possible archaeology has been identified within the survey area.

3.3 *Medieval/Post-Medieval Agriculture*

No features of medieval/post-medieval agricultural activity have been identified within the survey area.

3.4 *Other Anomalies*

- 1 Linear anomalies across the site. These are of unknown origin but are likely to be related to modern activity.

- 2 A strong bipolar linear anomaly in south of the site and negative linear anomaly in the centre of the site. These are likely to be related to modern underground services, such as a pipes.
- 3 A number of areas of scattered magnetic debris in the centre of the site that are likely to be modern in origin.
- 4 A small area of amorphous magnetic variation in the centre of the site. This is likely to be natural in origin, though its exact origin is unknown.
- 5 Areas of magnetic disturbance are the result of substantial nearby ferrous metal objects such as fences and underground services. These effects can mask weaker archaeological anomalies.
- 6 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

4 DATA APPRAISAL & CONFIDENCE ASSESSMENT

Limestone geologies, such as the Cornbrash Formation across the majority of the site, generally provide a good response for gradiometer survey, however mudstone geologies can give variable results. This is evidenced through the fact that the data in the north of the site, underlain by mudstone, has a more uniform appearance with a lower contrast between anomalies compared to the data from the southern half of the site.

There is a high level of magnetic disturbance across the site, likely related to the construction work of the A350 immediately to the east. This has the potential to mask weaker archaeological anomalies. Given the moderate-high potential for prehistoric, Roman and medieval remains, and the lack of archaeological features identified, it could be assumed that the proximity to the road, and limited size of the survey area has inhibited the effectiveness of the survey.

5 CONCLUSION

The survey at Chippenham has not identified any features of archaeological origin, despite the potential for prehistoric, Roman and medieval remains. A number of linear anomalies are of unknown origin, and are likely to relate to modern agricultural activity on the site. The remaining features are natural or modern and include an underground service, scattered magnetic debris, and magnetic disturbance from nearby ferrous metal objects which may be masking weaker archaeological responses.

6 REFERENCES

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(<http://www.bgs.ac.uk/opengeoscience/home.html?Accordion1=1#maps>) Geology of Britain viewer.

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APPENDIX A – METHODOLOGY & SURVEY EQUIPMENT

Hand-held Collection

Grid locations

The location of the survey grids has been plotted together with the referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site or a Leica Smart Rover RTK GPS.

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. A SmartNet RTK GPS uses Ordnance Survey's network of over 100 fixed base stations to give an accuracy of around 0.01m.

Sampling interval

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

For cart collected data readings were taken at intervals of 0.125m along traverses 0.75m apart.

Depth of scan and resolution

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m, though strongly magnetic objects may be visible at greater depths. The collection of data at 0.25m centres provides an optimum methodology for the task balancing cost and time with resolution.

Cart-Collected Data

All survey data points had their position recorded using Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS equipment. The geophysical survey area is georeferenced relative to the Ordnance Survey National Grid.

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.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	CARTEASY ^N cart system (Bartington 1000L Sensors)	0.75m	10Hz (approximating 0.125m)

Survey equipment and gradiometer configuration

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The mapping of the anomaly in a systematic manner will allow an estimate of the type of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects or by kilns or hearths. More subtle anomalies such as pits and ditches can be seen if they contain more humic material which is normally rich in magnetic iron oxides when compared with the subsoil.

To illustrate this point, the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material being accumulated in the trench compared to the undisturbed subsoil. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer and a CartEasyN magnetometer cart system utilizing Bartington 1000L Gradiometer sensors manufactured by Bartington Instruments Ltd. The instruments consist of two fluxgates 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. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame..

Data capture

The CartEasyN magnetometer cart system collects data at 10Hz which approximates 0.125m.

The readings are logged consecutively into the data logger which in turn is daily down- loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

APPENDIX B – BASIC PRINCIPLES OF MAGNETIC SURVEY

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.

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 and material such as brick and tile may be magnetised through the same process.

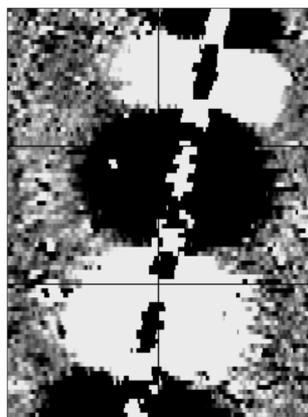
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement 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 field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried 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, disturbance from modern services etc.

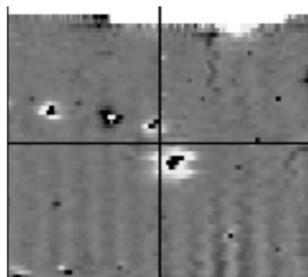
APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES

Bipolar



A bipolar anomaly is one that is composed of both a positive response and a negative response. It can be made up of any number of positive responses and negative responses. For example a pipeline consisting of alternating positive and negative anomalies is said to be bipolar. See also dipolar which has only one area of each polarity. The interpretation of the anomaly will depend on the magnitude of the magnetic field strength. A weak response may be caused by a clay field drain while a strong response will probably be caused by a metallic service.

Dipolar

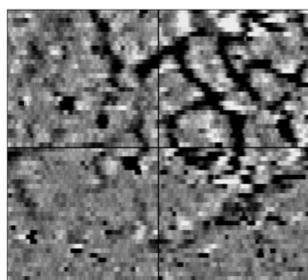


This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very strong anomaly is likely to be caused by a ferrous object.

Positive anomaly with associated negative response

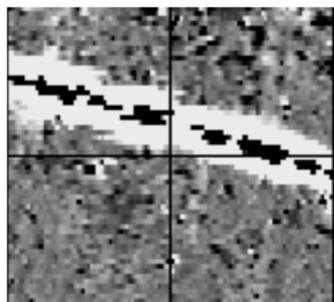
See bipolar and dipolar.

Positive linear



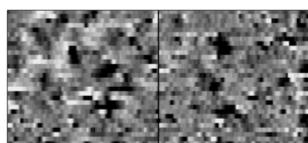
A linear response which is entirely positive in polarity. These are usually related to in-filled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity and some may even have a natural origin.

Positive linear anomaly with associated negative response



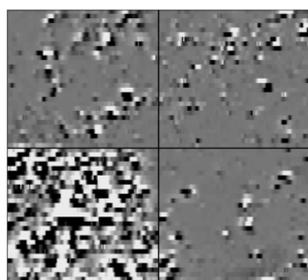
A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field boundaries.

Positive point/area



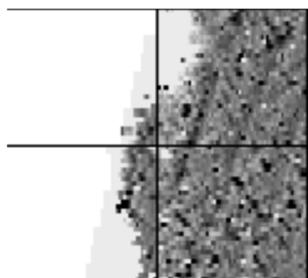
These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by in-filled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally occurring depressions in the ground.

Magnetic debris



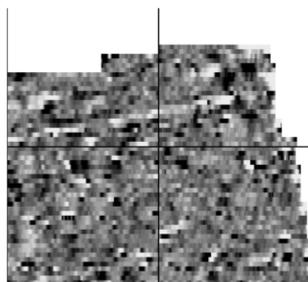
Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low ($\pm 3\text{nT}$) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly ($\pm 250\text{nT}$) is more indicative of a spread of ferrous debris. Moderately strong anomalies may be the result of a spread of thermoremanent material such as bricks or ash.

Magnetic disturbance



Magnetic disturbance is high amplitude and can be composed of either a bipolar anomaly, or a single polarity response. It is essentially associated with magnetic interference from modern ferrous structures such as fencing, vehicles or buildings, and as a result is commonly found around the perimeter of a site near to boundary fences.

Negative linear

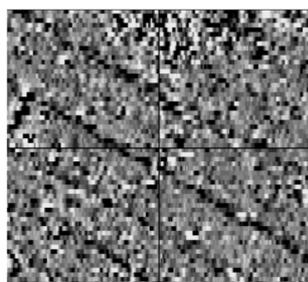


A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative to the background top soil is built up. See also ploughing activity.

Negative point/area

Opposite to positive point anomalies these responses may be caused by raised areas or earthen banks. These could be of an archaeological origin or may have a natural origin.

Ploughing activity



Ploughing activity can often be visualised by a series of parallel linear anomalies. These can be of either positive polarity or negative polarity depending on site specifics. It can be difficult to distinguish between ancient ploughing and more modern ploughing. Clues such as the separation of each linear, straightness, strength of response and cross cutting relationships can be used to aid this, although none of these can be guaranteed to differentiate between different phases of activity.

Polarity

Term used to describe the measurement of the magnetic response. An anomaly can have a positive polarity (values above 0nT) and/or a negative polarity (values below 0nT).

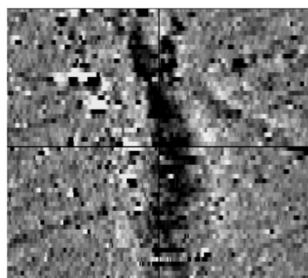
Strength of response

The amplitude of a magnetic response is an important factor in assigning an interpretation to a particular anomaly. For example a positive anomaly covering a 10m² area may have values up to around 3000nT, in which case it is likely to be caused by modern magnetic interference. However, the same size and shaped anomaly but with values up to only 4nT may have a natural origin. Colour plots are used to show the amplitude of response.

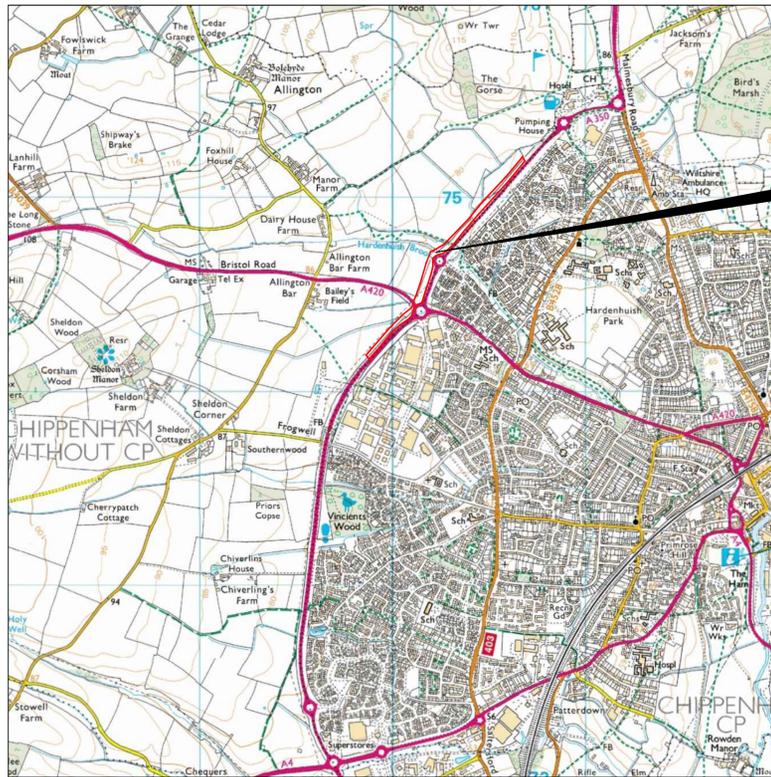
Thermoremanent response

A feature which has been subject to heat may result in it acquiring a magnetic field. This can be anything up to approximately +/-100 nT in value. These features include clay fired drains, brick, bonfires, kilns, hearths and even pottery. If the heat application has occurred in situ (e.g. a kiln) then the response is likely to be bipolar compared to if the heated objects have been disturbed and moved relative to each other, in which case they are more likely to take an irregular form and may display a debris style response (e.g. ash).

