

Geophysical Survey Report

HAVANT ROAD WARBLINGTON

For Barratt David Wilson

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L~P:ARCHÆOLOGY

Geophysical Survey Report

HAVANT ROAD WARBLINGTON

Client: Barratt David Wilson

Local Authority: Havant Borough Council

NGR: 473539, 106264

Planning App: N/A

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Abstract

A geophysical survey was carried out at Havant Road, Warblington. The objectives of the geophysical survey were to conduct a fluxgate gradiometer survey over the site with emphasis on identifying the potential for archaeological remains.

The fieldwork was carried out by L - P : Archaeology. This report has been prepared by Jessica Ogden of L - P : Archaeology on behalf of Barratt David Wilson.

Anomalies observed within the fluxgate gradiometer results were predominantly of modern origin, although a few archaeological anomalies of interest are discussed. Ridge and furrow was first identified in the topography at the northeastern edge of the site, and confirmed as positive anomalies in the results. A single positive anomaly, resembling a ditch, was identified in the northwestern portion of the survey area. Anomalies in the location of the presumed 20th century trackway were also detected, as well as the structural remains of a small farm building and late 19th century well.

Extensive modern disturbance was observed in the gradiometer results, stemming from a high pressure gas main and electrical station, and concentrations of rubbish dumping across the site.

Few archaeological features of interest were identified within the geophysical results. The presence of ridge and furrow in the northern area reinforces the notion that historically the site area was predominantly used for agricultural purposes.

1. Introduction

- 1.1. This geophysical survey report has been prepared by Jessica Ogden of L - P : Archaeology on behalf of Barratt David Wilson. The survey was conducted between the 25th - 28th of October 2011.
- 1.2. The site is located at Havant Road, Warblington and is centred on NGR 473539, 106264 (FIGURE 1). The site is bounded to the north by the A27 Havant Bypass and the Havant to Chichester railway line. To the east the site is bounded by houses on Selangor Avenue, to the south by Havant Road, and to the west by a small collection of houses.
- 1.3. The local authority is Havant Borough Council who take archaeological advice from the Hampshire County Council Archaeologist.
- 1.4. The report is based on the results of a fluxgate gradiometer survey and incorporates research completed as part of the Desk Based Assessment (MADIGAN 2011).

2. Site Background

2.1.GEOLOGY

2.1.1. The British Geological Survey GeoIndex shows the site to be located on a bedrock of white chalk with superficial deposits of clay, sand, gravel and silt ([HTTP://MAPS.BGS.AC.UK/GEOINDEX](http://maps.bgs.ac.uk/geoindex)). This data is at relatively low resolution and does not give site specific site geology.

2.1.2. Additional geotechnical information will be consulted as and when it becomes available to further refine the understanding of the geological conditions of the site.

2.2.TOPOGRAPHY AND SITE CONDITIONS

2.2.1. The site is situated on a level coastal plain on the south coast of England (FIGURE 1). It is 1.1km north of Warblington Creek and 1.8km east of the coastal settlement of Emsworth.

2.2.2. The site lies 1.9km west of Havant and 12km east of Chichester between the A27 to the north and the A259 to the south. It is also situated to the south of the railway line that runs east to west from Chichester to Havant.

2.2.3. The site area consists of open fields used for cattle grazing. The site is low lying, and generally level with a slight rise from south to north rising from 9mAOD to 10mAOD.

2.2.4. At the centre of the site are the remains of a small farm building with associated hardstanding and disturbed ground. There are the remains of north-south and east-west hedgerows which divide the southern and northern areas.

2.2.5. Certain areas of the site were inaccessible for survey including the northeastern-most extent of the site due to excessive vegetation and surface obstacles.

2.3.ARCHAEOLOGY AND HISTORY

TIMESCALES USED IN THIS REPORT:

PERIOD	FROM	TO
PREHISTORIC		
PALAEOLITHIC	450,000	12,000 BC
MESOLITHIC	12,000	4,000 BC
NEOLITHIC	4,000	1,800 BC
BRONZE AGE	1,800	600 BC
IRON AGE	600	43 AD
HISTORIC		
ROMAN	43	410 AD
EARLY MEDIEVAL	410	1066 AD
MEDIEVAL	1066	1485 AD
POST MEDIEVAL	1485	PRESENT

Table 1 - Timescales used in this report

- 2.3.1. This is a general summary for the purpose of correlating the geophysical results, for a more detailed account of the archaeology and history of the site please refer to the Desk Based Assessment (MADIGAN 2011).
- 2.3.2. There are no entries in the Hampshire County Council Historic Environment Record (HCCHER) for Prehistoric archaeology within a 1km radius of the site.
- 2.3.3. There is significant activity during the Roman period in the vicinity of the site. A Roman road lies to the immediate south of the site running from *Noviomagus Reginorum* (Chichester) to *Clausentum* (Bitterne), and is thought to follow the approximate line of Havant Road (MARGARY 1969:92). A Roman villa is known to exist to the south of the site, where excavations have revealed floors, tiles, tesserae, pottery, wall foundations and evidence of large rooms with a potential bath house (MADIGAN 2011).
- 2.3.4. Evidence for settlement within the vicinity of site during the Early Medieval period is present, including the possible reoccupation of the villa site to the south and the construction of a church in Warblington (MADIGAN 2011).

- 2.3.5. There is evidence for continued settlement of the area through the Medieval period, although populations seem to be centred on market towns to the east such as Emsworth, and Hayling Island and the coastal lowlands (KLPC ET AL 2006). Warblington is recorded as a Deserted Medieval Village in the HCCHER, approximately 500m southwest of the southern edge of the site.
- 2.3.6. Archaeological investigations 35m southwest of the site revealed a Medieval well, a dump of Medieval material including pottery, building materials and residual Roman tiles, and pits which had evidence of burning (MADIGAN 2011).
- 2.3.7. Post Medieval changes to landscape were abundant and included the enclosure of open fields (commonly used for strip cultivation) into geometric shaped fields with linear boundaries. Little survives of the earlier field systems of this landscape, though the curving of field boundaries in Warblington is remnant of the underlying origins of ridge and furrow ploughing (KLPC ET AL 2006).
- 2.3.8. The documentary evidence suggests that the site was most likely in agricultural use throughout the Medieval and Post Medieval periods, and has remained mainly in pasture to the modern day (MADIGAN 2011).

3. Aims

3.1.The objective of this report is to highlight possible areas where significant archaeological remains are present in order to further inform any potential future development works.

3.2.The specific aims of the geophysical survey:

- ◆ Assess the presence of archaeological remains within the site area
- ◆ To inform and target any potential archaeological evaluation.

