THE CANONS, MITCHAM, SOUTH LONDON TQ 27895 68346

August 2016/CANONS-16

PROJECT

Earth Resistance and Detailed Gradiometer Survey

Genevieve Shaw
SHAW ARCHAEOLOGICAL PROSPECTION SERVICES

Contents

Figures

Tables

Front Cover image: The East Lawn under earth resistance survey looking north-east © Genevieve Shaw

Back cover image: Junction box of the Geoscan multiplexer PA20 frame © Genevieve Shaw

Summary

Shaw Archaeological Prospection Services was commissioned by Addyman Archaeology, on behalf of Southern Green to carry out an archaeological geophysical survey over land at The Canons, part of the Mitcham Cricket Green Conservation Area. The results of which will inform on the Conservation Management Plan proposal.

An earth resistance and detailed gradiometer survey were carried out on the 6th August 2016 over two areas totalling an area of approximately 0.42 ha. The survey targeted the cropmark of a potential building associated with the former medieval farmstead thought to pre-date the 17th century Canons manor house and an area of Canons Green recorded as the former meadow to The Canons estate.

The earth resistance survey identified, in the 0.5m and 1.0m Twin probe surveys, a series of linear and rectilinear high resistance anomalies interpreted as a potential rectangular, east-west oriented stone building or surviving building foundations. Within this rectangular outline are several smaller high resistance anomalies interpreted as possible rubble or surviving internal walls. There was also identified a rectilinear and short linear high resistance anomaly in a linear formation parallel to the first potential building. This has been interpreted as a potential second separate building approximately 3m to the south between the cropmark area and the dovecote.

The gradiometer survey identified a few possible curvilinear ditch type anomalies in the Canons Green Area B, these are possibly archaeological in origin but they cannot be dated from the geophysics alone. The majority of anomalies identified were ferrous anomalies assumed to be associated with the more recent land use of this area as allotments during World War II. The larger amount of ferrous on the East Lawn (Area A) is due to large above ground metal features such as a metal tree barrier and a rubbish bin cage.

The geophysical surveys have been successful in identifying a number of anomalies of archaeological potential especially in the targeted cropmark area. The anomalies as a whole comprise a potential east-west rectangular stone or masonry building along with a potential second east-west oriented building nearby to the south.

Acknowledgements

The author would like to thank Simon Green of Southern Green and Tom Addyman and Liz Jones of Addyman Archaeology for commissioning the geophysical survey and providing the project and archaeological background.

Also gratefully acknowledged is the assistance of Anne Jones of The Canons Partners for organising the Community Archaeology Day and for publicising the event and procuring many helpful and enthusiastic volunteers who helped out with the survey set up and data collection for the earth resistance survey.

Many thanks goes to Ross Lefort of Lefort Geophysics for providing geophysical equipment and geophysical advice and guidance both during the survey and the data processing.

Finally, I would like to acknowledge the help of the many volunteers who were eager to learn and participate in a geophysical survey for the benefit of a local community landmark.

The Canons, Mitcham, South London

Earth Resistance and Detailed Gradiometer Survey Report

1. Introduction

1.1. Project Background

Shaw Archaeological Prospection Services was commissioned by Addyman Archaeology on behalf of Southern Green Ltd to undertake an archaeological geophysical survey of land at The Canons, Mitcham, London. The site of The Canons lies within the Mitcham Cricket Green Conservation Area and the results of the geophysical survey are for inclusion in a Conservation Management Plan proposal.

The geophysical survey consisted of an earth resistance survey and a magnetometer survey over the East Lawn of The Canons centred on TQ 27895 68346 (Area A) and a second detailed gradiometer survey over an area of ground to the west of The Canons house known as Canons Green centred on TQ 27804 68363 (Area B).

1.2. Aims and Objectives

The aim of the geophysical survey was to locate and characterise any anomalies of archaeological interest within The Canons manor house, gardens, fish pond and Dovecote (HER Reference: MLO90585; MLO90425) in particular associated with the possible former medieval farmstead recorded in this area (HER Reference: MLO10729).

The East Lawn survey targeted a rectilinear cropmark within the East Lawn that was identified during a site visit (Addyman Archaeology 2016) and suspected to be a possible masonry or stonework building associated with the former medieval farmstead recorded in this area. Earth resistance survey is favoured where building foundations and other masonry features are suspected (English Heritage 2008). A twin probe earth resistance survey was agreed upon to target this possible masonry building. A multiplexer with three increasing probe separations of 0.5m, 1.0m and 1,5m was decided upon to try to establish a relative approximate depth for any features of archaeological potential identified (Addyman Archaeology: contact Liz Jones). A detailed gradiometer survey was undertaken to identify any anomalies of archaeological interest possibly associated with the moat itself within the East Lawn and to identify any former watercourses, ditches or field boundaries across the Canons Green area formerly recorded as a meadow.

2. The Site

2.1. Location and Topography

The Canons, as defined in the current conservation plan, is an area of approximately 8 ha comprising the Canons Recreation Ground and Leisure Centre, the Park Place complex, the Grade II* Listed Canons manor house and gardens and Canons Green, an open field to the west of the manor house. The geophysical survey targets the East Lawn within the Canons manor house and gardens and part of Canons Green to the west of Canons manor house (Figure 1).

The East Lawn (Area A) is an approximately rectangular shaped area of grass lawn enclosed by hedgerow arches to the north and east and bounded by the Grade II* Listed Canons manor house to the west and a 15th century Grade II Listed dovecote and former medieval fish pond to the south. The lawn is mostly flat except for a small mounded area to the south on which the dovecote sits. The pond is to the south of the dovecote.

Canons Green (Area B) to the west is a large, open, green, park space bounded by hedgerows and railings which was utilised as allotments during World War II and prior to that was described as a meadow within the Canons estate. There is a large pipeline recorded running across the Green therefore the survey area was reduced to avoid the modern service trench.

2.2. Soils and Geology

The solid geology of the survey area comprises of London Clay Formation of the Palaeogene period with Superficial deposits of either Taplow Gravel Formation or Hackney Gravel Member of the Quaternary Period. The soils are recorded in this area as unsurveyed (SSEW SE Sheet 6).

2.3. Archaeological Background

An archaeological Desk-Based Assessment (DBA) has been undertaken which identified archaeological potential spanning from the prehistoric to medieval periods (Addyman Archaeology 2016). The DBA established the high potential for the survival of buried heritage assets within the study area of The Canons, in particular for significant remains relating to the Medieval complex. A summary of the main sites identified within and immediately surrounding the geophysical survey areas A and B is detailed below in Table 1.

During the site visit undertaken for the DBA (Addyman Archaeology 2016) a sub-rectangular cropmark was identified within the East Lawn suggesting the remains of a possible structure immediately north of the dovecote (see Plate 1). The cropmark is described as orientated approximately north-south, containing a smaller rectangle or room within the north-west corner and a possible east-west division towards the southern end. It possibly predates the foundation of the manor and may be contemporaneous with, or even predate the Dovecote and fish pond.