Weak background variations



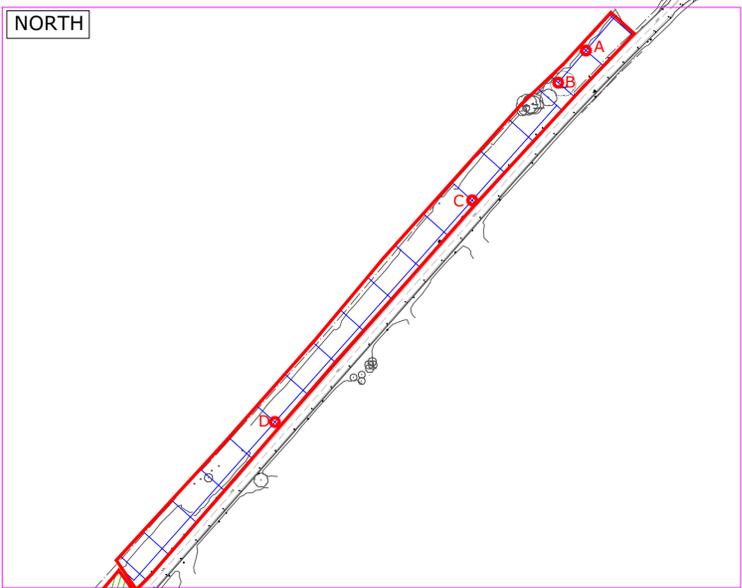
Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be caused by changes in the underlying geology or soil type which may contain unpredictable distributions of magnetic minerals, and are usually apparent in several locations across a site.



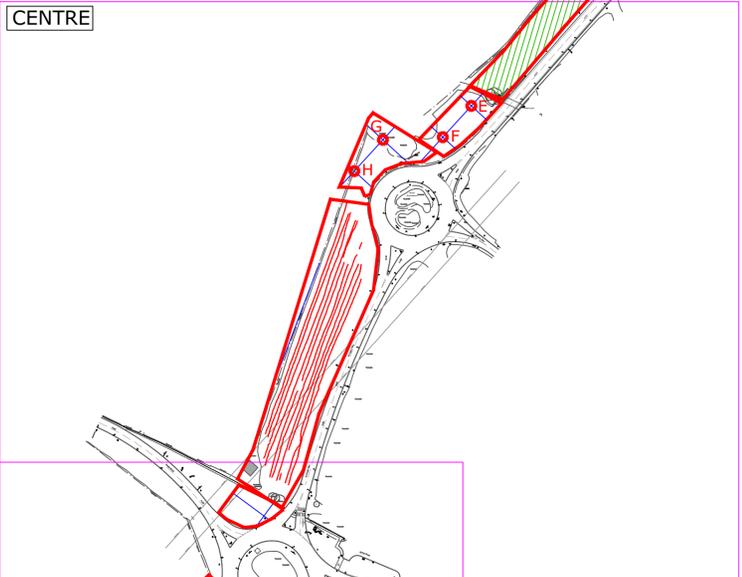
Reproduced from Ordnance Survey's 1:25 000 map of 1998 with the permission of the controller of Her Majesty's Stationery Office. Crown Copyright reserved. Licence No: AL 50125A
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 WR8 0SA
 OS 100km square = ST

Survey area

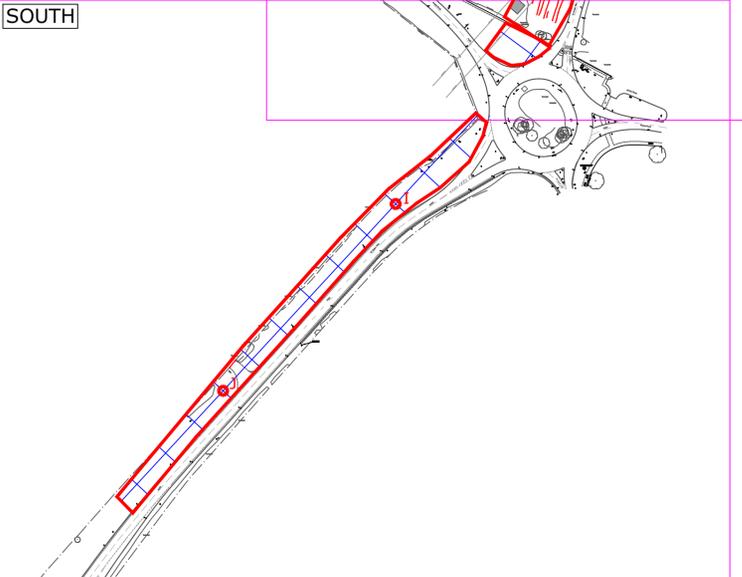
NORTH



CENTRE



SOUTH



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Site centred on NGR ST 902 747

	Hand collected grids
	Cart traverses
	Area unsurveyable due to plant

OS REFERENCING INFORMATION

A	390788.69, 175310.89
B	390769.09, 175288.18
C	390708.17, 175204.98
D	390568.42, 175048.24
E	390287.50, 174744.21
F	390267.25, 174722.10
G	390224.87, 174720.19
H	390204.62, 174698.06
I	390044.75, 174348.09
J	389922.53, 174215.95

Job No.	8583	Survey Date	JUN/JUL 15
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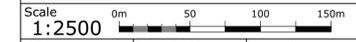
Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
 CHIPPENHAM, WILTSHIRE**

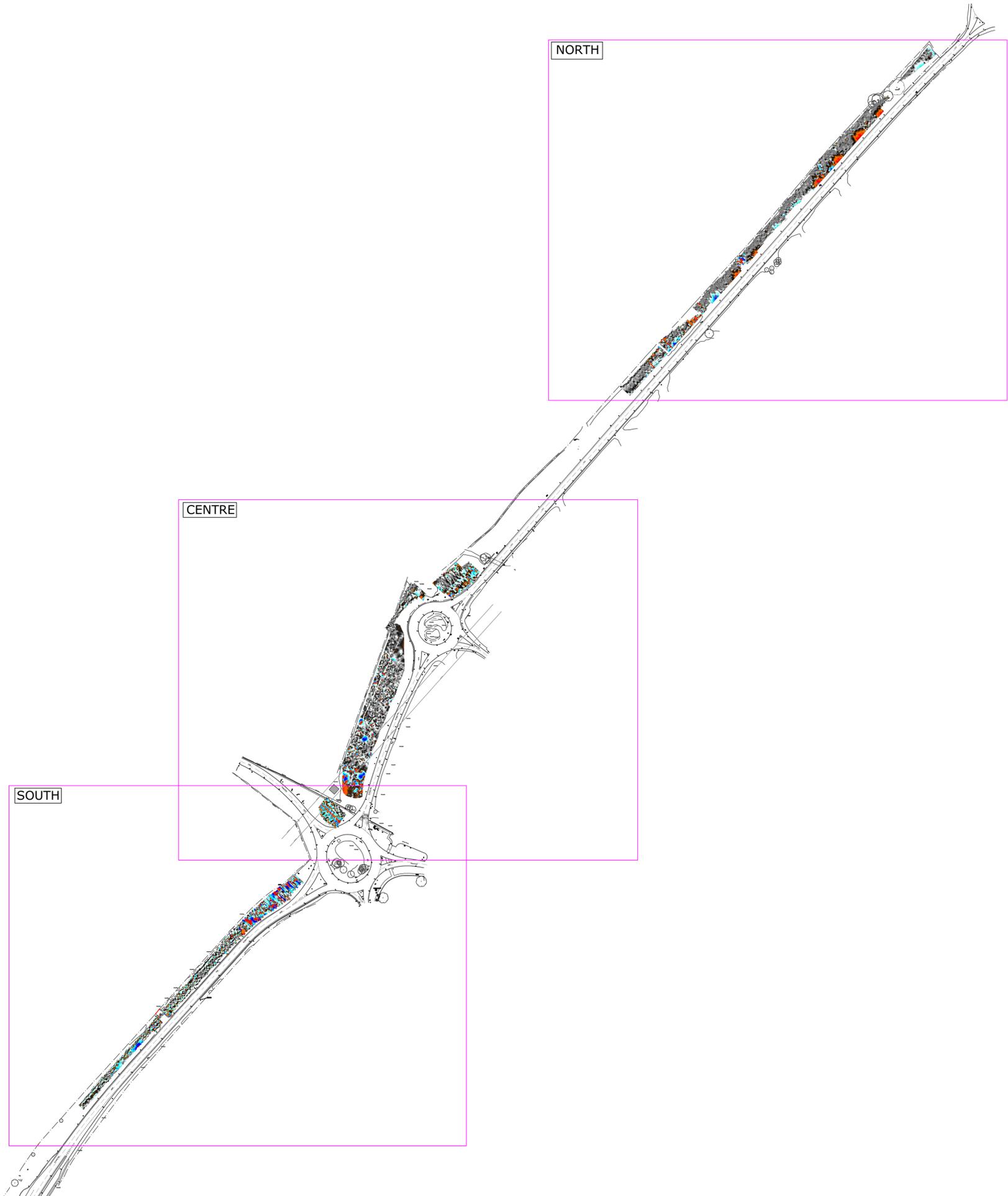
Subject
**SITE LOCATION, SURVEY
 AREA & REFERENCING**

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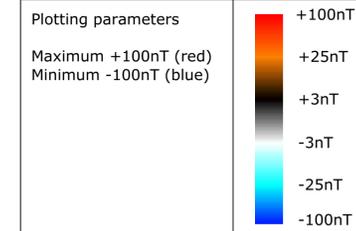
Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	RD	Figure No.	01



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Job No.	8583	Survey Date	JUN/JUL 15
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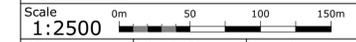
Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**COLOUR PLOT OF
GRADIOMETER DATA SHOWING
EXTREME VALUES - OVERVIEW**