4. Methodology

4.1. EXPLANATION OF GEOPHYSICAL METHODS

- 4.1.1. Magnetometry involves the prospection of magnetised iron oxides in the soil. Fluxgate gradiometers measure the difference between two vertical fluxgates, one which measures the Earth's magnetic field and one which measures the variation in magnetism directly below (CLARK 1990).
- 4.1.2. Magnetic contrast between anthropogenic features and the surrounding subsoil, whether stemming from thermoremanent magnetism, magnetic susceptibility, or both, must be present to detect features of archaeological interest (GAFFNEY AND GATER 2003:39).
- 4.1.3. Magnetometry is particularly well suited for prospection of fired or burnt materials such as kilns, ovens, and hearths. Magnetometers also respond well to negative features such as ditches and pits (GAFFNEY AND GATER 2003:37), as well as field systems in the form of earth works and settlement enclosures.
- 4.1.4. This technique has been widely applied to a range of archaeological sites in the UK, and is known to respond well to limestone geologies such as the local chalk bedrock. Under ideal geological and pedological survey conditions, fluxgate gradiometry offers a non-invasive, time and cost-efficient mechanism for surveying a given site's archaeological potential.

4.2. DATA ACQUISITION



Plate 1 - Fluxgate gradiometer survey at Havant Road, looking southwest (Photo: Guy Hunt)

- 4.2.1. A reference grid based on 30m x 30m grids was set out prior to the initiation of the fluxgate gradiometer survey using a Leica Smart Rover GPS system in the British National Grid. This grid was then used to rectify the geophysical data output within the Geographic Information System (GIS).
- 4.2.2. The survey was conducted using two Bartington 601-2 Dual Sensor fluxgate gradiometers (PLATE 1). The data was collected as single grids with a line spacing of 0.5 metres, at 4 samples per metre, in zig-zag acquisition mode to facilitate a speedier data collection. The sensor separation was 1.0 metre.
- 4.2.3. Each grid was recorded separately and the order of data acquisition was noted in the field to ensure accurate locations for each grid.

4.3. DATA AND IMAGE PROCESSING

- 4.3.1. All data was downloaded using the Bartington downloader and imported into Geoplot for data and image processing before being exported to the GIS for interpretation.
- 4.3.2. Grids were fitted to a composite view using field notes and a raw, unrectified data plot was exported for comparison with the final processed results.

- 4.3.3. The magnetometry data underwent traditional processing techniques to remove the effects of diurnal shift in the Earth's magnetic field, minimize broader underlying geological responses, and to enhance potential archaeological features.
- 4.3.4. The overall plot was clipped to +/- 3 standard deviations in the total magnetic field to accentuate weaker magnetic features.
- 4.3.5. Zero mean traverse was performed to average variations in the Earth's magnetic field and remove striping within and between grids.
- 4.3.6. Traverses exhibiting staggering in readings caused by topography and surface conditions were de-staggered and realigned.
- 4.3.7. The data was de-spiked using a 3 x 3 search radius to remove high response readings from ferrous materials, typically of modern origin.
- 4.3.8. A 3 x 3 pixel low pass filter was applied to reduce the amount of variability in magnetic readings and smooth the final output before being exported in bitmap format.
- 4.3.9. A final plot was then georeferenced to the British National Grid within the GIS (FIGURE 3) using the grid coordinates established at the outset of the survey.

4.4.STATEMENT OF INDEMNITY

- 4.4.1. Whilst every effort has been made to ensure that interpretation of the survey presents an accurate indication of the nature of sub-surface remains, any conclusions derived from the results form an entirely subjective assessment of the data and the importance attributed to certain features is a product of the judgment of the surveyor. Geophysical survey facilitates the collection of data relating to variations in the form and nature of the soil or subsurface materials. This may only reveal certain archaeological features and may not record all the material present.

5. Results

5.1. An overview of the interpretation is presented in **FIGURE 4**. Results are discussed and presented below with basic interpretations for anomalies in both the northern and southern areas of the site. Anomalies of interest are numbered and discussed below with their corresponding reference numbers, e.g. **M#**. It is not the purpose of this report to analyse and discuss every anomaly presented in the overall geophysical results.

5.2. Anomalies observed within the fluxgate gradiometer results were predominantly of modern origin. A few archaeological anomalies of interest are discussed below, including ridge and furrow, a possible ditch, trackway and well.

5.3. NORTHERN SITE AREA (**FIGURE 5,6**)

5.3.1. Ridge and furrow is present as a series of northeast to southwest linear, positive anomalies (**M1**). The ridge and furrow can be seen clearly in the topography as a series of rounded ridges across the northeastern edge of the site. The chronological and stratigraphic relationship between the ridge and furrow and the enclosure is unclear from the survey results, particularly as it is unknown if the ridge and furrow continues beyond the boundaries of the site area and the A27 to the north. Ridge and furrow in itself is not confined to pre-enclosure origins, and the narrow separation between ridges (2-3 metres) suggests a later date, perhaps even as late as the early 19th century (RACKHAM 1986:168).

5.3.2. A positive anomaly is present in the northwestern area of the site, projecting in a southwestern direction from the northern most site boundary (**M2**). Although it is impossible to ascertain the original date of this anomaly without further supporting evidence, it is possible it is either a drainage ditch or early boundary ditch. It is in the same approximate orientation of the ridge and furrow and may date to a similar period.

5.3.3. A dual positive anomaly, most likely a modern trackway is present at the eastern edge of the survey extent (**M3**).

5.3.4. A large, dipolar anomaly with internal divisions is present just north of the known gas main and fence boundary (**M4**). Although it can not currently be

correlated to the location of known modern features, this anomaly is presumed to be of modern origin possibly relating to the gas main installation immediately to the south.

5.3.5. A distinct alternating dipolar response is seen in the location of a known high pressure gas main which runs across the site (**M5**). This gas main runs along the southern edge of the northern area of site and along the eastern edge of the site within the southern area towards Havant road. This gas main produced the high and low maximum readings (nT) within the survey, typical of modern pipes constructed of ferrous materials such as iron, and likely obstructed any ephemeral features that may have been present in its vicinity.

5.3.6. A dipolar anomaly is present just north of the east-west hedgerow (**M6**), projecting towards the northeast. This anomaly may be related to the well and pump which first appears on the on the 1897 Ordnance Survey map (FIGURE 9), and again on the 1932 (FIGURE 10) and 1963 (FIGURE 11) Ordnance Survey maps.

5.3.7. A dipolar anomaly is present in the northern extent of the survey area (**M7**), at the northern edge of the hedgerow. There is evidence of an iron pipe protruding from the surface in this area and is likely associated with a modern service.

5.3.8. Several dipolar anomalies such as (**M8**) are present across the site, likely due to modern ferrous surface materials.

