

GEOPHYSICAL SURVEY OF LAND AT GARA BARTON, DEVON



GEOPHYSICAL SURVEY REPORT
CP. No: CP10323
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Quality Assurance

This report covers works as outlined in the brief for the above-named project as issued by the relevant authority, and as outlined in the agreed programme of works. Any deviation to the programme of works has been agreed by all parties. The works have been carried out according to the guidelines set out in the Institute for Archaeologists (IfA) Standards, Policy Statements and Codes of Conduct. The report has been prepared in keeping with the guidance set out by WA Archaeology Ltd on the preparation of reports.

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SUMMARY

Between 28th and 30th August 2012, Wardell Armstrong Archaeology Ltd (WAA), undertook a geophysical survey of land at Gara Barton in the South Hams district of Devon, at the request of Wardell Armstrong LLP. This work was undertaken on behalf of their client Lightsource Renewable Energy Ltd, in order to provide information in support of a planning application for a proposed new solar development at the site. The site lies within an area of significant archaeological potential, which includes a number of well-preserved prehistoric earthworks.

The objective of the geophysical survey was to determine the presence/absence, nature and extent of any potential archaeological features present within the study area, and to determine any areas of potential disturbance of the archaeological resource caused by modern intrusions. The results of the project were to be used to inform the need for further evaluation work and/or mitigation measures, should potential significant archaeological remains be identified during the project.

Geomagnetic survey was undertaken over c.4.68ha in total, to cover the area of the proposed solar farm development. The survey detected a possible early field boundary at the southwest corner of the site, which is not depicted on historic maps of the site, and may therefore be medieval or post-medieval in date. The remains of possible ridge and furrow cultivation of potential medieval or post-medieval date has also been detected across the majority of the survey area. The survey also detected a number of modern features including a service pipe, possible land drains, and a modern field boundary, which had been removed to create a single larger field.

No other definite archaeological features were detected by the geophysical survey. However, there remains some uncertainty about the exact nature of a curvilinear feature, which could possibly relate to a soil-filled feature of potential archaeological significance, given the archaeological context of the area.

Other than this, the results of the geophysical survey suggest that the land has not been intensively used in the past, other than for agricultural purposes.

ACKNOWLEDGEMENTS

Wardell Armstrong Archaeology Ltd would like to thank Paul Evans, Wardell Armstrong LLP. WA Archaeology Ltd would also like to extend their thanks to Charlotte Dawson and Dave Hodgkinson, for their assistance with the project.

The geophysical surveys were undertaken by Angus Clark and Don O'Meara. The report was written and illustrated by Martin Railton. The project was also managed by Martin Railton, Project Manager for WAA Ltd.

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 Between 28th and 30th August 2012, Wardell Armstrong Archaeology Ltd (WAA), undertook a geophysical survey of land at Gara Barton in the South Hams district of Devon, at the request of Wardell Armstrong LLP. This work was undertaken on behalf of their client Lightsource Renewable Energy Ltd, in order to provide information in support of a planning application for a proposed new solar development at the site.
- 1.1.2 The study area comprised a single field of pasture to the south of Little Oaks Farm, southeast of the A381, to the south of Halwell (centred on NGR SX 776 516). The total area of the geophysical survey amounted to c.4.68ha of land, situated immediately to the south of Stanborough Reservoir and east of Stanborough Hundred (Figure 1).
- 1.1.3 The site lies in an area of significant archaeological potential, being immediately to the east of an Iron Age hillfort, known as Stanborough Camp, which is a Scheduled Ancient Monument. The earthwork remains of a smaller ringwork are located 137m to the northeast. The remains of a round barrow cemetery, of Late Neolithic to Bronze Age date, known as Ritson Barrows are also present to the north of the site. This site is also a Scheduled Ancient Monument and consists of at least 11 barrows, several retaining their encircling ditch despite past ploughing.
- 1.1.4 The objective of the geophysical survey was to determine the presence/absence, nature and extent of any potential archaeological features present within the study area, and to determine any areas of potential disturbance of the archaeological resource caused by modern intrusions. The results of the project were to be used to inform the need for further evaluation work and/or mitigation measures, should potential significant archaeological remains be identified during the project.