Site No.	Name, Feature	HER Reference	Designation	Description
AR006	Cricket Green Farmstead,	MLO10729	HER	Moated site thought to lie under the Canons, farm belonging to Southwark Priory. Medieval farmstead likely contemporaneous with Fish pond Medieval 1100-1500AD
AR007	Madeira Road (The Canons) Manor House, Formal Garden, Fish pond	MLO90585; 205111	HER, Grade II* Listed	Post Medieval 1680
AR008	Madeira Road (adjacent to pond South-east of the Canons) Dovecote	MLO90425; 205112	HER, Grade II Listed	Possible 16th century Dovecote. Once part of the complex associated with the Priory of St Mary Overy (later Southwark Priory). Possible date stone inscribed 1511. Rough cut squared ashlar stone with brick quoins. Contains upwards of 400 nesting boxes. Post Medieval - 16th century?
AR014	Meadow as seen on the 1840s estate map	N/A	N/A	Meadow area located in the south-west corner of the Conservation Area. Delineated by a field boundary to the north. Now part of Canons Green to the west of the Canons manor house.

				Pre 1840
AR018	House Lawn (referred to as the East Lawn in this report)	N/A	N/A	Formal lawn to the east of the Manor House. Contains the earlier Dovecote and encircled by a path.
AR059	Allotment Gardens	N/A	N/A	World War II
AR060	Pipeline Trench	N/A	N/A	Line of trench excavated during Post 1968 – pre 1971
AR061	Area of former golf course	N/A	N/A	Area of former 18-hole pitch golf course along the eastern edge of the meadow (AR014) Mid to late 1960s – early 1970s
AR065	Rectilinear cropmarks	N/A	N/A	Possible remains of a rectangular structure, likely surviving as a series of low foundation walls. Likely pre-17th century

Table 1: Cultural Heritage Assets within and immediately surrounding the geophysical survey extents (extracted from Table 1 Addyman Archaeology DBA 2016)

On Canons Green a number of linear cropmarks have been identified relating to former field boundaries and to a 1960s pipe trench visible on Google Earth satellite imagery (Addyman Archaeology 2016). This area was formerly used as allotments during World War II with numerous internal subdivisions to mark out allotment plots and a small 18-hole golf course present in the western area adjacent to the Canons manor house in the 1960s (see **Table 1**).

3. Methodology

3.1. Introduction

A twin probe earth resistance survey was carried out using a Geoscan Reasearch RM85 attached to a PA20 multiplexer frame with increasing probe separations of 0.5m, 1m and 1.5m. The surveys were conducted in accordance with English Heritage guidelines (English Heritage 2008) and the CIfA geophysics guidelines (2014). The earth resistance survey covered an area of 0.07ha and the detailed gradiometer survey covered a total area of 0.35 ha. The fieldwork was undertaken on 6th August 2016 and the field conditions were good at the time being sunny and warm with firm ground under foot. Further details of the survey equipment, fieldwork procedures and methods of processing are described in **Appendix 1**.

3.2. Grids

A 20m x 20m survey grid system was established using a Leica Viva RTK GNSS differential global positioning system (dGPS). The positional accuracy provided by this system gives a precision of approximately 0.03m and therefore exceeds the Historic England minimum requirements for geophysical survey (English Heritage 2008). The geophysical survey is georeferenced relative to the Ordnance Survey National Grid (OSGB 36). The cropmark suggested a possible north-south aligned building therefore to maximise the response of the earth resistance survey the grid was rotated at a 45° angle (Clark 1996). For the location of the survey area extents see **Figure 1**.

3.3. Earth Resistance Survey

A Geoscan Research RM85 earth resistance meter was used with a PA20 frame in multiplexer mode with thee difference probe separations of 0.5m, 1m and 1.5m. The earth resistance survey was undertaken in twin probe array mode with a traverse interval of 1m and a sampling interval of 1m and data were collected in zig-zag mode. A 0.5m twin probe array is likely to respond to features at a maximum depth

of 0.75m therefore the increasing probe separations will give a relative approximate depth rather than an actual depth (Gaffney & Gater 2003).

The East Lawn (Area A) is within a built up area and bounded by a fish pond to the south and gravel paths or paving to the north, east and west which limited the length at which the remote probes could be placed. The remote probes were at an approximate distance of 30m from the survey area which is within the recommended distance for 0.5m and 1m probe separations but not for the 1.5m probe separation. The local geology and pedology suggested a high water table which was reflected in the low overall resistance values obtained from the survey and the increasingly very low contrast seen with increasing depth.

3.4. Gradiometer Survey

A detailed gradiometer survey was undertaken on two areas using a Bartington Grad 601-2 dual sensor magnetometer. This magnetometer system has two fluxgate sensors placed 1m apart with a vertical sensor separation of 1m. The Bartington has an effective sensitivity of 0.03nT which exceeds English Heritage survey recommendations (English Heritage 2008). The data were collected with a sampling interval of 0.25m and a traverse interval of 1m using the zig-zag mode.

3.5. Processing and Display

The earth resistance survey data were downloaded directly into Geoplot 4 which assembles the data grids into a composite for reviewing and processing. Data processing was undertaken which involved de-spiking the data and a high pass filter. The data were then interpolated using a linear interpolation in both an X and Y direction.

The gradiometer data were downloaded into the Bartington Grad 601-2 download software and then imported into Geoplot 4 for assembly of the data grids into a composite for processing. The data were subject to zero mean traverse (threshold of ±5nT) to eliminate heading errors introduced by the surveyor and for minor differences in the two sensors and deslope to correct for grid edge discontinuities introduced by the zero mean traverse function. The data were then interpolated to enhance the greyscale image.

Further details of the survey equipment, fieldwork procedures and methods of processing are described in **Appendix 1**.

4. Results

4.1. Introduction

The earth resistance survey was successful in detecting anomalies of archaeological potential as well as anomalies of geological origin. The detailed gradiometer survey identified a large number of ferrous anomalies assumed to be modern in origin and of no archaeological potential with only a few anomalies of possible archaeological potential. The results are displayed as a series of processed greyscales, XY trace plots and interpretation plots at a scale of 1:1000 for the gradiometer data and raw and processed greyscales and interpretation plots for the earth resistance data at a scale of 1:500 (**Figures 2 to 8**). A list of all anomalies identified in the geophysical surveys are presented in **Appendix 2**.

4.2. Earth Resistance Survey

The earth resistance survey shows several anomalies of high resistance in the 0.5m and 1m probe separation data corresponding with the location of the sub-rectangular cropmark being targeted. The results have been interpreted as suggesting a potential surviving building in the same location as the cropmark as well as a potential second building directly to the south.

0.5m separation Twin probe array

A number of high resistance anomalies have been identified which are typical of a response to a stone or brick constructed feature likely to be a wall or foundation. A 0.5m twin probe array is likely to respond to features at a maximum depth of 0.75m which suggests that part of the building wall or foundation wall is surviving at this level in the form of an intermittent rectangular plan.