5.4. SOUTHERN SITE AREA (FIGURE 7,8)

5.4.1. A north-south positive anomaly is present in the southern area, to the north of the modern extent of the remains of a hedgerow (**M9**). This anomaly is in the location of a presumed trackway which features on the 1932 Ordnance Survey map (FIGURE 10) as two dashed north-south lines, and indicated during the Desk Based Assessment (MADIGAN 2011).

5.4.2. Dipolar linear anomalies as well as a general area of disturbance is present just south of the east-west hedge row which divides the site (**M10**). These anomalies are in the area of the out building present on the 1963 Ordnance

Survey map (FIGURE 11), and is likely related to the former foundations of these structures.

- 5.4.3. A large area of surface debris was present in the area of (M11), which produced a series of spikes in the readings, as well as a few dipolar anomalies likely of modern origin.
- 5.4.4. A positive anomaly is present in the break in the north-south hedgerow in the southern site (M12). This is likely modern in origin, although may pertain to the previous field boundary or hedgerow.

6. Summary and Conclusions

- 6.1. A fluxgate gradiometer survey was conducted by L – P : Archaeology between the 25th - 28th of October 2011 with the aim of assessing the potential for archaeological remains within the site area and to target any future archaeological evaluation.
- 6.2. Extensive modern disturbances were detected, including a high pressure gas main, surface debris and the effects of modern dumping across the site.
- 6.3. A possible 20th century trackway identified in the 1932 Ordnance Survey map was also confirmed in the southern area, as well as the remains of a 19th century well described on the 1897, 1932, and 1963 Ordnance Survey maps. Structural remains of the small farm and out buildings were also detected.
- 6.4. A positive anomaly, resembling a ditch was identified in the northern area of the site. This feature, possibly a drainage ditch, runs in approximately the same orientation as the ridge and furrow in the eastern most part of the site. The date of the ridge and furrow is unclear from the survey results alone, however, the narrow separation between ridges suggests the ridge and furrow could have occurred post-enclosure.
- 6.5. Few archaeological features of interest were identified within the geophysical results. The presence of ridge and furrow in the northern area reinforces the notion that historically the site area was predominantly used for agricultural purposes.

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- MADIGAN K, 2011. *Archaeological Desk Based Assessment at Havant Road, Warblington*. Unpublished archive report: L – P : Archaeology.
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CARTOGRAPHIC AND PICTORIAL

- ORDNANCE SURVEY 1897
- ORDNANCE SURVEY 1932
- ORDNANCE SURVEY 1963

STATUTORY AND GUIDANCE

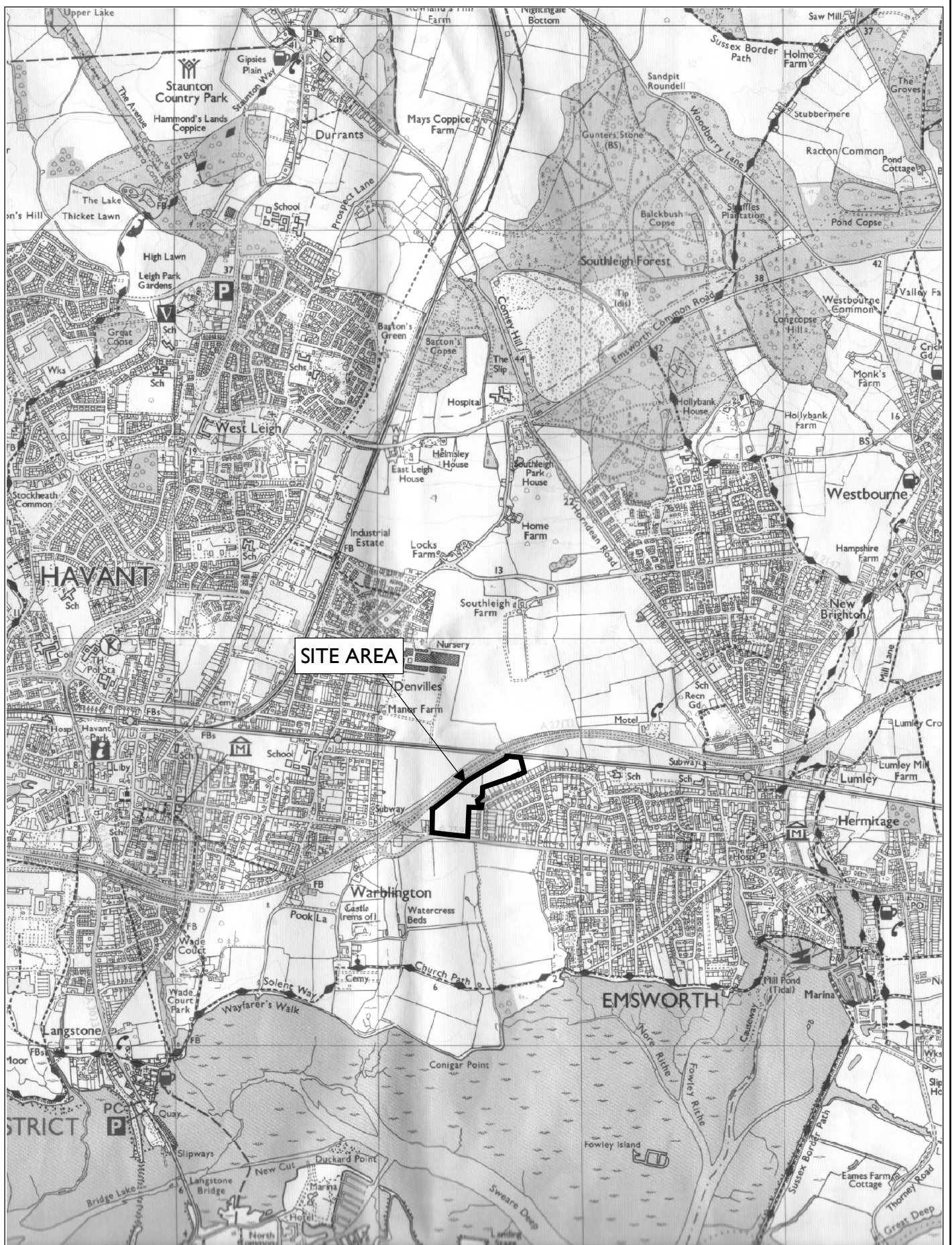
- GEOPHYSICAL SURVEY IN ARCHAEOLOGICAL FIELD EVALUATION English Heritage 2008
- STANDARD AND GUIDANCE FOR ARCHAEOLOGICAL GEOPHYSICAL SURVEY Institute for Archaeologists DRAFT 2010

ELECTRONIC

- KIRKHAM LANDSCAPE PLANNING CONSULTANTS, WESSEX ARCHAEOLOGY, COUNTRYSIDE, 2006. *Havant Borough Landscape Character Assessment*. Havant Borough Council: <http://www.havant.gov.uk/havant-7364>.