STRATASCAN™
GEOPHYSICS FOR ARCHAEOLOGY
AND ENGINEERING

VINEYARD HOUSE T: 01684 592266
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WR8 0SA www.stratascan.co.uk



Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	RD	Figure No.	02



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Plotting parameters

Maximum +100nT (red)
Minimum -100nT (blue)

Job No. **8583** Survey Date **JUN/JUL 15**

Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**COLOUR PLOT OF
GRADIOMETER DATA SHOWING
EXTREME VALUES - NORTH**

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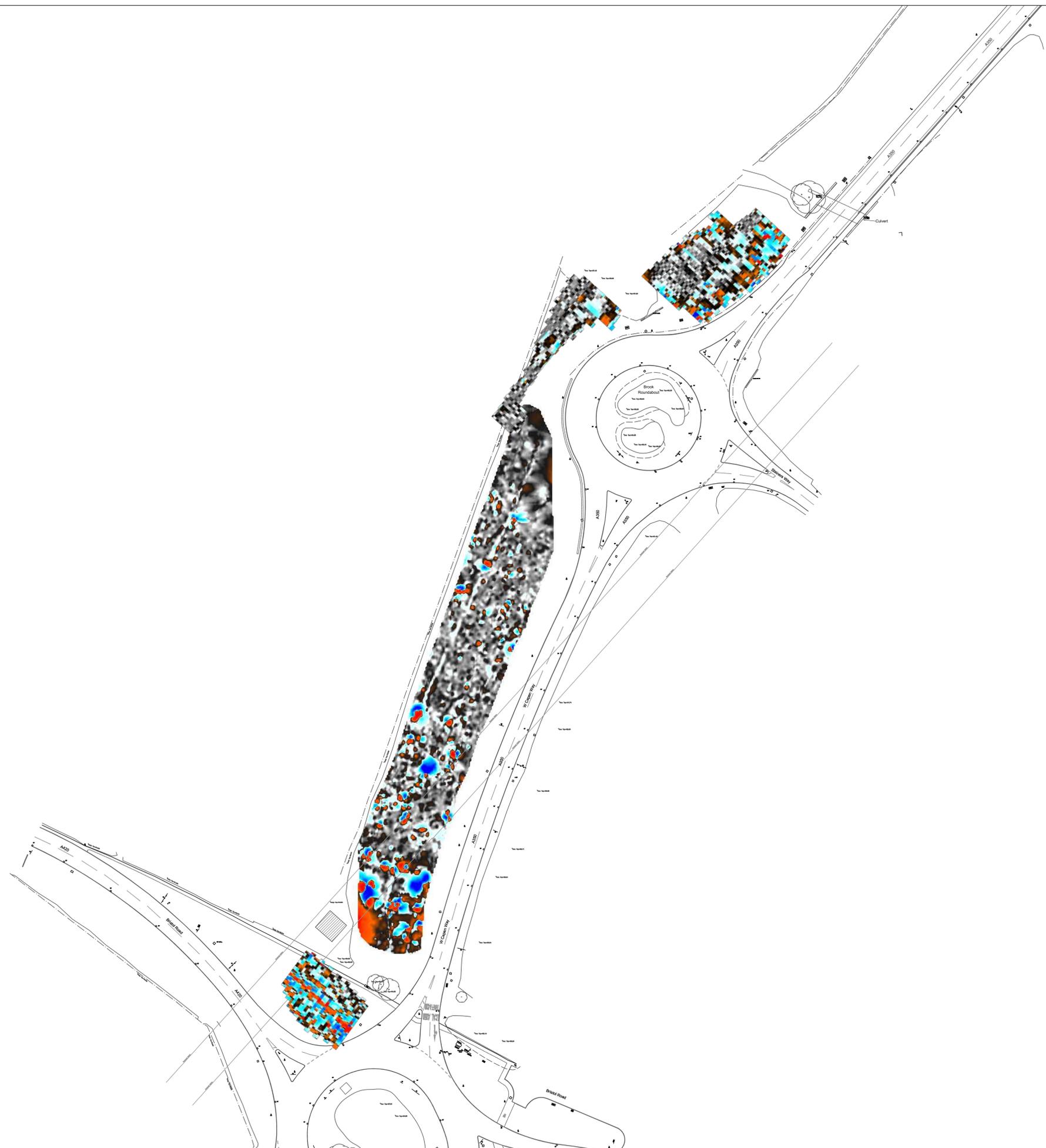
GPR ASSOCIATION

SUMO GROUP MEMBER

ISO 9001 certified
ISO 14001 certified

Scale 0m 10 20 30 40 50m
1:750

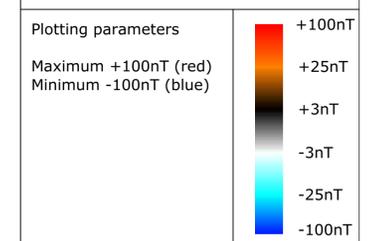
Plot A1	Checked by DGE	Issue No. 01
Date JUL 15	Drawn by RD	Figure No. 03



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Job No.	8583	Survey Date	JUN/JUL 15
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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

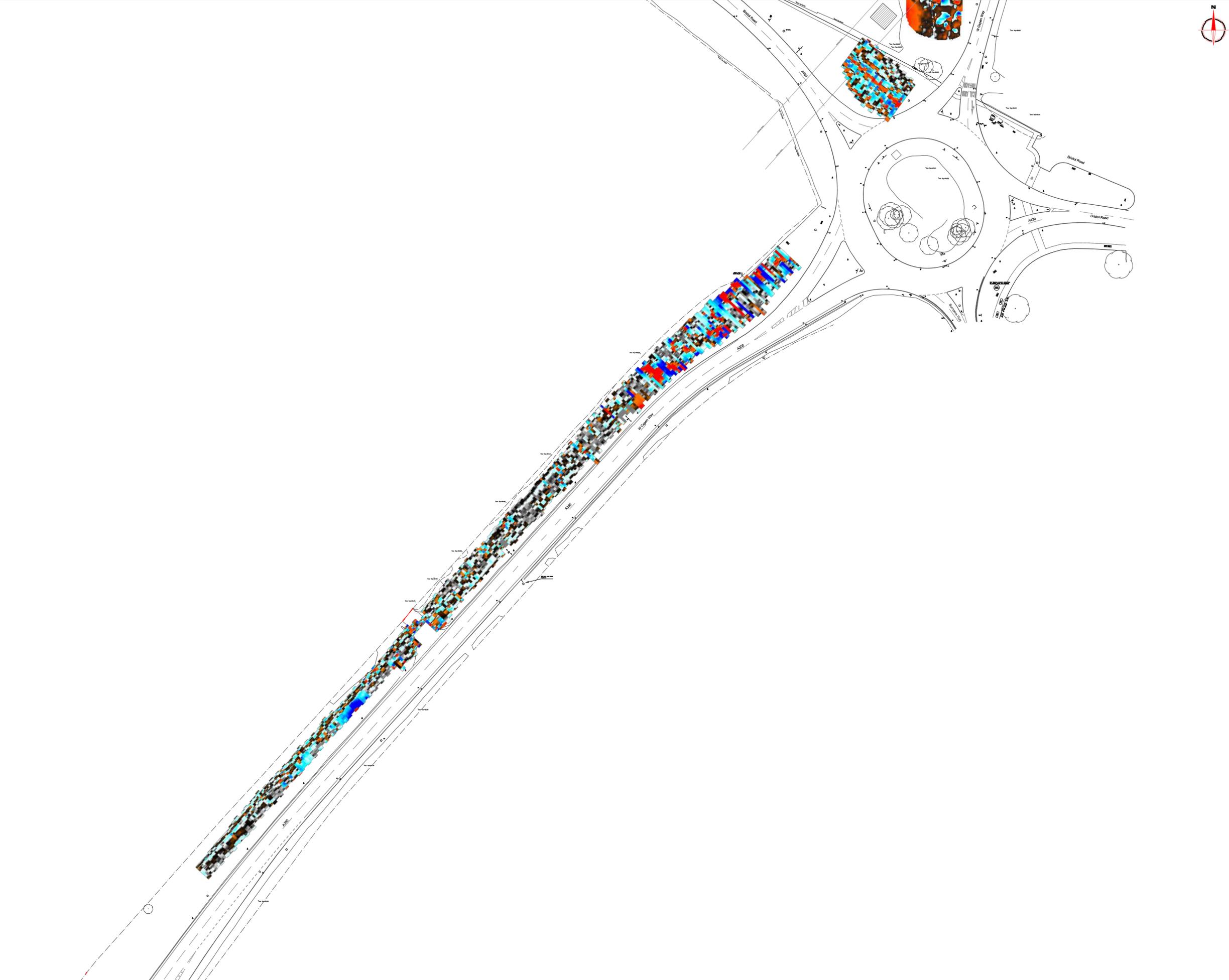
Subject
**COLOUR PLOT OF
GRADIOMETER DATA SHOWING
EXTREME VALUES - CENTRE**

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AND ENGINEERING
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Scale 0m 10 20 30 40 50m
1:750

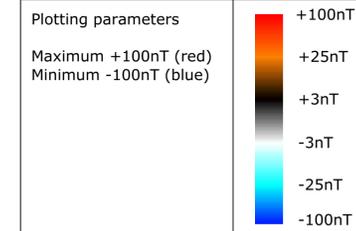
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Date	JUL 15	Drawn by	RD	Figure No.	04