2 METHODOLOGY

2.1 PROJECT DESIGN

- 2.1.1 A project design was produced by Wardell Armstrong Archaeology Ltd in response to a request by Wardell Armstrong LLP, for a geophysical survey of the study area (Railton 2012). Following this, Wardell Armstrong Archaeology Ltd was commissioned by the client to undertake the work. The project design was adhered to in full, and the work was consistent with the relevant standards and procedures set out in the standard and guidance of the Institute for Archaeologists (IfA 2011), and English Heritage Guidelines (English Heritage 2008).
- 2.1.2 The fieldwork programme was followed by an assessment of the data as set out in the *Management of Archaeological Projects* (English Heritage 1991) and *Management of Research Projects in the Historic Environment* (English Heritage 2006).

2.2 GEOPHYSICAL SURVEY

- 2.2.1 **Technique Selection:** geomagnetic survey was selected as the most appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. The technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of sub-surface archaeological features. Data were recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.
- 2.2.2 **Field Methods:** the geophysical study area measured c.4.68ha in total and comprised a single field of pasture at the time of the survey. A 30m grid was established across this area, and tied-in to known Ordnance Survey points using a Trimble 3605DR Geodimeter total station with datalogger.
- 2.2.3 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m would be detected using this arrangement. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 30m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 3600 sample measurements per grid unit. The data were downloaded on site into a laptop computer for processing and storage.

2.2.4 Data Processing: geophysical survey data were processed using ArchaeoSurveyor II software, which was used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies are displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar shows the relationship between the grey shades and geomagnetic values in nT.

2.2.5 Raw data were processed in order to further define and highlight the archaeological features detected. The following basic data processing functions were used:

Despike: to locate and suppress random iron spikes in the gradiometer data.

Clip: to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data.

Destagger: to reduce the effect of staggered gradiometer data, sometimes caused by difficult working conditions, topography, or operator error.

Interpolate: to match the traverse and sample intervals in the gradiometer data.

2.2.6 Interpretation: three types of geophysical anomaly were detected in the gradiometer data:

positive magnetic: regions of anomalously high or positive magnetic data, which may be associated with the presence of high magnetic susceptibility soil-filled features, such as pits or ditches.

negative magnetic: regions of anomalously low or negative magnetic data, which may be associated with the presence of low magnetic susceptibility stone-built features, or voids.

dipolar magnetic: regions of paired positive and negative magnetic anomalies, which typically reflect ferrous or fired materials, including fired/ferrous debris in the topsoil, modern services, metallic structures, or fired structures, such as kilns or hearths.

2.2.7 Presentation: the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey plan. A colour-coded geophysical interpretation diagram is provided, showing the locations and extent of positive, negative and dipolar geomagnetic anomalies.

2.2.8 An archaeological interpretation diagram is provided, which is based on the interpretation of the geophysical survey results, in light of the archaeological and historical background of the site.

2.2.9 Trace plots of the unprocessed geophysical data are available if required.

2.3 ARCHIVE

2.3.1 The data archive for the geophysical survey has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2001). This archive is currently held at the company offices at Carlisle, Cumbria.

2.3.2 One copy of the final report will be deposited with the County Historic Environment Record, where viewing will be available on request. The project is also registered with the **Online Access to the Index of archaeological investigationS (OASIS)**, where a digital copy of the report will be made available.