FIGURES

FIGURE I // Site Location General



A4 Scale 1:25,000

0 1 km

PROJECT // I211L - Havant Road, Warblington

DESCRIPTION // Site general location map

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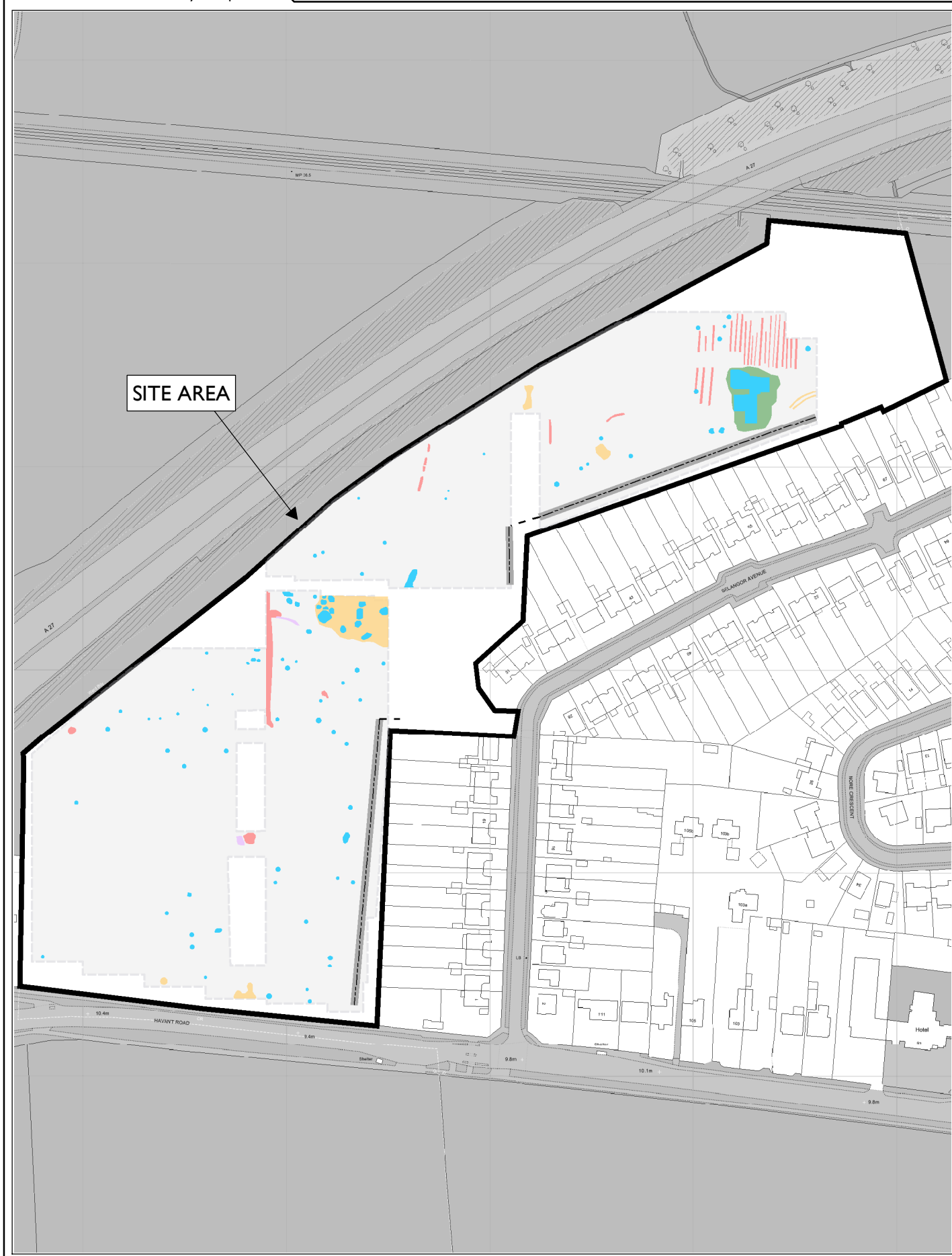
The map displays a proposed development site, outlined in a thick black line. The site is situated adjacent to a railway line (A27) running diagonally across the upper left. To the south of the site is Havant Road, which features a bus stop and a 'Station' label. To the east of the site is Slingsor Avenue, a residential street with numerous numbered plots. A 'Hotel' is located at the bottom right of the map. The site area itself is currently undeveloped, showing only some vegetation and a small existing building. A callout box with the text 'SITE AREA' and an arrow points to the black-outlined boundary. Various dimensions and labels are present throughout the map, including '10.4m', '9.4m', '9.8m', '10.1m', '9.8m', '111', '109', '103a', '103', '100a', '100b', '100c', '100d', '100e', '100f', '100g', '100h', '100i', '100j', '100k', '100l', '100m', '100n', '100o', '100p', '100q', '100r', '100s', '100t', '100u', '100v', '100w', '100x', '100y', '100z', '100aa', '100ab', '100ac', '100ad', '100ae', '100af', '100ag', '100ah', '100ai', '100aj', '100ak', '100al', '100am', '100an', '100ao', '100ap', '100aq', '100ar', '100as', '100at', '100au', '100av', '100aw', '100ax', '100ay', '100az', '100ba', '100bb', '100bc', '100bd', '100be', '100bf', '100bg', '100bh', '100bi', '100bj', '100bk', '100bl', '100bm', '100bn', '100bo', '100bp', '100bq', '100br', '100bs', '100bt', '100bu', '100bv', '100bw', '100bx', '100by', '100bz', '100ca', '100cb', '100cc', '100cd', '100ce', '100cf', '100cg', '100ch', '100ci', '100cj', '100ck', '100cl', '100cm', '100cn', '100co', '100cp', '100cq', '100cr', '100cs', '100ct', 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'100lj', '100lk', '100ll', '100lm', '100ln', '100lo', '100lp', '100lq', '100lr', '100ls', '100lt', '100lu', '100lv', '100lw', '100lx', '100ly', '100lz', '100ma', '100mb', '100mc', '100md', '100me', '100mf', '100mg', '100mh', '100mi', '100mj', '100mk', '100ml', '100mm', '100mn', '100mo', '100mp', '100mq', '100mr', '100ms', '100mt', '100mu', '100mv', '100mw', '100mx', '100my', '100mz', '100na', '100nb', '100nc', '100nd', '100ne', '100nf', '100ng', '100nh', '100ni', '100nj', '100nk', '100nl', '100nm', '100nn', '100no', '100np', '100nq', '100nr', '100ns', '100nt', '100nu', '100nv', '100nw', '100nx', '100ny', '100nz', '100oa', '100ob', '100oc', '100od', '100oe', '100of', '100og', '100oh', '100oi', '100oj', '100ok', '100ol', '100om', '100on', '100oo', '100op', '100oq', '100or', '100os', '100ot', '100ou', '100ov', '100ow', '100ox', '100oy', '100oz', '100pa', '100pb', '100pc', '100pd', '100pe', '100pf', '100pg', '100ph', '100pi', '100pj', '100pk', '100pl', '100pm', '100pn', '100po', '100pp', 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FIGURE 3 // Overview of Survey Results