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**COLOUR PLOT OF
GRADIOMETER DATA SHOWING
EXTREME VALUES - SOUTH**

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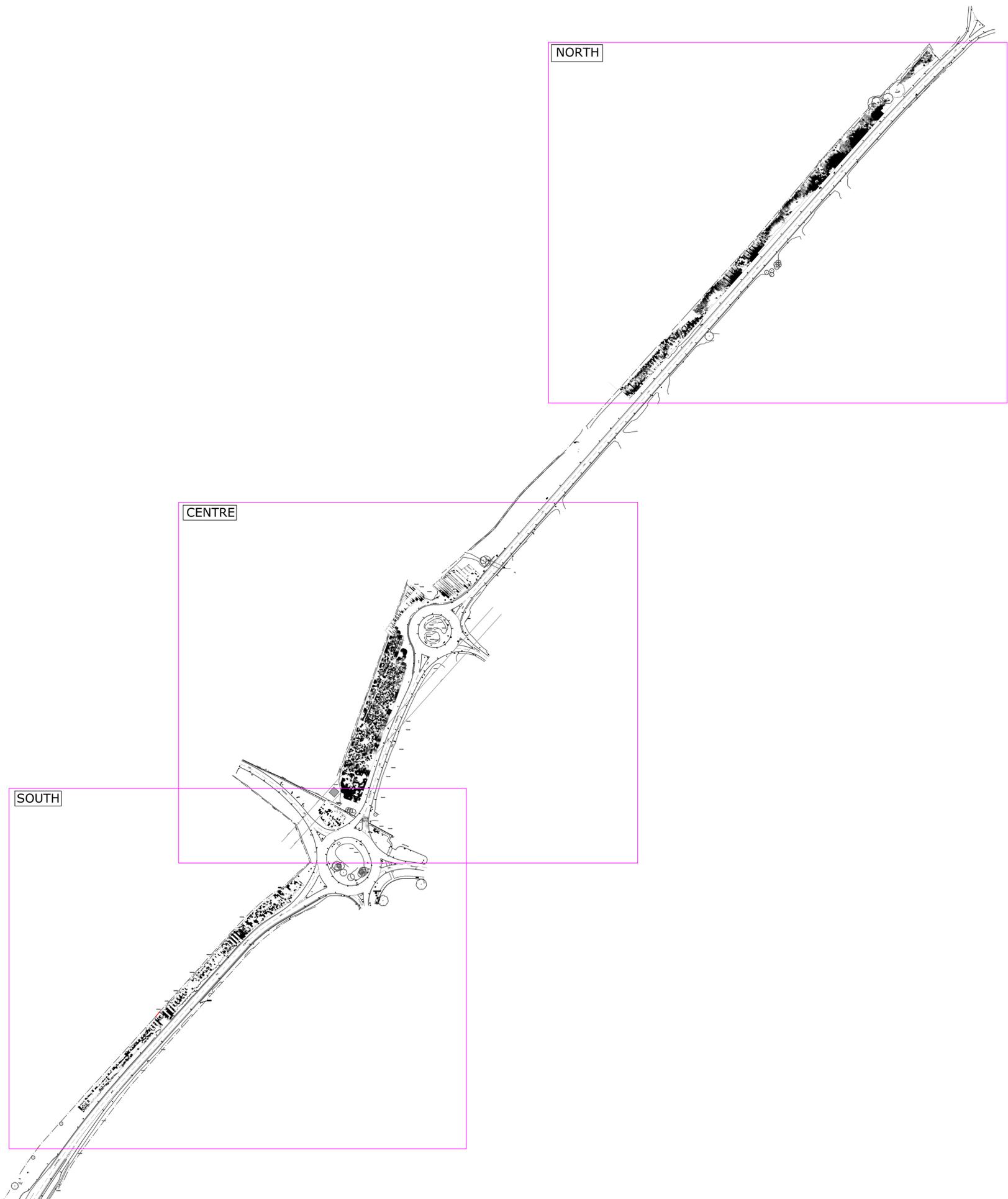
GPR ASSOCIATION

SUMO GROUP MEMBER

ISO 9001 certified
ISO 14001 certified

Scale 0m 10 20 30 40 50m
1:750

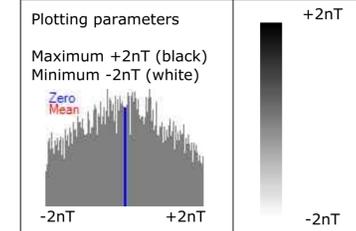
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Date	JUL 15	Drawn by	RD	Figure No.	05



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

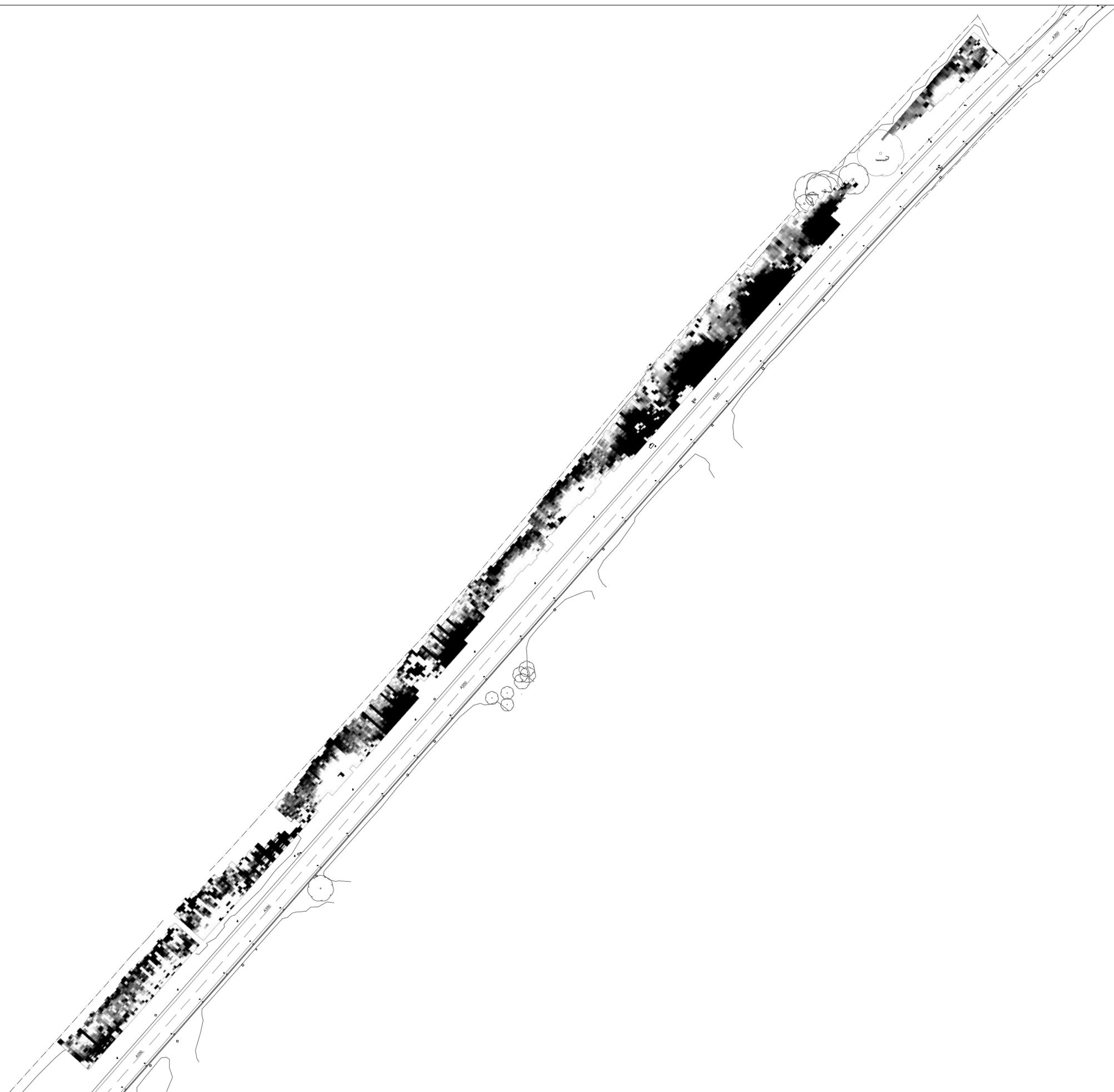
Subject
**PLOT OF MINIMALLY
PROCESSED GRADIOMETER
DATA - OVERVIEW**

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Scale 0m 50 100 150m
1:2500

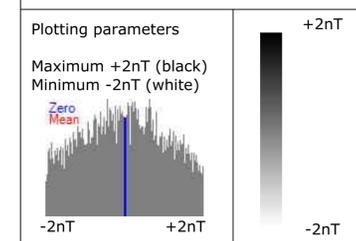
Plot A1	Checked by DGE	Issue No. 01
Date JUL 15	Drawn by RD	Figure No. 06



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

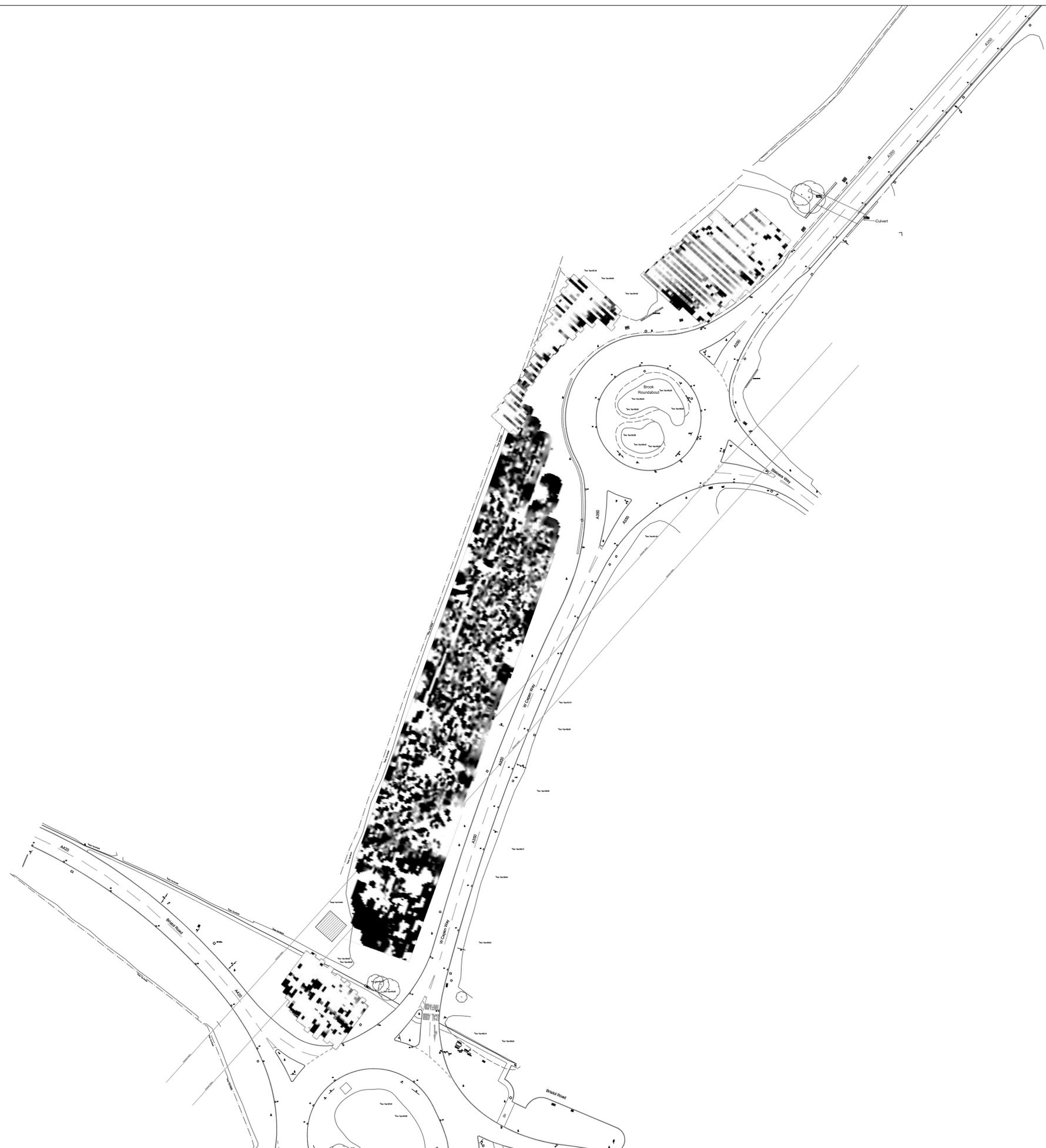
Subject
**PLOT OF MINIMALLY
PROCESSED GRADIOMETER
DATA - NORTH**