Anomaly 1 is a rectilinear area of high resistance suggesting the south-west corner of the potential building with a small area at **anomaly 2** possibly an extension of this. It continues right up to the edge of the survey extents and suggests that the surviving wall continues outside of the survey area. Anomaly 3 is an approximately linear high resistance anomaly measuring approximately 6.5m in length and is likely to indicate part of the north wall due to its shaped and location. The linear **anomalies 1** and **3** are extended areas of high resistance and are likely to be lengths of surviving wall or foundation.

Anomalies 4 to **7** are smaller areas of high resistance in a linear orientation along the eastern and southern edges of the potential building possibly indicating further surviving wall or foundation at a maximum depth of 0.75m in these areas. **Anomalies 8** and **9** are smaller, linear sections of high resistance which are within the areas interpreted as surviving wall or foundation. They are potentially rubble or could be short surviving sections of wall hinting at internal subdivisions.

Anomalies 1 to **9** which are considered to be archaeological in origin are all within an approximately rectangular area of higher background resistance in contrast to the rest of the survey area (**Anomaly 10**). This higher resistance background area could indicate the location of the building extents measuring approximately 17.5m x 6.5m with its long axis orientated east-west.

A second smaller rectangular area of higher background resistance is identified at **anomaly 17** which is approximately rectangular in shape. The area measures 13.8m x 8m with its longer axis oriented east-west and containing an overall rectilinear high resistance anomaly at **13** and **14**. This suggests the north-west corner of a possible stone feature and a small high resistance area on the same orientation at 15 possibly indicating a surviving section of the north wall or foundation. A large, approximately square low resistance anomaly appears to truncate the possible wall line at **16** possibly indicating a cut feature such as a pit.

A single, approximately linear high resistance has been identified as possible surviving wall or foundation (**Anomaly 12**) and of possible archaeological potential but it is outwith of the two potential building areas and therefore of uncertain origin.

Large, broad areas of high resistance between **anomalies 20** to **21**, in particular crossing the eastern area of the lawn, is likely to be geological in origin and reflecting a localised change in the superficial geology or a change in the soils in this area possibly indicating an area of more free draining material. Further areas of geological or natural origin at **18** and **19** reflect a change in the topography where a mounded area is situated on which is built the Dovecote.

1m separation Twin probe array

A number of linear and rectilinear high resistance anomalies have been identified in similar locations to those in the shallower 0.5m twin probe survey as well as some larger, more irregular shaped areas of high resistance which could suggest rubble spread or foundations as opposed to surviving sections of wall. A 1m twin probe array has an effective depth penetration up to 1.5m.

The most significant feature at **anomaly 22** is a linear high resistance anomaly approximately 7.5m in length which has been interpreted as surviving stone wall or wall foundation. This is in contrast to the series of smaller, short sections of wall identified at the shallower 0.5m twin probe survey.

Two approximately linear and rectilinear high resistance anomalies at **23** and **25** are interpreted as surviving wall or foundation possibly the northern and north-west corner wall of the potential building. **Anomaly 24** is similarly interpreted as wall but is within the building area and potentially an internal division.

A linear anomaly at **26** and a rectilinear anomaly at **27** are identified in this dataset only suggesting they survive at this depth and no higher. They are oriented approximately north-south and extend beyond the north wall area and potentially indicate an attached room or annexe to the main building area.

Larger, more irregular spreads of high resistance could indicate rubble areas at anomaly **28, 29**, **30** and **31** in similar areas to the shallower possibly surviving walls identified around **anomaly 1**. A further approximately linear anomaly is at **32** which is interpreted as possible wall or wall foundation in a similar area to **anomaly 12** suggesting the feature continues to this depth.

At **anomaly 33** is a more irregular, broad area of higher resistance which is interpreted as a spread of rubble and is in a similar area to the possible walls identified at **13** and **14** and is therefore considered to be part of the second possible building to the south.

Finally, a large area of broad higher resistance around **anomaly 35** is likely to be geological or natural in origin and **anomaly 36** is likely to be geological or due to a change in the topography as it is at the foot of the mounded area on which the dovecot sits. These are not considered to be of archaeological potential.

1.5m separation Twin probe array

The data shows a very low earth resistance contrast with very few anomalies of possible archaeological interest identified. There are also negative resistance values present in the data which is possibly a reflection of the conditions and the depth of the survey with a high water table in this area. Therefore, although some features and trends have been identified they should be treated with caution.

Two very weakly higher resistance anomalies have been identified at **39** and **40** possibly indicating some surviving features at this depth but this is tentative. A few faint linear low resistance trends (**Anomalies 41** to **44**) are identified within the overall potential building area of **anomaly 18** which would be in response to a negative or cut feature such as a ditch or pit possibly suggesting the survival of some internal features associated with the building but that would be at a potential maximum depth of 2-2.5m.

The remaining anomalies are either geological or natural in origin such as the large area of low resistance at **anomaly 45** to the south of the survey as you approach the pond, this could indicate the depth at which the water table is with a very low resistance indicating high levels of saturation of the soil.

4.3. Gradiometer Survey

The East Lawn (Area A) did not identify any anomalies of archaeological potential with all the anomalies identified as dipolar and bipolar ferrous responses. The strongest anomaly was in response to a metal barrier surrounding the tree that was situated at the northern end of the lawn (**Figures 7 to 9**).

In Canons Green (Area B) a large linear service trench cropmark is visible in this area (**Table 1: Site 060**) and this modern service was detected from scanning the area prior to detailed survey. Due to the fact that the strong magnetic response from the modern service would mask any weaker potential archaeological responses the survey area was reduced in size and at a suitable distance from the pipe trench to minimize its effect.

Four linear and curvilinear positive anomalies were identified which have been interpreted as possible archaeology and are likely to be in response to ditch type features. **Anomalies 54** and **55** are more

interesting as they are parallel and curving with each other and suggests that they are associated. The anomalies cannot be dated from the gradiometer data alone however the more recent use of this area as allotments and from being landscaped after their removal indicates a large amount of disturbance and the ditch type features could be associated with this phase of use. The large amount of ferrous material is assumed to be modern and of no archaeological importance.

4.4. Combined survey interpretation

There were no anomalies of archaeological potential identified in the detailed gradiometer survey over the East Lawn (Area A) therefore the results from this survey have not added to the archaeological potential identified from the earth resistance survey.

5. Conclusions

The geophysical survey was successful in identifying anomalies of archaeological interest as well as anomalies of geological and modern origin.

The earth resistance survey over the East Lawn (Area A) has identified a rectangular area of higher background resistance within which are a series of linear and rectilinear anomalies interpreted as either surviving wall foundations or areas of rubble spread. This rectangular shaped and approximately east-west area corresponds with the approximate location of a rectangular cropmark identified during the DBA site visit (Addyman Archaeology 2016). The cropmark was interpreted as being a north-south oriented building however in the earth resistance data the longer axis of the potential building is east-west with a second potential building to the south on a parallel orientation.