FIGURE 4 // Overview of Survey Interpretation



survey extent

gas main

projected gas main

0

Interpretation:

dipolar

disturbance

100m

modern

negative

positive

A4 Scale 1:2,500

PROJECT // I211L - Havant Road, Warblington

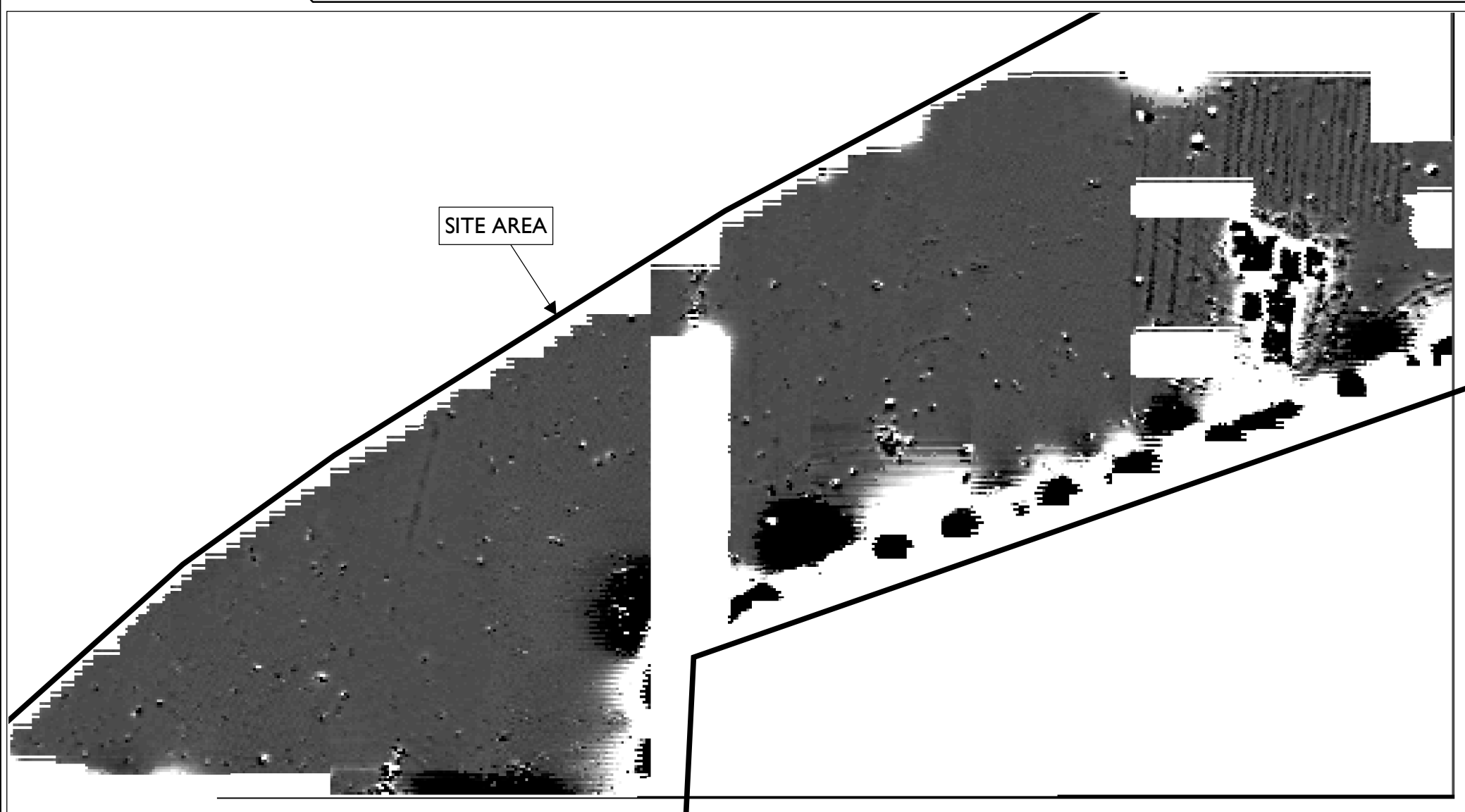
DESCRIPTION // Overview of fluxgate gradiometer interpretation