2.3.3 The OASIS reference for this project is wardella2-133465.

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

- 3.1.1 The proposed development area lies within the modern parish of Halwell and Moreleigh, is located approximately 1.25km south of the town of Halwell. The site sits in the catchment area of the River Avon amongst the undulating landscape of the various tributaries of this river. The study area comprised a single field of pasture to the south of Little Oaks Farm, southeast of the A381, centred on NGR SX 776 516 (Figures 1 & 2). A covered reservoir and an antennae station lie immediately to the north of the site.
- 3.1.2 The sites high point is approximately 215m Above Ordnance Datum (AOD) at the northern corner. From here the land falls gradually to the south to a low point of 206m AOD along the site's southern boundary.
- 3.1.3 The bedrock geology consists of Staddon Formation sandstone, siltstone and mudstone, formed approximately 391 to 400 million years ago in the Devonian Period. Superficial geology comprises alluvial sediments of clay, silts, sand and gravel, deposited within the Quaternary Period in a river dominated environment.

3.2 HISTORICAL CONTEXT

- 3.2.1 **Introduction:** an Archaeology and Cultural Heritage Assessment of the site has been undertaken by Wardell Armstrong LLP, a summary of which is provided below (Wardell Armstrong 2012). Baseline information was gathered from the Historic Environment Record (HER) held by Cornwall County Council and the Cornwall Record Office.
- 3.2.2 **Prehistoric (up to c.700 BP):** The site lies within a landscape with significant evidence for prehistoric activity. To the north and northeast funerary remains in the form of Bowl Barrows are known in three distinct areas. Stanborough Camp Bowl Barrow (HER 33746, located 130m to the west) and the Ritson Barrows Cemetery (HER 33767, located 215m to the north) both occupy prominent high points at c.210m AOD. The same is true of Halwell Camp Barrows (HER 33745, located 1.5km to the northeast) and the Bickleigh Brake Barrows (HER 33747, located 1.8km to the northeast).
- 3.2.4 **Iron Age and Romano British (c.700 BP - 5th century):** The continued occupation of the landscape is known from extant earthworks at Stanborough Camp hillfort (HER 33746) 130m to the west of the site, and

Halwell Camp hillfort (HER 33745) situated 1.5km northeast. In both cases these remains are found in close association with the barrows from the preceding period. Their locations may be due to various factors, including topography, since the sites sit at prominent locations with wide views of the landscape. Both sites are further connected by known ridge-ways whose origins may reach back to the Prehistoric period (Slater 1991).

- 3.2.5 No known Roman sites are known in the vicinity of the study area.
- 3.2.6 *Early Medieval (5th century – mid 11th century)*: Halwell is known to have been the seat of a Anglo-Saxon *burh* of the same name, a precursor to the later medieval parish of Halwell, and the post-Medieval parish of Halwell and Moreleigh. Established during the reign of Alfred the Great (849-899AD), its boundaries enclosed both the earthworks at Halwell and Stanborough (Slater 1991).
- 3.2.7 The ringworks, situated 100m north of the site (HER 33751), are believed to be medieval fortifications, built and occupied from the late Anglo-Saxon period. Ringworks acted as strongholds for military operations, and in some cases, as defended aristocratic or manorial settlements.
- 3.2.8 The place name Halwell is derived from ‘hālig’, the Old English for holy, sacred or dedicated to sacred use, and ‘wella’, Anglian for spring or stream (Gover et al 1965, Watts 2004). The springs are self-evident to the east of the village. Both elements of the name Stanborough come from Old English, being ‘stān’ for stone or rock, and ‘burh’, meaning a fortified place. As mentioned above, this area was part of the burh of Halwell. The stone element is most likely associated with the presence of the earlier prehistoric remains.
- 3.2.8 *Medieval (mid 11th century - 16th century)*: following the Norman conquest, the ringworks to the north of the site continued to be used as the setting for a Motte castle (HER 33751). These medieval fortifications were introduced into Britain by the Normans, and were occupied for only a short period of time. This example is believed to fallen out of use in the 12th century.
- 3.2.9 The landscape around the site would also have continued to develop during the medieval period. Halwell (with its early medieval origins) was at this point eclipsed in power by Totnes, believed to be better suited for trade and commerce (Slater 1991). The settlement of Clerkeston, situated 790m to the southeast (modern Lower and Higher Clifton) is first mentioned in 1311.
- 3.2.9 *Post-medieval (16th century – 19th century)* the dissolution of the monasteries (1536-1541) traditionally marks the start of the post-medieval

period. From c.1540 there was a step-change in the rate of exploitation of natural resources leading to radical changes to the landscape (Webster 2008).