The cropmark was interpreted as showing a smaller room within the north-west corner of the rectangular building and a further possible east-west subdivision towards in the south of the building. The earth resistance data also shows a possible internal division suggesting a smaller room within the north-west corner. However, depending on how the cropmark is interpreted the possible further east-west subdivision in the south building either is not detected in the earth resistance data or it is identified as a second linear high resistance anomaly suggesting a separate building to the south of the main rectangular building cropmark. This second linear high resistance anomaly is interrupted by an approximately square area of low resistance on both the 0.5m and 1m probe separations data suggesting that it has been truncated by this possible pit or larger cut feature.

The third area of interest is to the north of the rectangular area where two north-south high resistance linear anomalies adjoin the potential building suggesting further surviving wall foundations possibly a further adjoining room or annexe. Interestingly these anomalies only appear in the 1m probe separation data indicating they survive at a lower depth compared to the other potential walls at the west and south ends of the potential building area which are detected in the 0.5m and 1m probe separation data.

The detailed gradiometer survey over the East Lawn detected a large amount of ferrous which possibly reflects debris and items buried during landscaping of the lawn, these are not considered to be of archaeological potential. Although some potential ditches were identified on Canons Green there was also an extremely large amount of ferrous likely reflecting the former use of this area as allotments during World War II. The ditches are considered as of possible archaeological potential but cannot be dated from the geophysics alone.

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7. Appendices

7.1 Appendix 1 Technical Specifications of survey equipment

RM85 Earth Resistance Meter

Physical Dimensions (L x W x H) (instrument only)	20cm x 12cm x 9cm
Product Dimensions Weight (instrument only)	1.35kg (console only)
Technical Specifications Output voltage:	50 or 100V.
Constant current ranges (p-p):	10mA, 5mA, 1mA, 0.5mA ,0.1mA & 0.05mA.
Resistance ranges:	2, 20, 200, 2000, & 20,000?.
Logged resolution:	0.0005, 0.005, 0.05, 0.5 & 5?.
Operating frequencies:	17.5, 20, 22.5, 35, 40, 72.5, 80, 85, 90, 122.5, 137, 140, 142.5 Hz, User Defined.
Probe mode Auto-Log Delay times:	20, 200, 300, 450, 600, 800, 1000, 1200 ms (faster with Speed Boost).
High Pass Filter:	Off, 0.05, 0.16, 1.6, 8, 13 & 15 Hz.
Memory capacity:	491,200 readings, without GPS.
Grid dimensions:	10, 20, 30, 40, 50, 60, 100m (length and width independent).
Sample Interval:	0.0625, 0.125, 0.25, 0.5, 1m.
Communications:	USB (2.0) and RS232 at up to 115200 baud (RS232 only for GPS).
Power:	NiMH battery pack, 4 hours charging time.

Bartington Grad 601-2 Fluxgate Gradiometer

Dimensions (L X W X H)	3.8cm x 105cm x 100cm
Product Dimensions Weight (instrument only)	4.3kg
Number of axes:	One (vertical).
Sensor element spacing:	1m.
Gradient range:	±100nT/m or ± 1000nT/m full-scale.
Bandwidth:	DC to 14Hz with -40dB 50Hz/60Hz rejection.
Sensitivity:	0.03nT/m (max effective).
Calibration error:	±2%.
Maximum ambient field:	±100?T

Processing Resistance Data

Clip: This is used to limit data to specified maximum and minimum values for improving graphical presentation and also forms a useful pre-process procedure for many other functions.

De-spike: Automatically locates and removes random spurious readings present in resistance data and locates and removes random “iron spikes” often present in gradiometer data.

High Pass Filter: This is primarily undertaken for the removal of geological background in earth resistance data as it removes low frequency, large scale spatial data.

Interpolation: This is undertaken to enhance and smooth the appearance of the data and is only a cosmetic change. The interpolation function increases or decreases the number of data points in a survey (linear or sin x/x method).

Processing Gradiometer Data

Zero Mean Traverse: Sets the background mean of each traverse within a grid to zero. It is useful for removing striping effects in the traverse direction which can occur in gradiometer data. This also has the effect of removing grid edge discontinuities at the same time

Deslope: Removes a linear trend within a data set. It is typically used to correct for drift in gradiometer data where the use of the Zero Mean Traverse function is inappropriate.

De-stagger: This function corrects for displacement of anomalies caused by alternate zig-zag traverses which are sometimes observable in gradiometer data and introduced by the gait of the surveyor.

Processing history

0.5m Twin Probe	**1.0m Twin Probe**	**1.5m Twin Probe**
Clip Min=03.0SD Max=+3.0SD Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Power 1 Multiply 2 Clip Min=-1.5SD Max=+1.5SD HPF X=10 Y=10 Wt=U Applications=1 Interpolate Y, Expand - Linear, x2 Interpolate X, Expand - Linear, x2 Interpolate Y, Expand - SinX/X, x2 Interpolate X, Expand - SinX/X, x2	Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=1 Y=1 Thr=3 Repl=Mean Despike X=2 Y=2 Thr=3 Repl=Mean Despike X=2 Y=2 Thr=3 Repl=Mean Despike X=2 Y=2 Thr=3 Repl=Mean Despike X=2 Y=2 Thr=3 Repl=Mean Despike X=2 Y=2 Thr=3 Repl=Mean HPF X=10 Y=10 Wt=U Applications=1 Interpolate Y, Expand - Linear, x2 Interpolate X, Expand - Linear, x2	Search 148 to 149 Replace=10.25712 Search 159 to 160 Replace=9.818851 Search 370 to 371 Replace=9.582014 Search 424 to 426 Replace=9.010942 Sear 612 to 614 Replace=8.352731 Search 159 to 159 Replace=7.396011 HPF X=5 Y=5 Wt=U Applications=1 Interpolate Y, Expand - Linear, x2 Interpolate Y, Expand - Linear, x2 Interpolate X, Expand - Linear, x2 Interpolate X, Expand - Linear, x2
Area A East Lawn Gradiometer survey	**Area B Canons Green Gradiometer Survey**	
Zero M Trav., Grid=All LMS=On ZM=Mean Pos.Thresh. = 15 Neg.Thresh. = -15 Add -5, Bl(Inc) 1,10 80,13 Destagger All Grids, X dir, Shift= 1 Line Pattern - - 34 - - 78 LPF X=2 Y=1 Wt=G Applications=1 , Bl(Inc) 79,0 82,60	Zero M Trav., Grid=All LMS=On ZM=Mean Pos.Thresh. = 15 Neg.Thresh. = -15 Deslope Grid 5, Edge=Left, Bias=-1 Deslope Grid 6, Edge=Right, Bias=0.25 Deslope Grid 5, Edge=Right, Bias=-0.25 Destagger All Grids, X dir, Shift= 1 Line Pattern - - 34 - - 78 Destagger Grid 8, X dir, Shift=-3	