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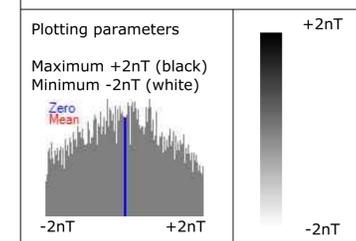
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1:750

Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	RD	Figure No.	07



Amendments		
Issue No.	Date	Description
-	-	-
-	-	-

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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

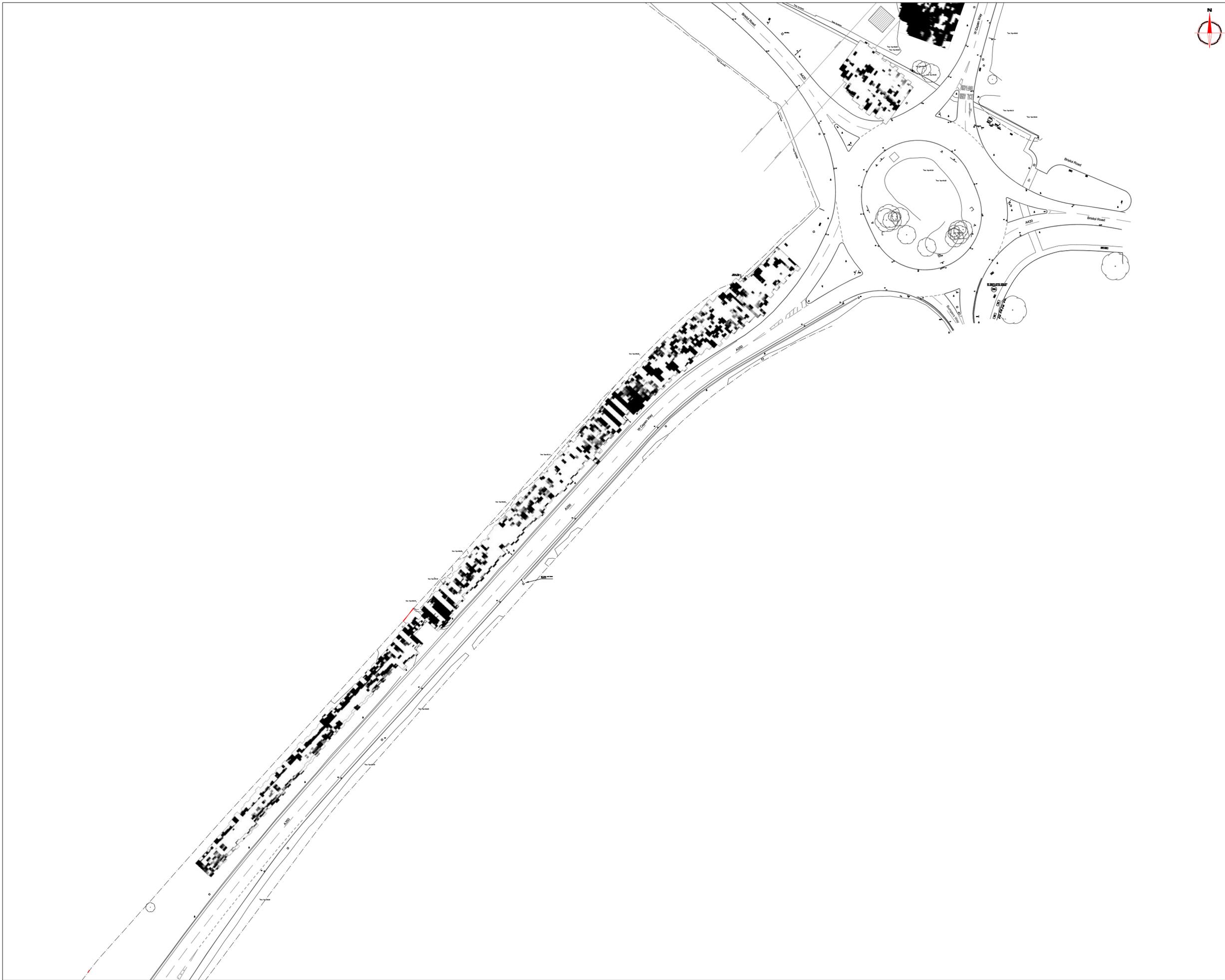
Subject
**PLOT OF MINIMALLY
PROCESSED GRADIOMETER
DATA - CENTRE**

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Scale 0m 10 20 30 40 50m
1:750

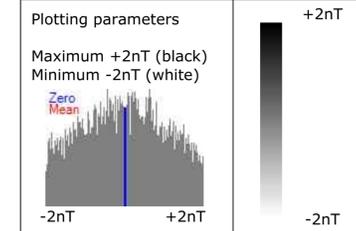
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Date	JUL 15	Drawn by	RD	Figure No.	08



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**PLOT OF MINIMALLY
PROCESSED GRADIOMETER
DATA - SOUTH**

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Scale 0m 10 20 30 40 50m
1:750

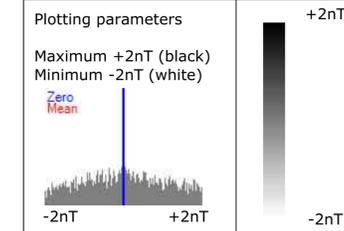
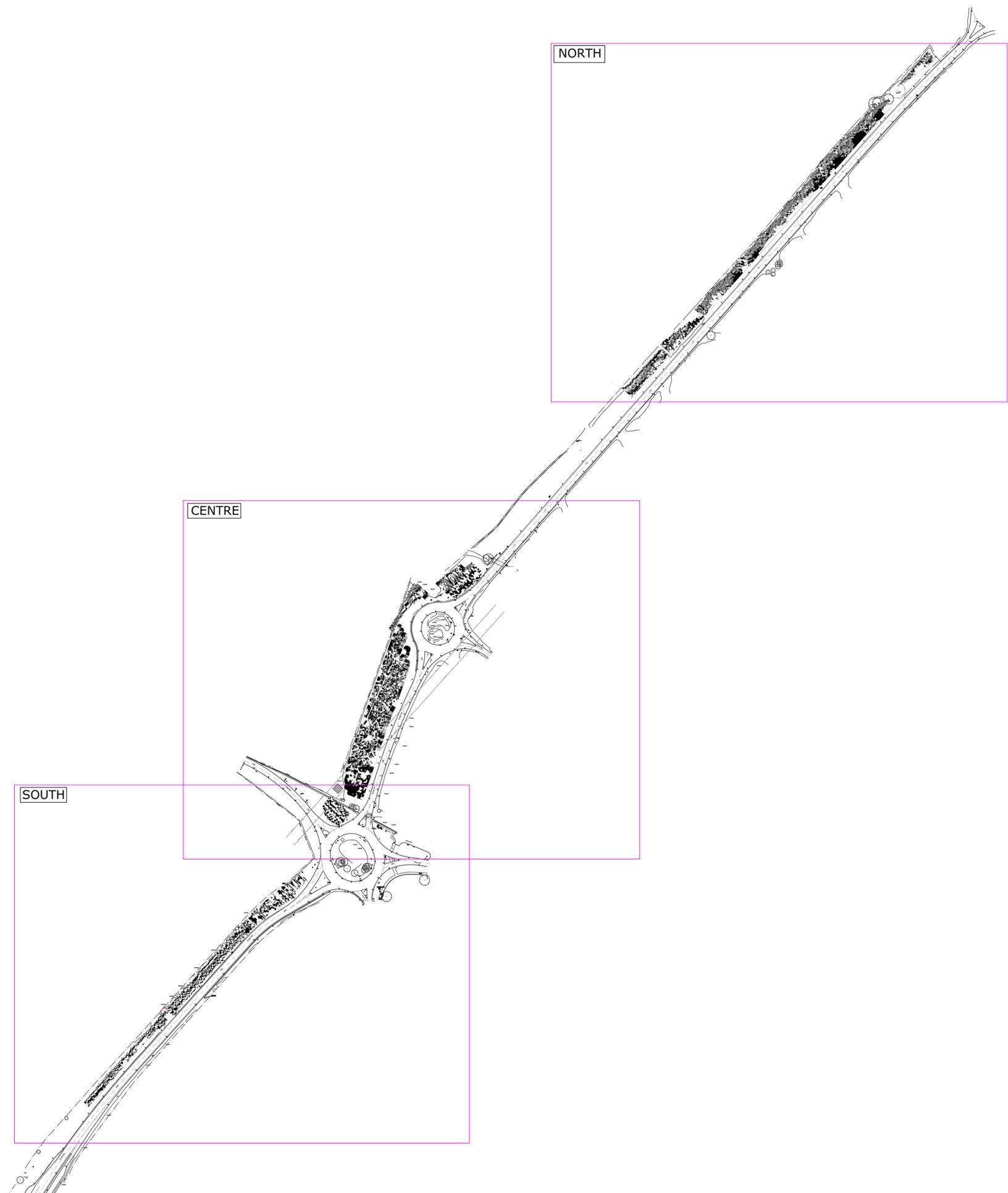
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Date	JUL 15	Drawn by	RD	Figure No.	09