3.2.10 Benjamin Donn's 1765 Map of the County of Devon shows Holwell (Halwell) and Clyston (Cliston), and the roads between the two of them. These roads are believed to follow earlier ridgeways (Wardell Armstrong 2012).

3.2.11 The 1839 Tithe map and apportionment provides the first available account of the site, and shows that the proposed development area comprised a single field under the ownership of the Earl of Devon (*ibid*). The northern boundary of the proposed development is somewhat irregular on this map, with a curving shape, which may possibly respect an earlier topographic feature at the site (Plate 1). However, the accuracy of the map is uncertain.



Plate 1: The 1839 Tithe Map, showing an irregular northern field boundary

3.2.12 The 1st Edition Ordnance Survey map for this area was not available at the time of the Cultural Heritage Assessment. However, the 2nd Edition (1906) Ordnance Survey map shows the same field arrangement as the previous tithe map. The detailing on this edition shows the ground cover as being rough pasture or heath (frontispiece).

3.2.13 The area around the proposed development area was utilised during the Second World War. This period saw the placement of bombing decoys and searchlight batteries on nearby ridges and highpoints (Wardell Armstrong 2012).

3.2.14 The post-war years saw no change in the size or form of the field. However, during the last ten years the site was split into two separate

fields, as a field boundary is shown subdividing the proposed development area on modern maps, aligned north to south.

3.3 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

- 3.3.1 No previous investigations have taken place within the proposed development area. However, a watching brief was undertaken in 2007 during the construction of a driveway at Stanborough Hundred house, approximately 450 west of the site. Depths of between 0.2m and 0.3m of topsoil were removed along the route with the underlying subsoil only occasionally exposed. No archaeological features were exposed, and no finds were recovered (Steinmetzer 2007).
- 3.3.2 In 2010 archaeological monitoring took place on land at Stanborough Farm, approximately 750m northwest of the site, in advance of the construction of agricultural buildings. An area of approximately 80m by 70m was stripped of topsoil and subsoil revealing two small undated pits, a linear spread of quartz gravel, four patches of burning and two substantial linear features. These features crossed the site northwest to southeast, and probably represent an earlier field boundary, cut by a later holloway. Neither could be dated, but probably predated the current historic landscape and may relate to prehistoric or early medieval activities in and around Stanborough Camp hillfort (Green et al 2010).

4 THE GEOPHYSICAL SURVEY

4.1 INTRODUCTION (FIGURES 1 & 2)

- 4.1.1 The geophysical survey was undertaken between 28th and 30th August 2012. Geomagnetic survey was undertaken over the majority of the study area which measured c.4.68ha in total (Figure 2). At the time of the survey the proposed development area comprised a single arable field.
- 4.1.2 Stanborough reservoir (covered) and an antennae station were immediately to the north of the survey area, with minor roads bounding the site to the east and west, and further agricultural fields to the south, bounded by mature hedge rows. The boundary with the antenna station comprised a chain-link fence, which produced strong dipolar magnetic anomalies along the northern edge of the survey area, and was therefore given a wide berth during the survey.
- 4.1.3 A number of small discrete dipolar magnetic anomalies were detected across the whole of the study area. These are almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.
- 4.1.4 A telegraph pole and manhole cover were present at the centre of the proposed development area, both of which produced strong dipolar magnetic anomalies in the gradiometer data.