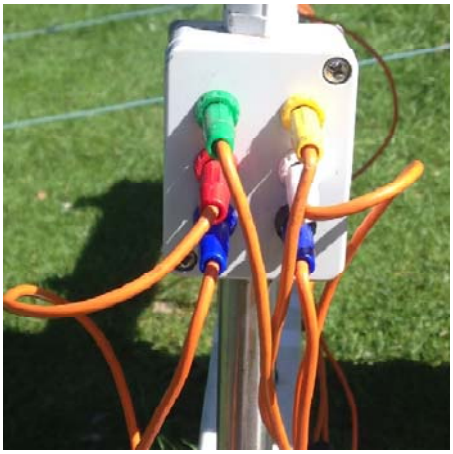
	Line Pattern - - 34 - - 78 Destagger Grid 8, X dir, Shift=-1 Line number 8 Search -1000 to 1000 Replace=2047.5 , Bl(Inc) 103,47 108,48 Search -1000 to 1000 Replace=2047.5 , Bl(Inc) 103,51 109,52 Search -1000 to 1000 Replace=2047.5 , Bl(Inc) 156,43 164,45 Search -1000 to 1000 Replace=2047.5 , Bl(Inc) 151,45 159,47 Search -1000 to 1000 Replace=2047.5, Bl(Inc) 71,4 89,8 Deslope Grid 5, Edge=Right, Bias=-0.5 LPF X=2 Y=1 Wt=G Applications=1 , Bl(Inc) 79,0 82,60 LPF X=2 Y=1 Wt=G Applications=1 , Bl(Inc) 159,0 162,60

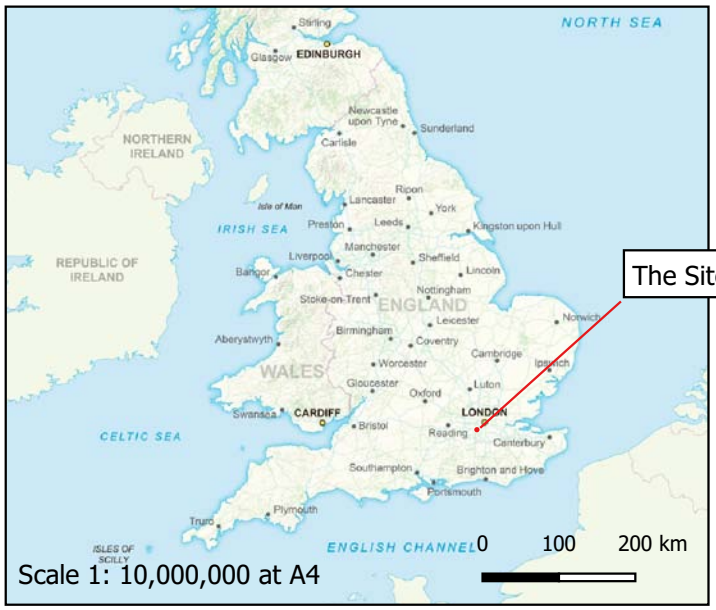
7.2 Appendix 2 Archaeological Interpretation Categories and Gazetteer of geophysical anomalies identified

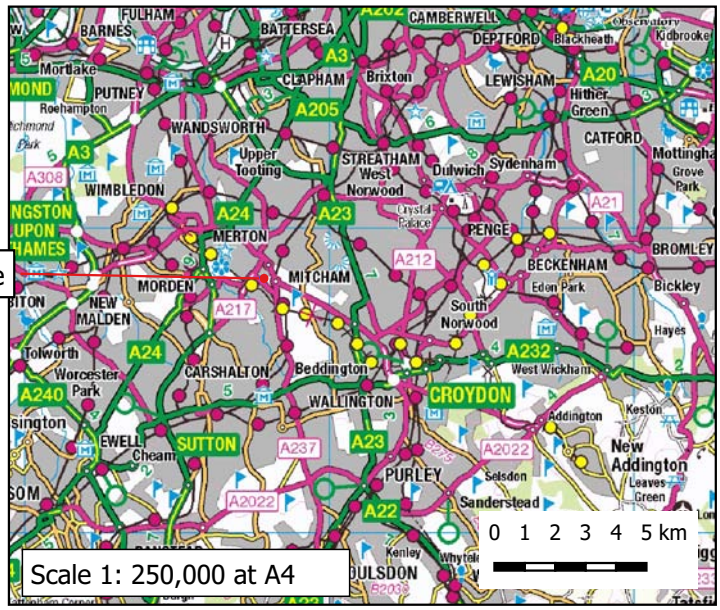
Anomaly Number	Geophysical Interpretation	Archaeological Interpretation
1	High Resistance - Rectilinear	Wall/Rubble?
2	High Resistance - small, distinct, oval shape	Wall
3	High Resistance - Linear	Wall
4	High Resistance - Short linear	Wall?
5	High Resistance - Short linear	Wall
6	High Resistance - Short linear	Wall
7	High Resistance - Short linear	Wall?
8	High Resistance - Short linear	Rubble
9	High Resistance - Short linear	Rubble?
10	High Resistance - Approximately rectangular area of higher background resistance	Building Area
11	High Resistance - Spike	Data artefact
12	High Resistance	Wall/Rubble?
13	High Resistance - Linear	Wall
14	High Resistance - Linear	Wall
15	High Resistance - Short linear	Wall?
16	Low resistance, approximately square in shape	Large cut feature?
17	High Resistance - Approximately rectangular area of higher background resistance	Building Area
18	High Resistance - broad, low area with little change in values over larger area	Natural
19	High Resistance - broad, low area with little change in values over larger area	Natural
20	High Resistance - broad, low area with little change in values over larger area	Natural
21	High Resistance - broad, low area with little change in values over larger area	Natural
22	High Resistance - Linear	Wall
23	High Resistance - Rectilinear	Wall
24	High Resistance - Short linear	Wall/Rubble?

25	High Resistance - Linear	Wall
26	High Resistance - Rectilinear	Wall?
27	High Resistance - Rectilinear	Wall?
28	High Resistance - Irregular shaped	Rubble
29	High Resistance - Irregular shaped	Rubble?
30	High Resistance - Irregular shaped	Rubble
31	High Resistance - Irregular shaped	Rubble?
32	High Resistance - Irregular shaped	Wall/Rubble?
33	High Resistance - Irregular shaped	Rubble?
34	High Resistance - broad, low area with little change in values over larger area	Natural
35	High Resistance - broad, low area with little change in values over larger area	Natural
35	High Resistance - broad, low area with little change in values over larger area	Natural
36	High Resistance - broad, low area with little change in values over larger area	Natural
37	High Resistance - Spike	Data Artefact
38	High Resistance - Spike	Data Artefact
39	High Resistance - Short linear	Wall?
40	High Resistance - Short linear	Wall?
41	High Resistance - weak linear trend	Uncertain Origin
42	Low Resistance - weak linear trend	Uncertain Origin
43	Low Resistance - weak linear trend	Uncertain Origin
44	Low Resistance - weak linear trend	Uncertain Origin
45	Low Resistance - broad, low area with little change in values over larger area	Natural - high water table, clay soils
46	High Resistance - broad, low area with little change in values over larger area	Natural
47	High Resistance - Spike	Data Artefact

48	High Resistance - Spike	Data Artefact
49	High Resistance - Spike	Data Artefact
50	High Resistance - Spike	Data Artefact
51	High Resistance - Spike	Data Artefact
52	High Resistance - Spike	Data Artefact
53	High Resistance - Spike	Data Artefact
54	Positive magnetic curvilinear	Possible ditch
56	Weak positive linear	Possible ditch
55	Positive curvilinear	Possible ditch
57	Positive linear	Possible ditch/pit