Map data generated by Groundsure Ltd License No 10001511162

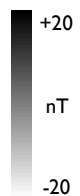
DOC REF: LP1211L-GSR-v1

L-P:ARCHAEOLOGY

FIGURE 5 // Northern Area Results



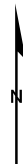
A4 Scale 1:1,000



-3SD Mean +3SD

0

50m



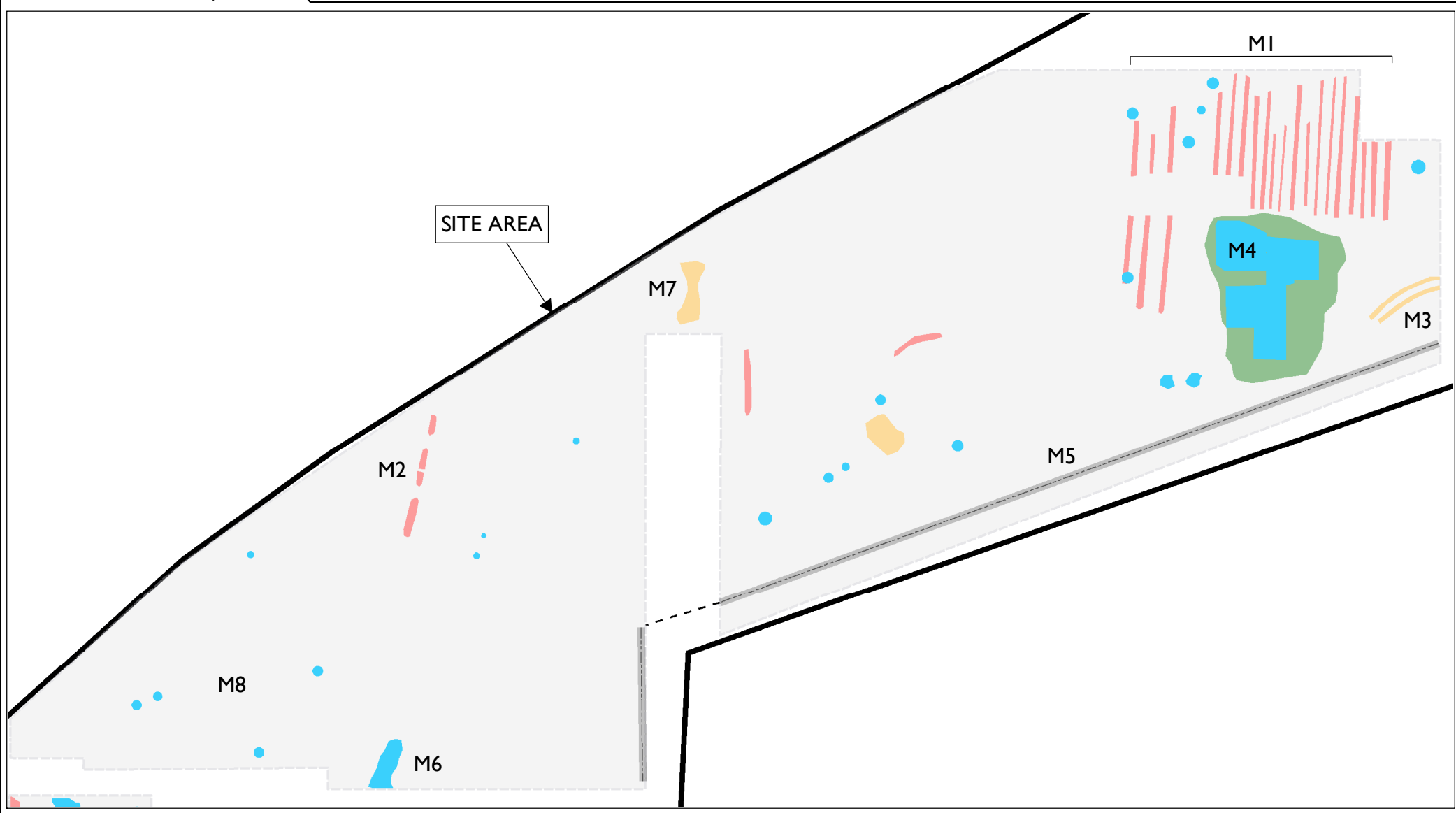
PROJECT // I211L- Havant Road, Warblington

DESCRIPTION // Northern area results of a fluxgate gradiometer survey

DOC REF: LP1211L-GSR-v1

L-P:ARCHAEOLOGY

FIGURE 6 // Northern Area Interpretation



A4 Scale 1:1,000

survey extent

gas main

projected gas main

Interpretation:

dipolar

disturbance

modern

negative

positive

PROJECT // I211L- Havant Road, Warblington

DESCRIPTION // Northern area interpretation of fluxgate gradiometer survey

DOC REF: LPI211L-GSR-v1

L-P:ARCHAEOLOGY

FIGURE 7 // Southern Area Results

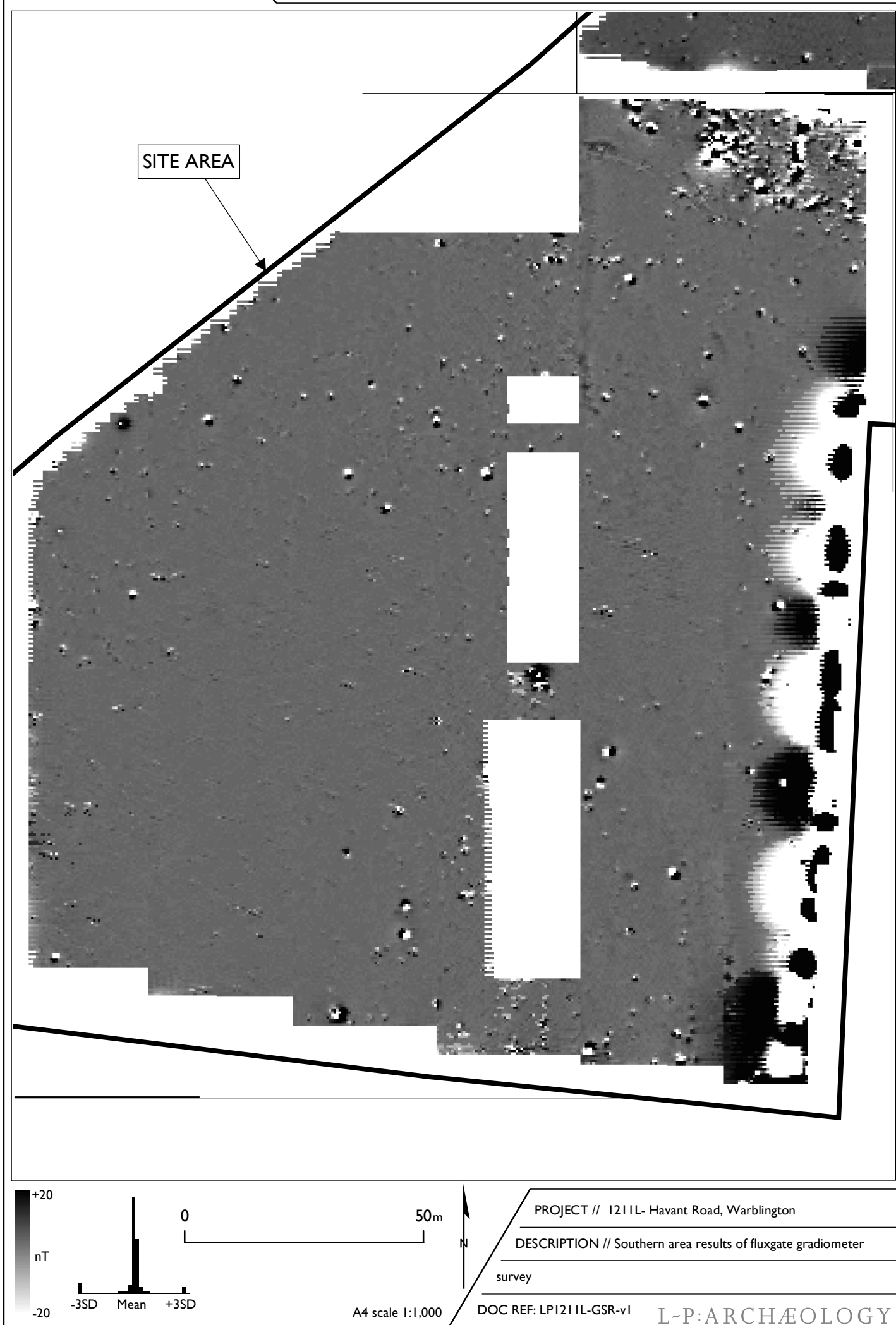
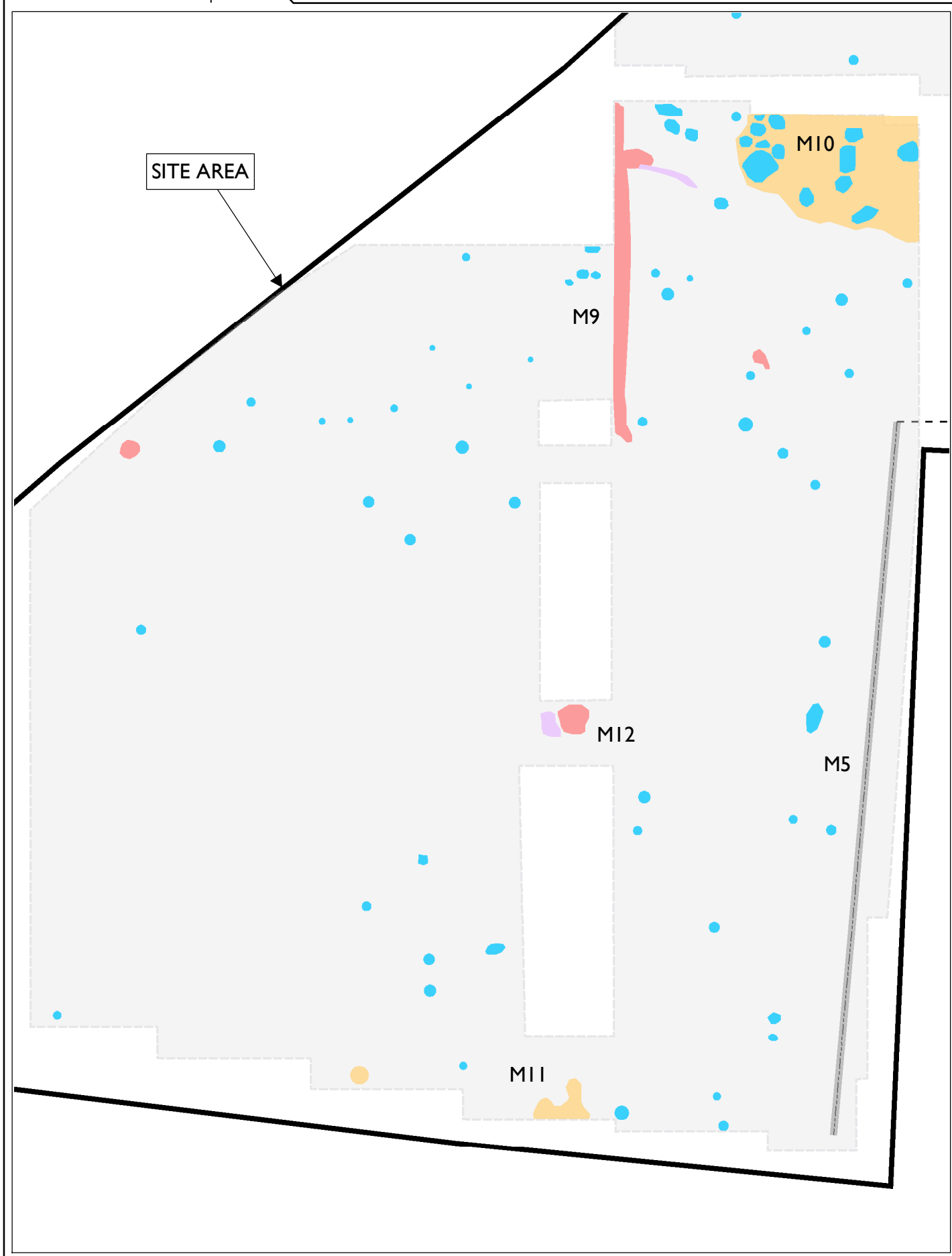
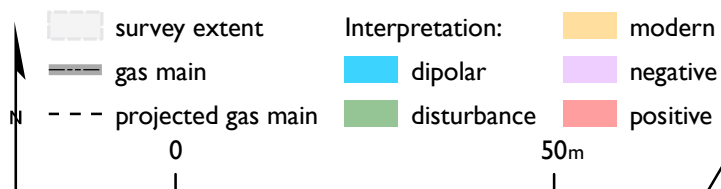


FIGURE 8 // Southern Area Interpretation



A4 scale 1:1,000



PROJECT // I211L- Havant Road, Warblington

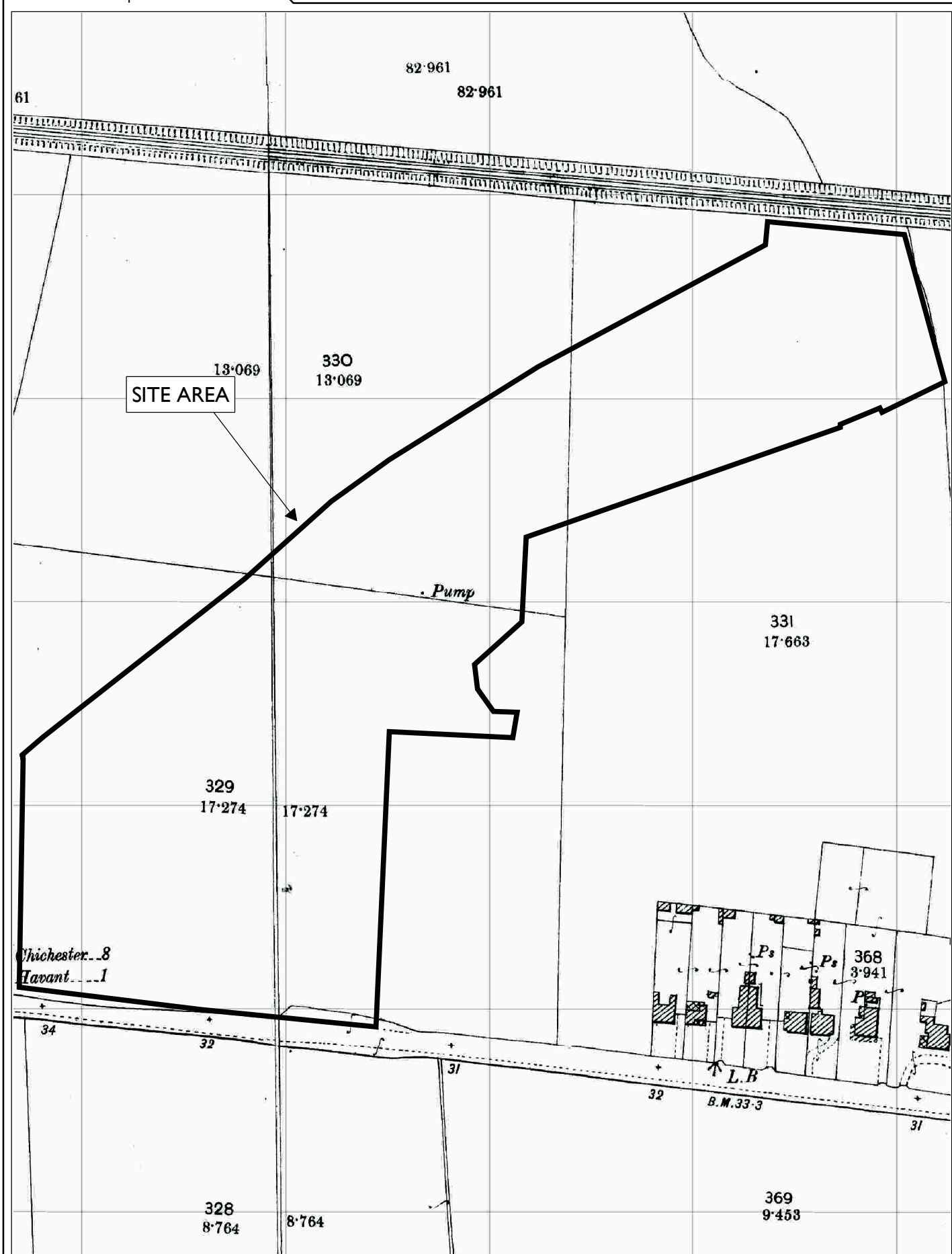
DESCRIPTION // Southern area interpretation of fluxgate gradiometer