Amendments

Issue No.	Date	Description
-	-	-
-	-	-
-	-	-

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CHIPPENHAM, WILTSHIRE**

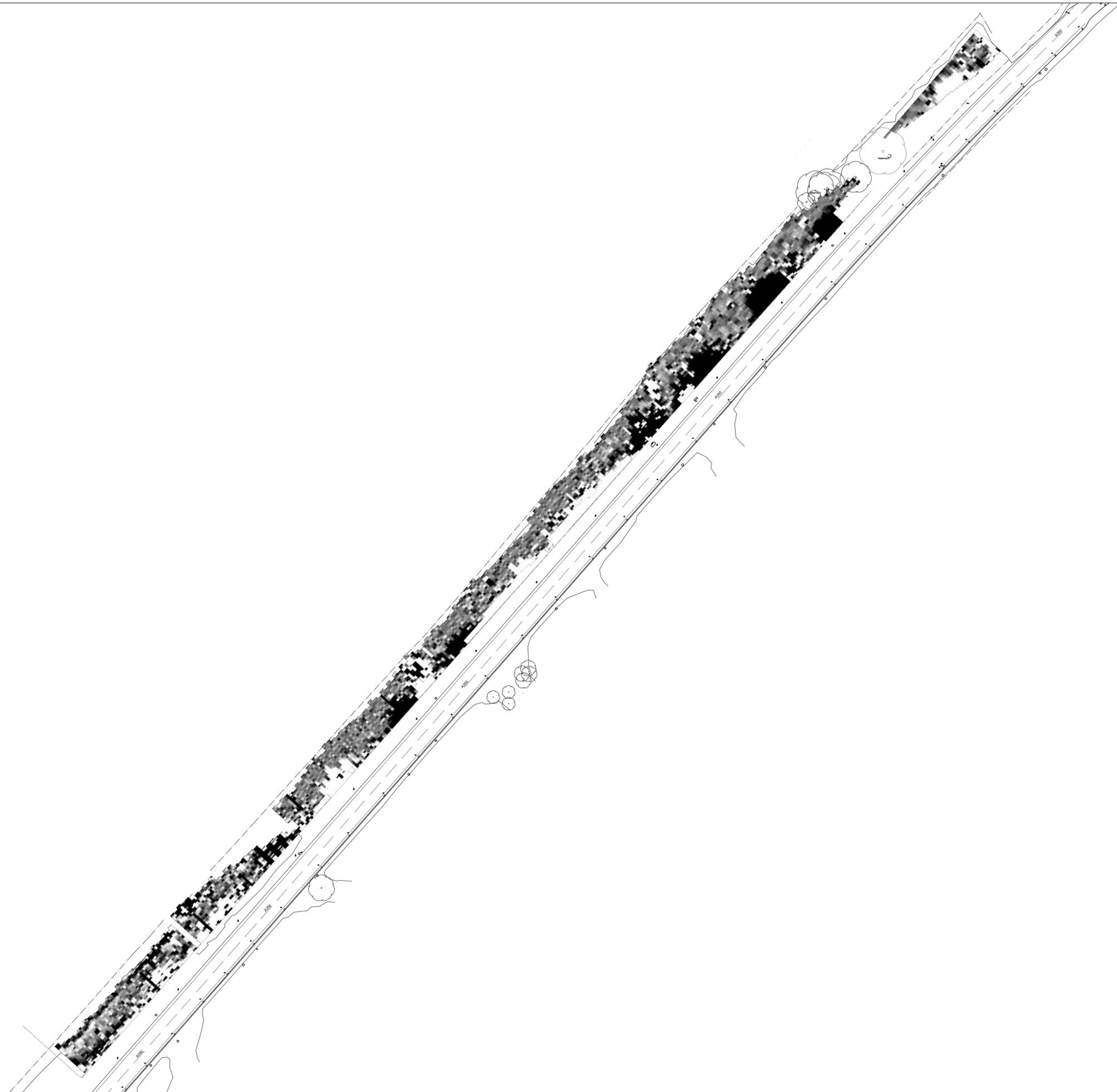
Subject
**PLOT OF PROCESSED
GRADIOMETER DATA -
OVERVIEW**

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AND ENGINEERING
VINEYARD HOUSE UPTON UPON SEVERN WR8 0SA T: 01684 592266 E: info@stratascan.co.uk www.stratascan.co.uk



Scale 0m 50 100 150m
1:2500

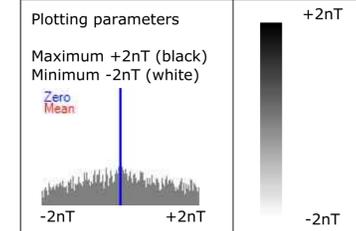
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A1	DGE	01
Date	Drawn by	Figure No.
JUL 15	RD	10



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

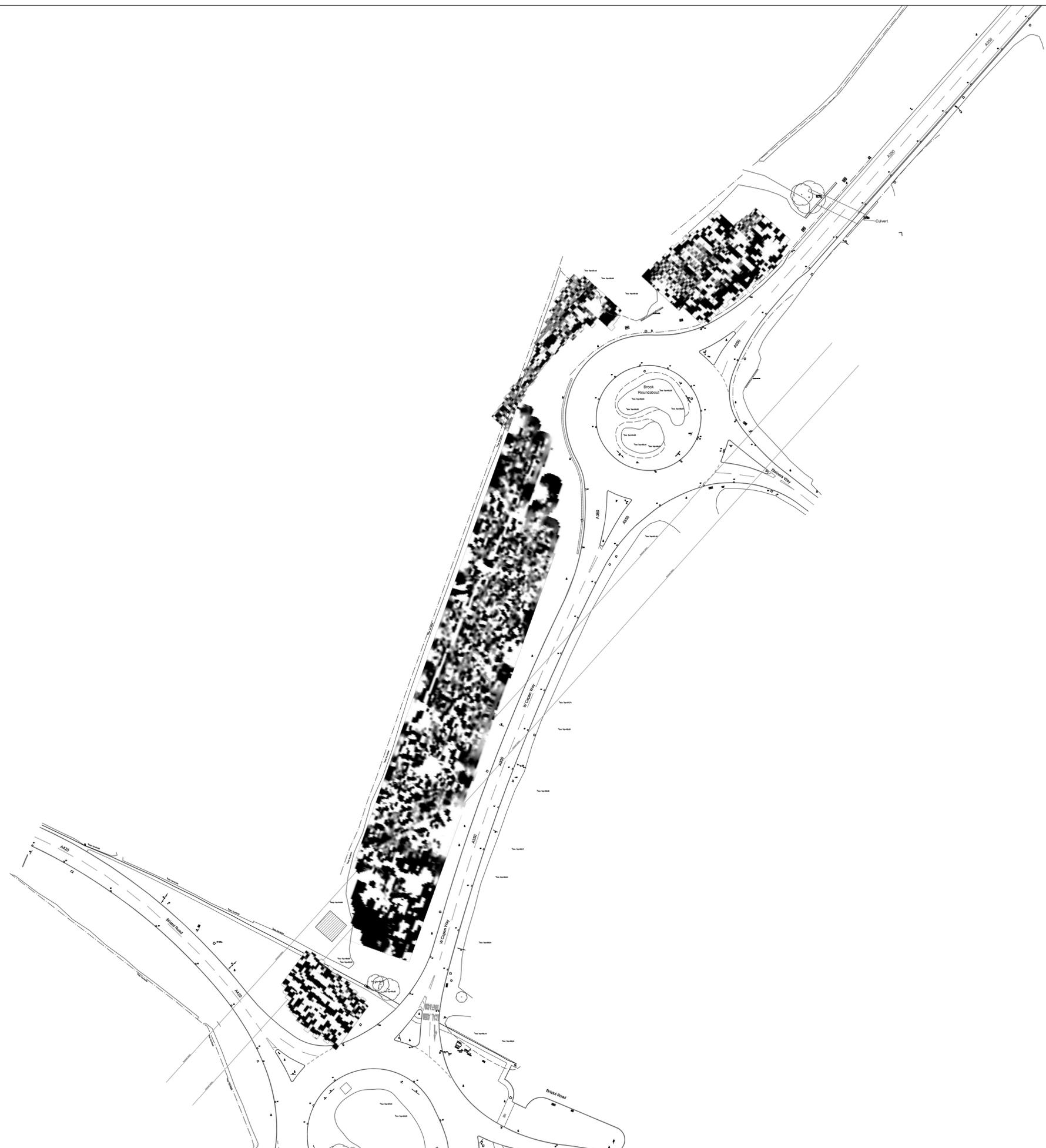
Subject
**PLOT OF PROCESSED
GRADIOMETER DATA - NORTH**

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Scale 0m 10 20 30 40 50m
1:750

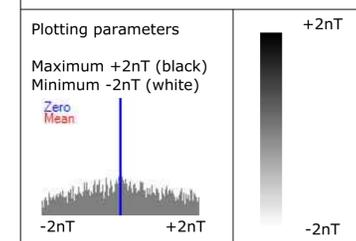
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Date	JUL 15	Drawn by	RD	Figure No.	11



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

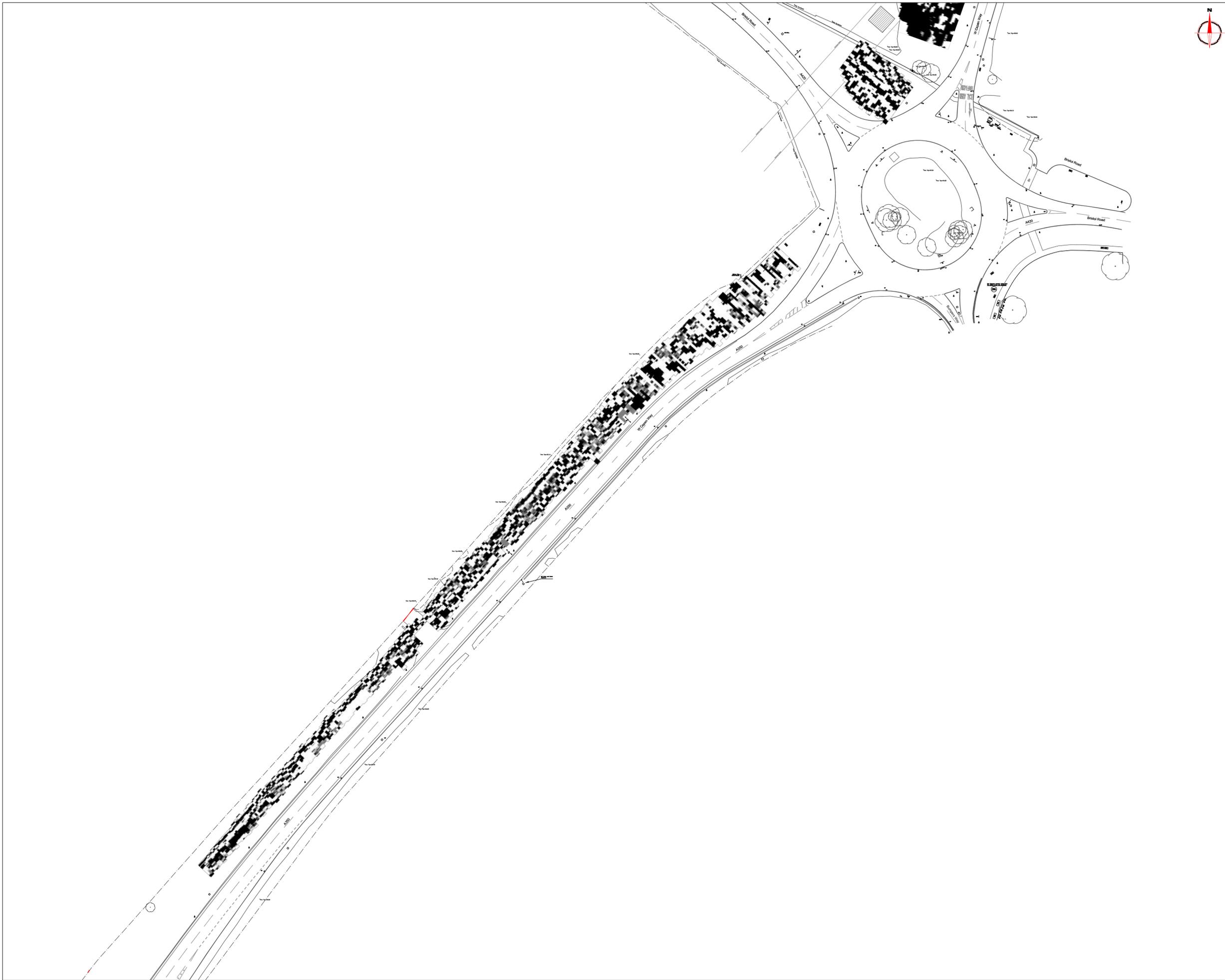
Subject
**PLOT OF PROCESSED
GRADIOMETER DATA - CENTRE**