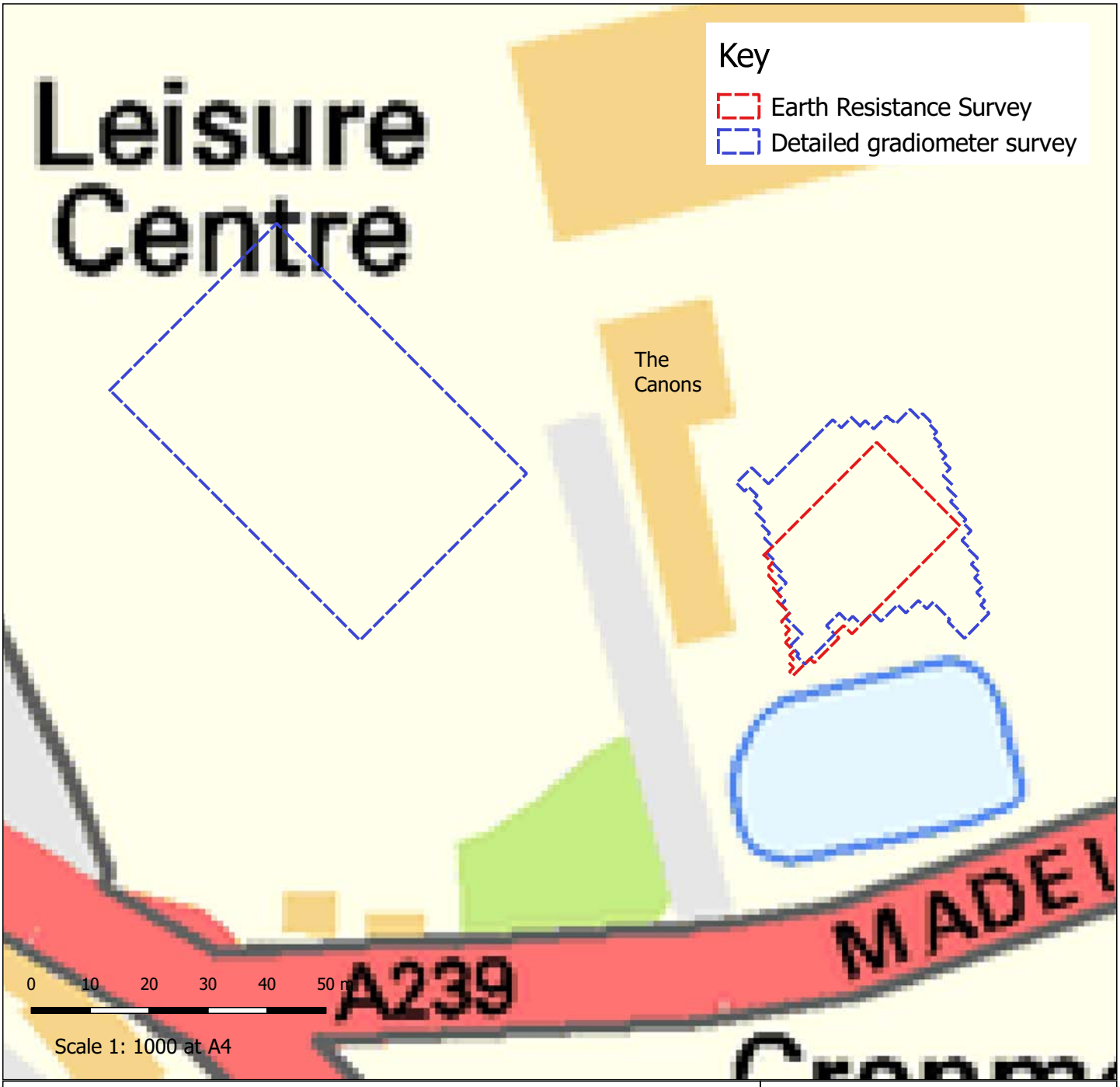


Figure 1: Site Location and geophysical survey extents Contains Ordnance Survey data © Crown copyright and database right 2016.	Date: 29/08/16 Author: G Shaw