survey results

DOC REF: LP1211L-GSR-v1

L~P:ARCHAEOLOGY

FIGURE 9 // OS Map 1897



A4 Scale 1:2,500

0 100m



PROJECT // I211L - Havant Road, Warblington

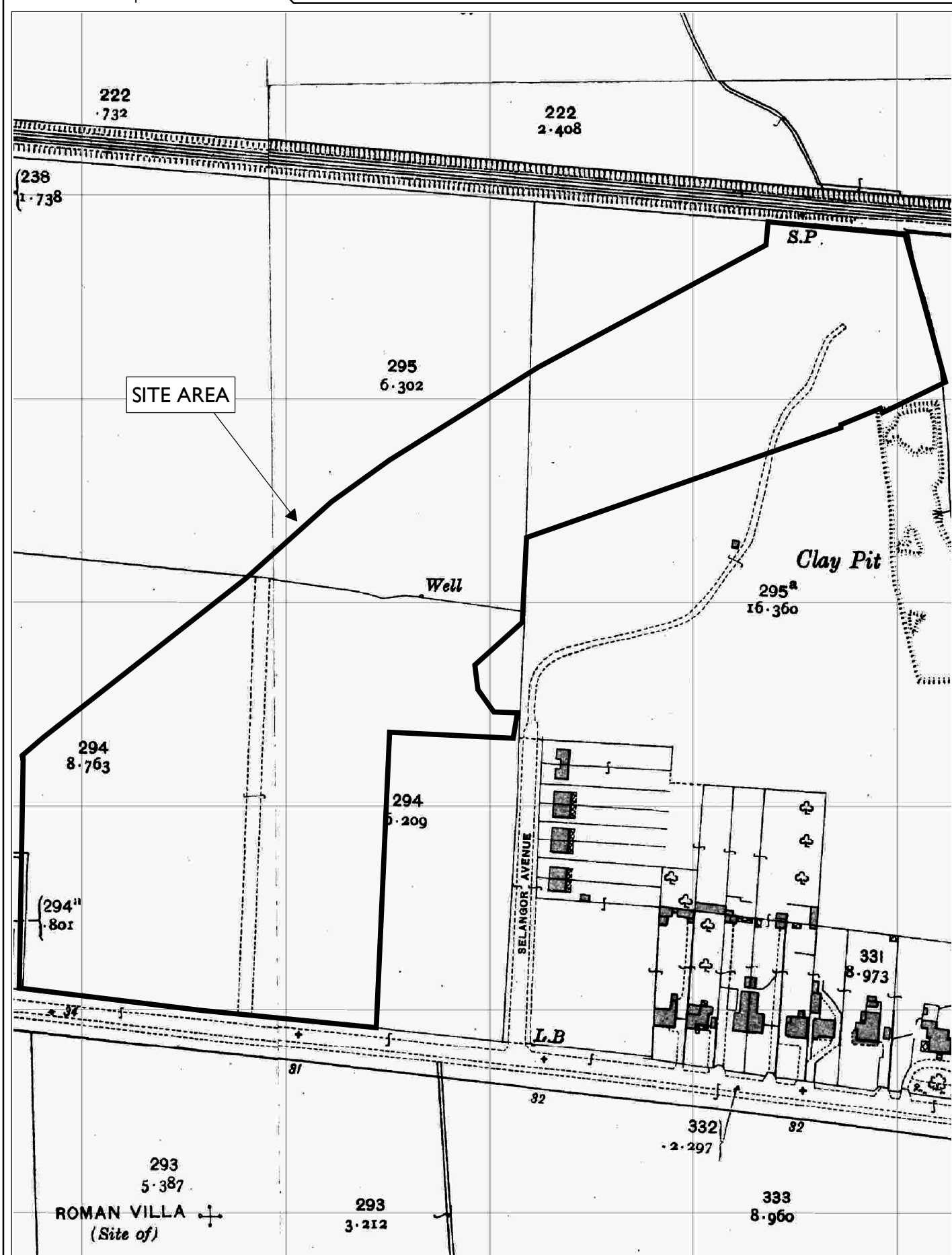
DESCRIPTION // Ordnance Survey map - 1897

Map data generated by Groundsure Ltd License No 10001511162

DOC REF: LP1211L-GSR-v1

L-P:ARCHAEOLOGY

FIGURE 10 // OS Map 1932



A4 Scale 1:2,500

0 100m

PROJECT // I211L - Havant Road, Warblington

DESCRIPTION // Ordnance Survey map - 1932

Map data generated by Groundsure Ltd License No 10001511162

DOC REF: LP1211L-GSR-v1

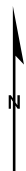
L-P:ARCHAEOLOGY

FIGURE 11 // OS Map 1963



A4 Scale 1:2,500

0 100m



PROJECT // I211L - Havant Road, Warblington

DESCRIPTION // Ordnance Survey map - 1963

Map data generated by Groundsure Ltd License No 10001511162

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