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Scale 0m 10 20 30 40 50m
1:750

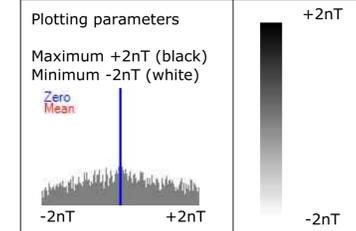
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Date	JUL 15	Drawn by	RD	Figure No.	12



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

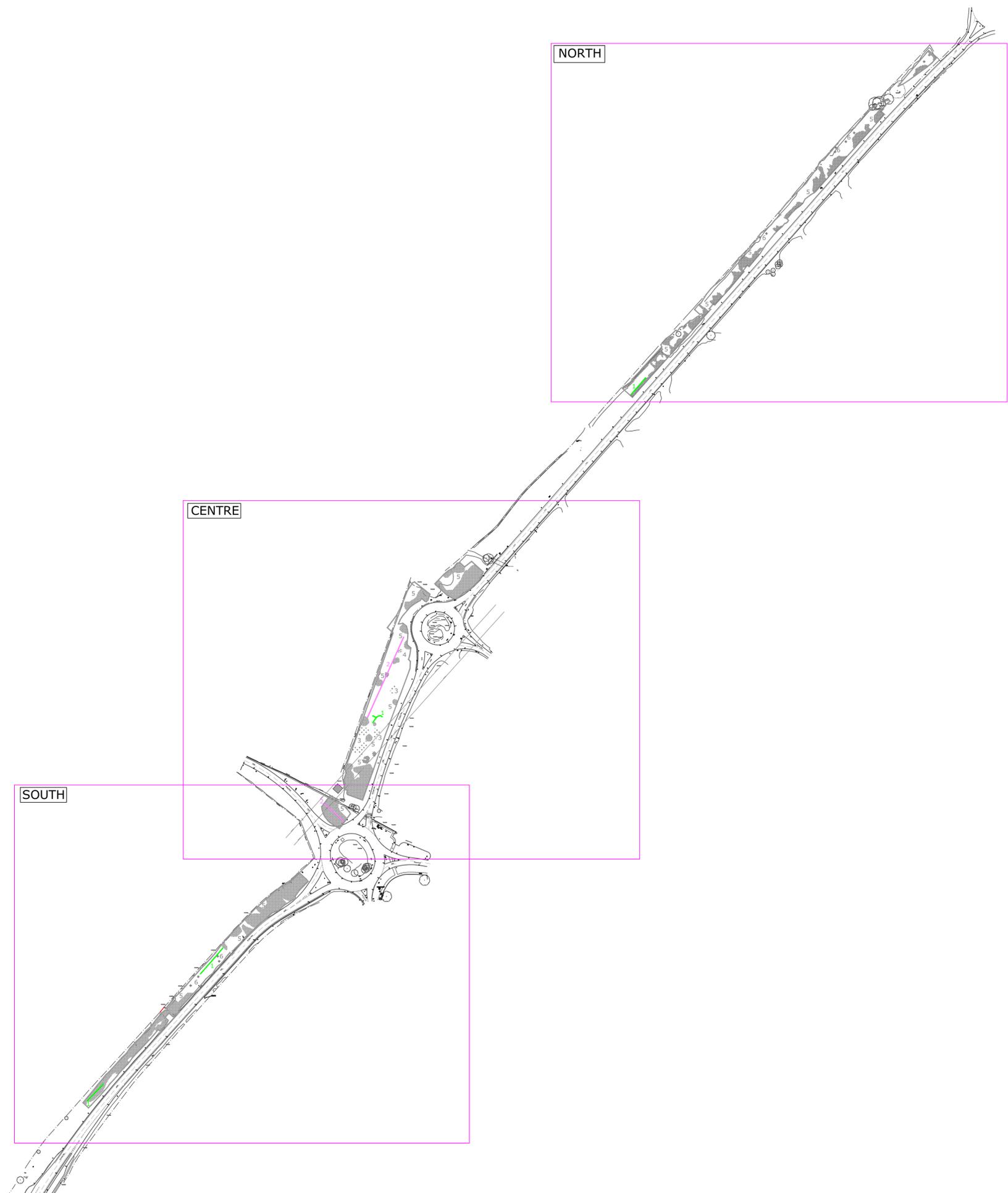
Subject
**PLOT OF PROCESSED
GRADIOMETER DATA - SOUTH**

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Scale 1:750 0m 10 20 30 40 50m

Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	RD	Figure No.	13



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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PROBABLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin

POSSIBLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin

MEDIEVAL/POST-MEDIEVAL AGRICULTURE

- Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow
- Closely spaced parallel linear anomalies - probably related to agricultural activity such as ploughing
- Linear anomaly - probably related to a former field boundary not present on available mapping
- Linear anomaly - related to a former field boundary present on available mapping

OTHER ANOMALIES

- Linear anomaly - probably related to pipe, cable or other modern service
- Linear anomaly - unknown origin, likely to be modern
- Magnetic disturbance associated with nearby metal object such as service or field boundary
- Strong magnetic debris - possible disturbed or made ground
- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Job No.	8583	Survey Date	JUN/JUL 15
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Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**ABSTRACTION AND
INTERPRETATION OF
GRADIOMETER ANOMALIES -
OVERVIEW**

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WR8 0SA www.stratascan.co.uk

GPR ASSOCIATION

SUMO GROUP MEMBER

IMS GROUP MEMBER

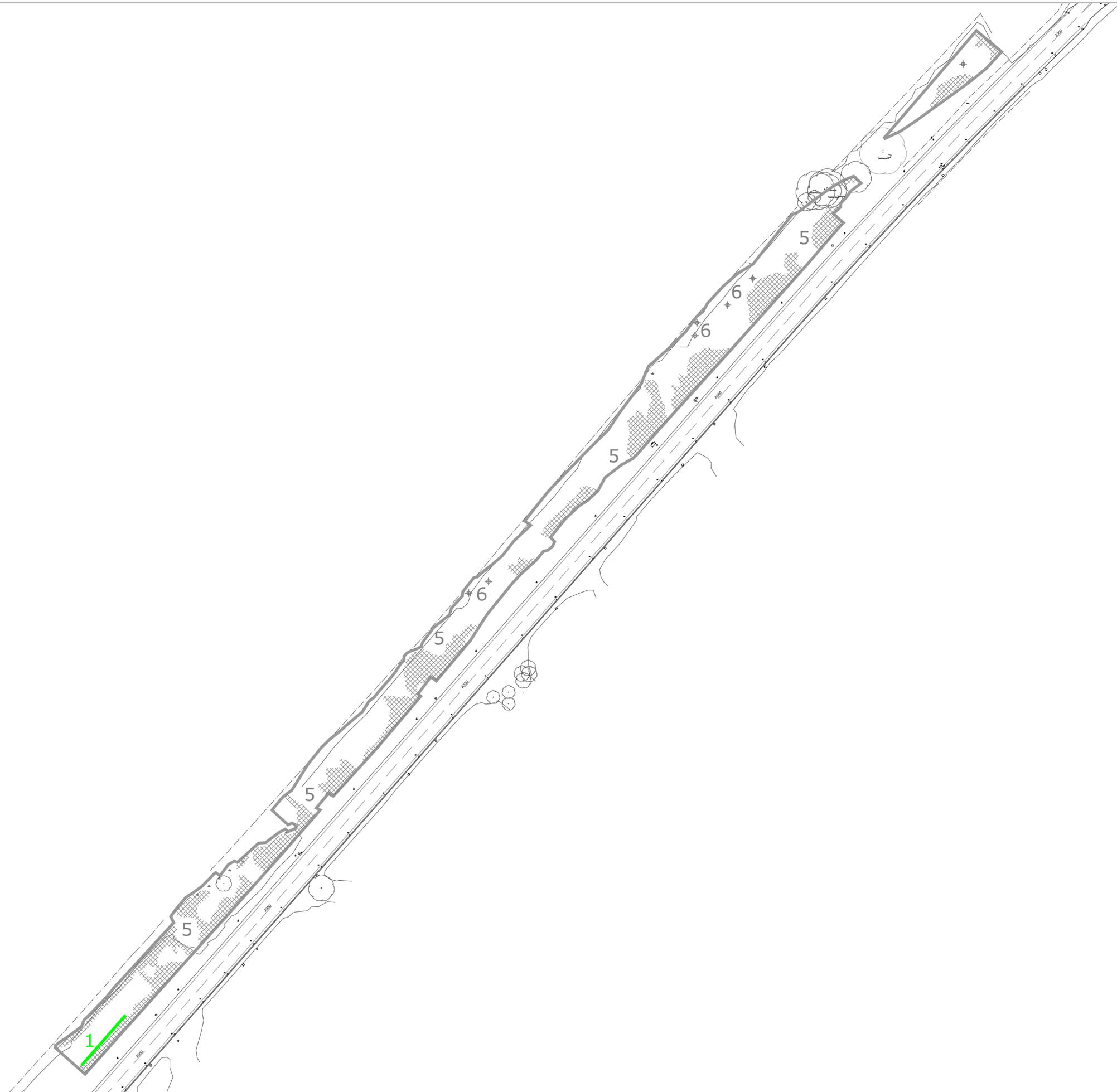
ISO 9001 certified

ISO 14001 certified

UKAS

Scale 0m 50 100 150m
1:2500

Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
JUL 15	JHS/RD	14



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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PROBABLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin

POSSIBLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin

MEDIEVAL/POST-MEDIEVAL AGRICULTURE

- Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow
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- Linear anomaly - related to a former field boundary present on available mapping

OTHER ANOMALIES

- Linear anomaly - probably related to pipe, cable or other modern service
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- Strong magnetic debris - possible disturbed or made ground
- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Job No.	8583	Survey Date	JUN/JUL 15
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Client
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Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

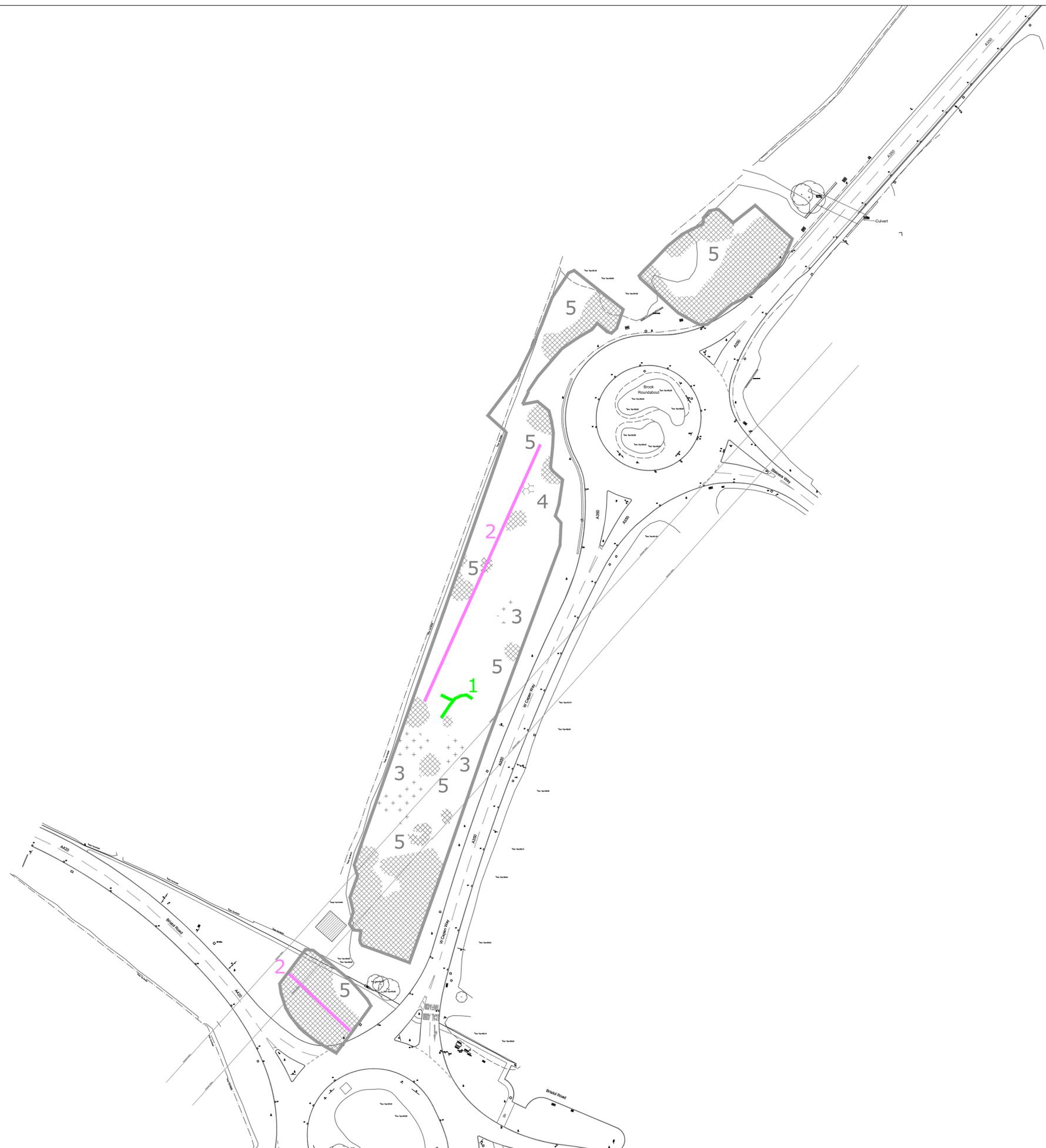
Subject
**ABSTRACTION AND
INTERPRETATION OF
GRADIOMETER ANOMALIES -
NORTH**

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AND ENGINEERING
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GPR ASSOCIATION
SUMO GROUP MEMBER
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ISO 45001 certified

Scale 0m 10 20 30 40 50m
1:750

Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	JHS/RD	Figure No.	15



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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PROBABLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin

POSSIBLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin

MEDIEVAL/POST-MEDIEVAL AGRICULTURE

- Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow
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- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Job No.	8583	Survey Date	JUN/JUL 15
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Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**ABSTRACTION AND
INTERPRETATION OF
GRADIOMETER ANOMALIES -
CENTRE**

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GPR ASSOCIATION

SUMO GROUP MEMBER

IMS GROUP MEMBER

IMS GROUP MEMBER

Scale 0m 10 20 30 40 50m
1:750

Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	JHS/RD	Figure No.	16



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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PROBABLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin

POSSIBLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin

MEDIEVAL/POST-MEDIEVAL AGRICULTURE

- Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow
- Closely spaced parallel linear anomalies - probably related to agricultural activity such as ploughing
- Linear anomaly - probably related to a former field boundary not present on available mapping
- Linear anomaly - related to a former field boundary present on available mapping

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- Linear anomaly - probably related to pipe, cable or other modern service
- Linear anomaly - unknown origin, likely to be modern
- Magnetic disturbance associated with nearby metal object such as service or field boundary
- Strong magnetic debris - possible disturbed or made ground
- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Job No.	8583	Survey Date	JUN/JUL 15
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Client
ATKINS HERITAGE

Project Title
**GEOPHYSICAL SURVEY - A350
CHIPPENHAM, WILTSHIRE**

Subject
**ABSTRACTION AND
INTERPRETATION OF
GRADIOMETER ANOMALIES -
SOUTH**

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GPR ASSOCIATION

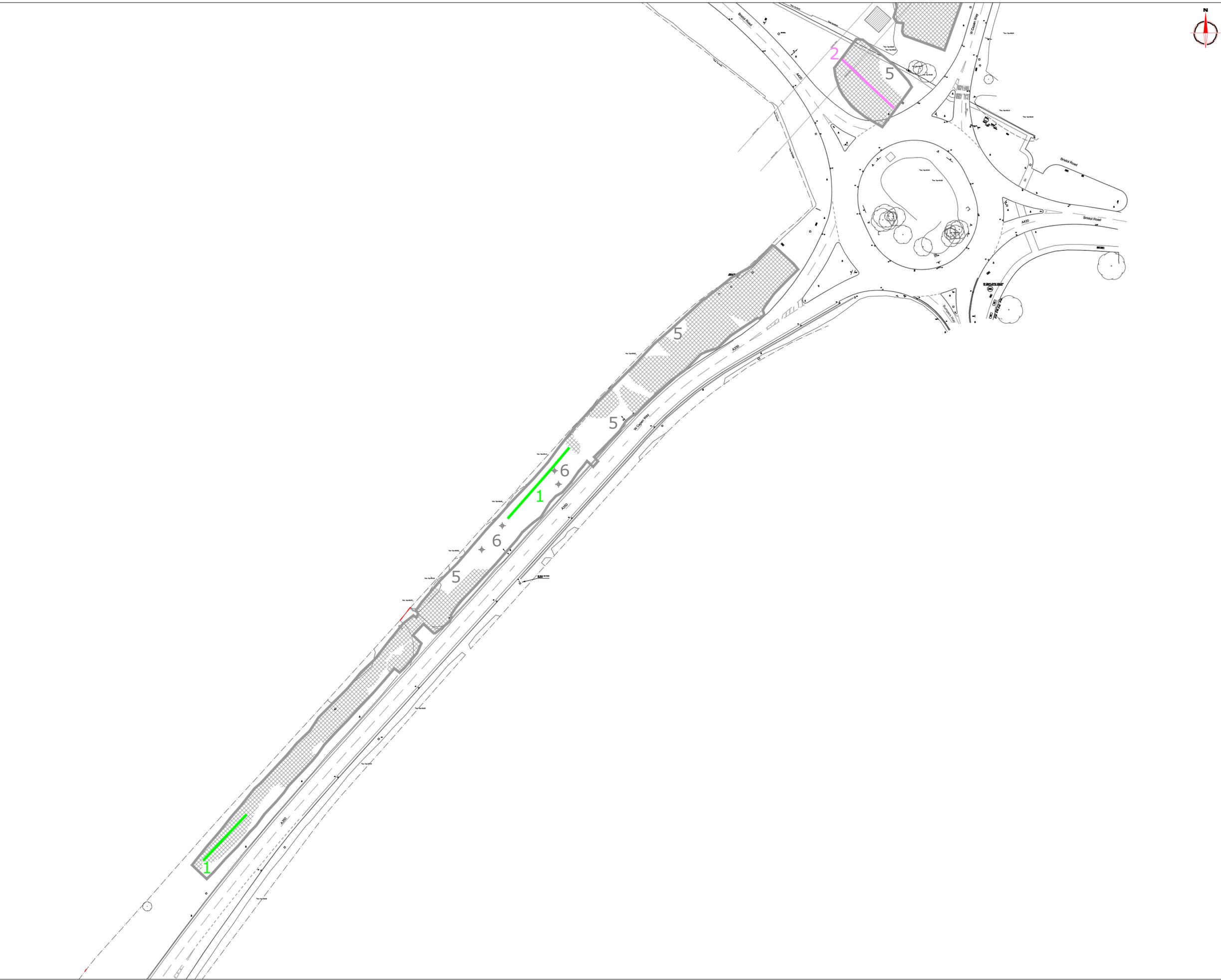
SUMO GROUP MEMBER

IMS ISO 9001 certified

IMS ISO 14001 certified

Scale 0m 10 20 30 40 50m
1:750

Plot	A1	Checked by	DGE	Issue No.	01
Date	JUL 15	Drawn by	JHS/RD	Figure No.	17



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Worcestershire WR8 0SA United Kingdom

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