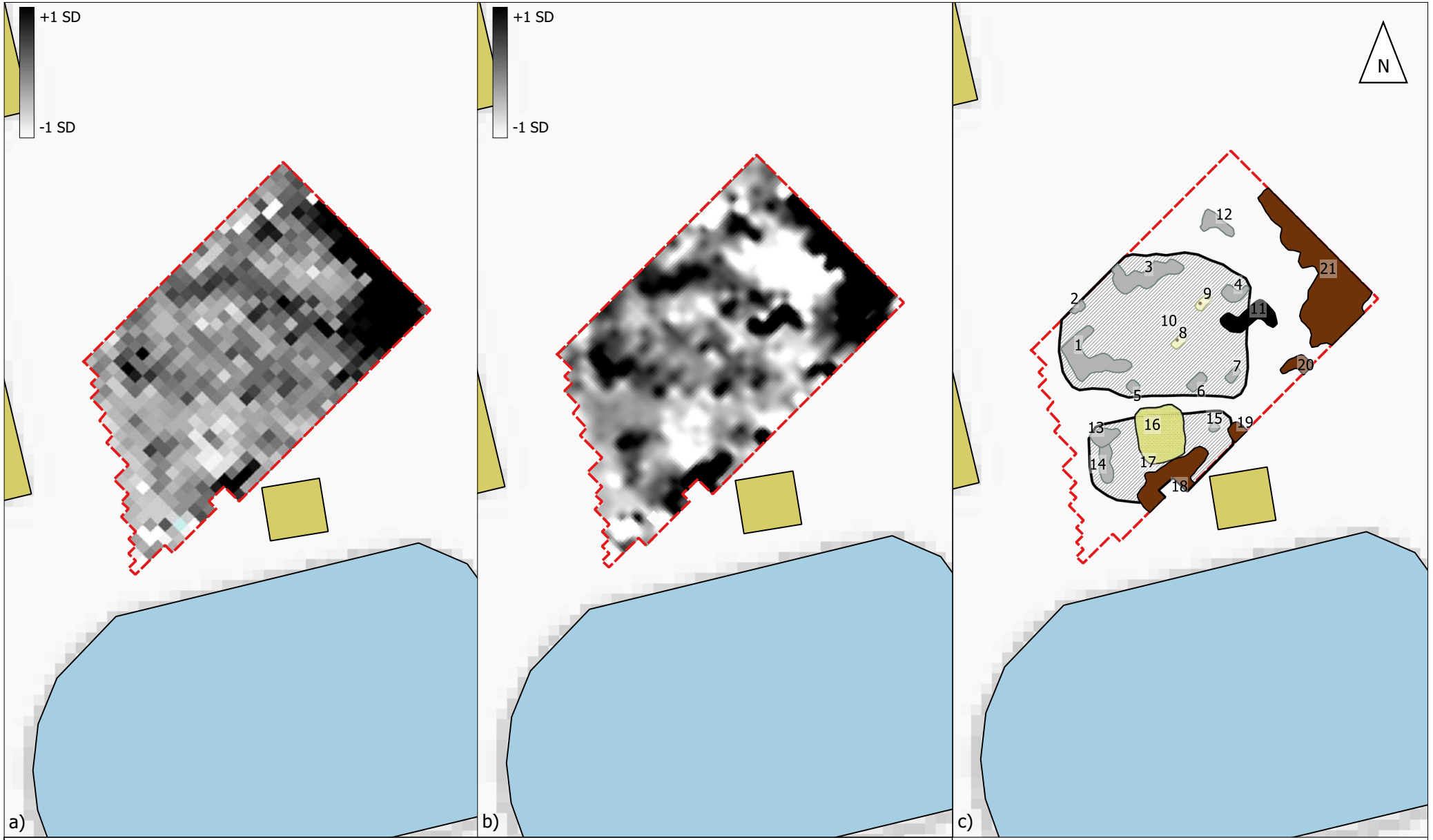


Figure 2: 0.5m Twin Probe array survey
a)Despiked b) high pass filtered greyscale and c) interpretation plot

0 5 10 15 20 m

Scale 1:500 at A4

Legend

Survey extents
Interpretation
Building Area
Data artefact
Large cut feature?
Natural
Rubble
Rubble?
Wall
Wall/Rubble?
Wall?

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/02/01

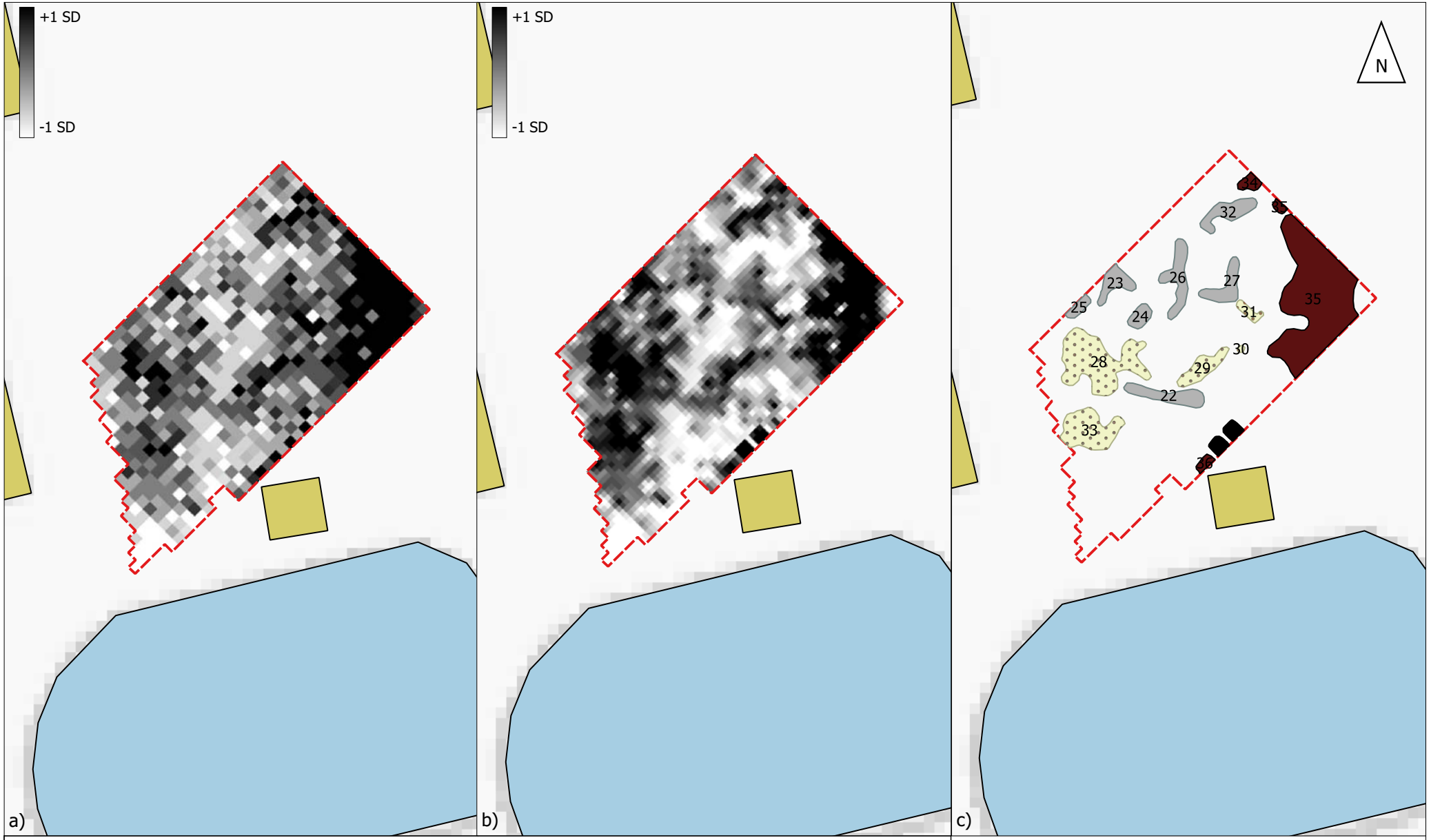


Figure 3: 1.0m Twin Probe array survey
a)Despiked b) high pass filtered greyscale and c) interpretation plot

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/03/01

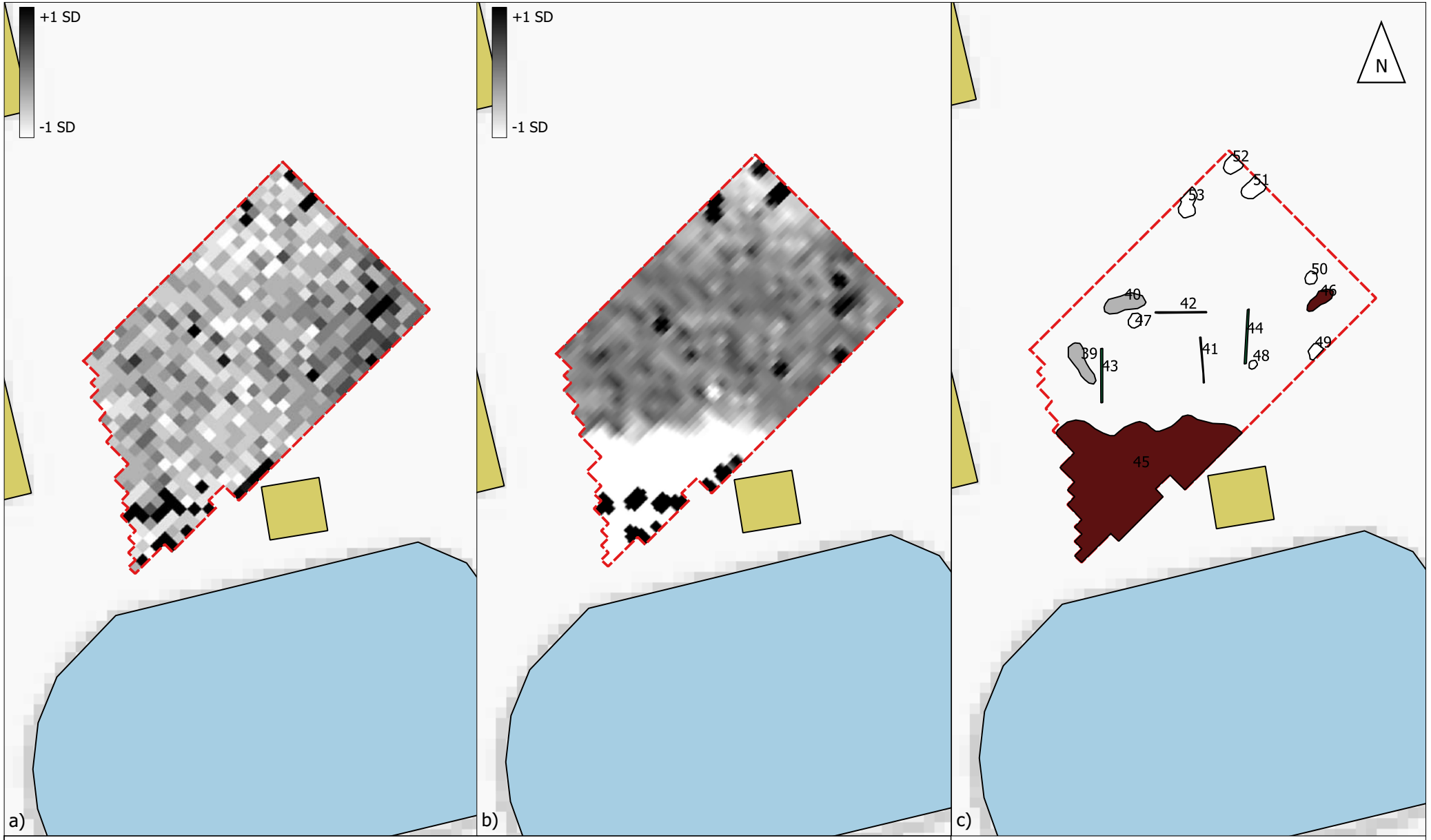


Figure 4: 1.5m Twin Probe array survey
a)Despiked b) high pass filtered greyscale and c) interpretation plot

0 5 10 15 20 m

Scale 1:500 at A4

Legend

Survey extents
Interpretation
Data Artefact
Natural
Uncertain Origin
Wall?

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/04/01

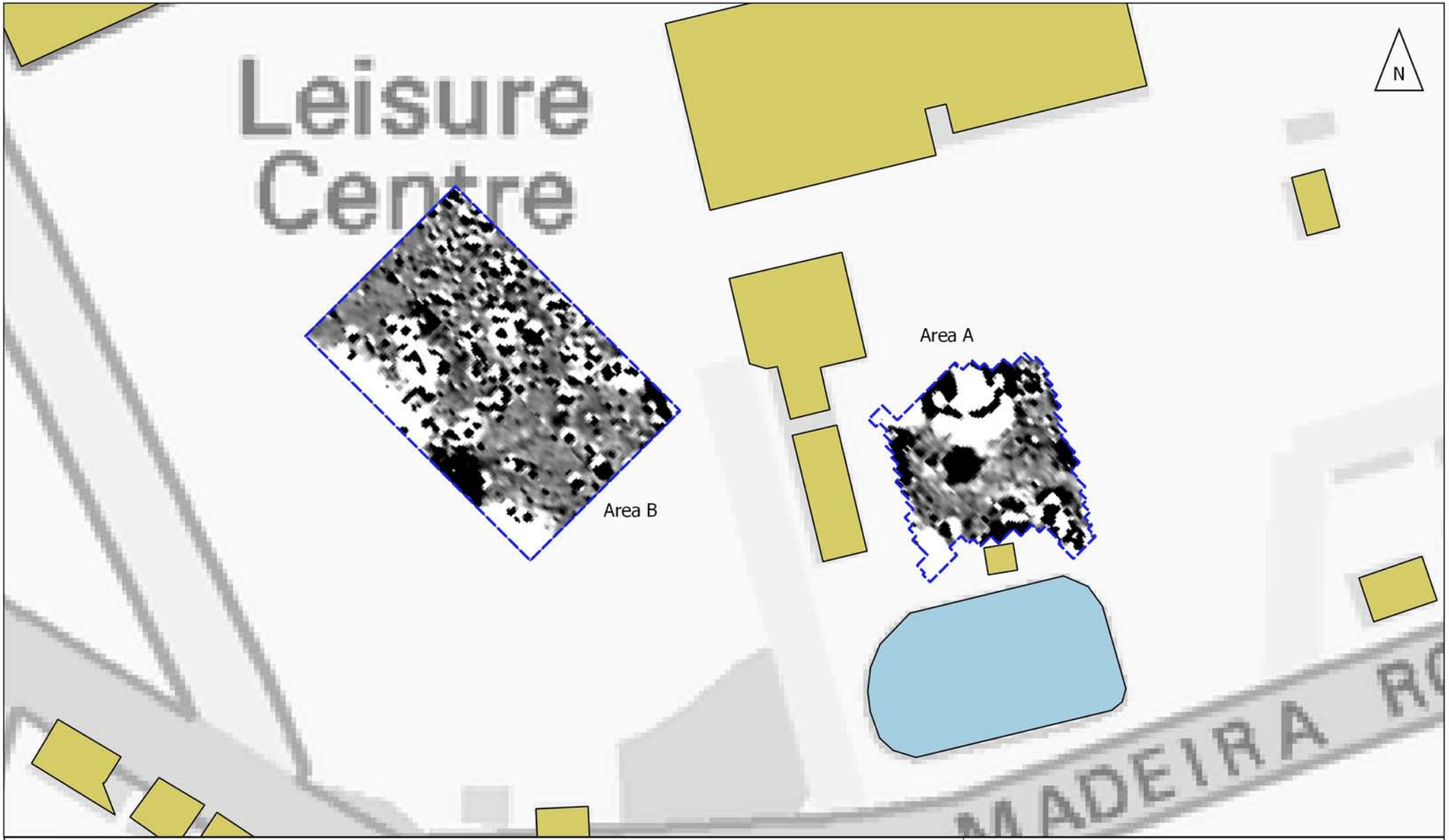


Figure 5: Detailed gradiometer survey greyscale plot -5nT to +5nT

0 10 20 30 40 m

Scale 1:1000 at A4

Legend

Gradiometer survey extents

+5 nT

-5 nT

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/05/01

Figure 7: Detailed gradiometer survey interpretation plot

0 10 20 30 40 m

Scale 1:1000 at A4

Legend

Gradiometer survey extents

Interpretation

Ferrous - Modern

Possible ditch

Possible ditch/pit

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/07/01

Figure 8: Combined earth resistance and detailed gradiometer survey interpretation plot

Illustrator: Genevieve Shaw Date: 29/08/2016 Version: CAN16/08/01