4.2 GEOPHYSICAL SURVEY (FIGURES 3-6)

- 4.2.1 A series of very irregular diffuse magnetic anomalies were detected over the southern part of the survey area, producing a 'mottled' effect on the grey scale plots. This area coincided with an area of lower ground and may be due to a change in the geology or soil conditions at the site.
- 4.2.2 A very strong linear dipolar magnetic anomaly was detected crossing the east end of the survey area, aligned northwest to southeast, leading towards the Stanborough Reservoir. This was almost certainly due to the presence of a service pipe for the reservoir or the adjacent antenna station.
- 4.2.3 A linear concentration of small dipolar magnetic anomalies was also detected crossing the east side of the survey area, aligned north to south. These anomalies coincided with the location of a modern field boundary, which has since been removed, and are likely to represent fired or ferrous material which has collected along the former boundary, or material pertaining to a former fence line.

- 4.2.4 A linear negative magnetic anomaly was detected on the western edge of the survey area, which is likely to represent a land drain, or the limit of ploughing. Another negative magnetic anomaly was detected crossing the central part of the survey area, aligned northeast to southwest, which is also interpreted as a land drain.
- 4.2.5 A series of weak linear positive and negative magnetic anomalies were detected crossing the majority of the survey area, aligned northeast to southwest and northwest to southeast, which are interpreted as evidence for former plough regimes. These anomalies were spaced on average between 5m and 8m apart, and may represent the remains of ridge and furrow cultivation of possible medieval or post-medieval date.
- 4.2.6 A positive magnetic anomaly, with corresponding negative magnetic anomalies, was detected at the southwest corner of the survey area, aligned approximately east to west. This may represent part of a former field boundary.
- 4.2.7 A very weak curvilinear positive magnetic anomaly and corresponding negative anomaly were detected at the centre of the survey area, forming an arc with a radius of c.45m. The nature of the anomaly is uncertain. It is possible that the positive anomaly represents a ploughed-out ditch or other soil-filled feature. However, it is also possible that the anomaly is due to soil conditions or the underlying geology, being very indistinct.

4.3 DISCUSSION

- 4.3.1 The survey has detected a possible early field boundary at the southwest corner of the site, which is not depicted on historic maps of the site, and may therefore be medieval or post-medieval in date. Evidence for the possible remnants of medieval or post-medieval ridge and furrow cultivation has also been detected.
- 4.3.2 No other definite archaeological features have been revealed by the geophysical survey. However, there remains some uncertainty about the exact nature of the curvilinear feature detected, which could possibly relate to a soil-filled feature of potential archaeological significance, given the archaeological context of the area, which includes a number of circular earthworks. When viewed with respect to the curved northern boundary of the proposed development area, as depicted on the 1839 To the Map (see Figure 1), this feature might potentially represent the southern half of a sub-circular enclosure. The excavation of a small number of archaeological trial trenches could clarify this.

5 CONCLUSIONS

5.1 CONCLUSIONS

- 5.1.1 Geomagnetic survey covering c.4.68ha of land has been conducted within a field to the south of Halwell, covering the proposed location of a proposed solar development. The site lies within an area of significant archaeological potential, which includes a number of well-preserved prehistoric earthworks.
- 5.1.2 A number of modern features were detected, including a service pipe, and possible land drains. The survey also detected a modern field boundary, which has since been removed to create a single larger field.
- 5.1.3 The geophysical survey also detected a possible early field boundary at the southwest corner of the site, which is not depicted on historic maps of the site, and may therefore be medieval or post-medieval in date. The remains of possible ridge and furrow cultivation of potential medieval or post-medieval date has also been detected across the majority of the survey area.
- 5.1.4 No other definite archaeological features have been revealed by the geophysical survey, although a weak curvilinear feature was detected which could potentially be of some archaeological significance. It is feasible that this represents the denuded soil-filled ditch of a former enclosure. However it is also possible that this is a geological or topographic feature.
- 5.1.5 The results of the geophysical survey would suggest that the land has not been intensively used in the past, other than for agricultural purposes.

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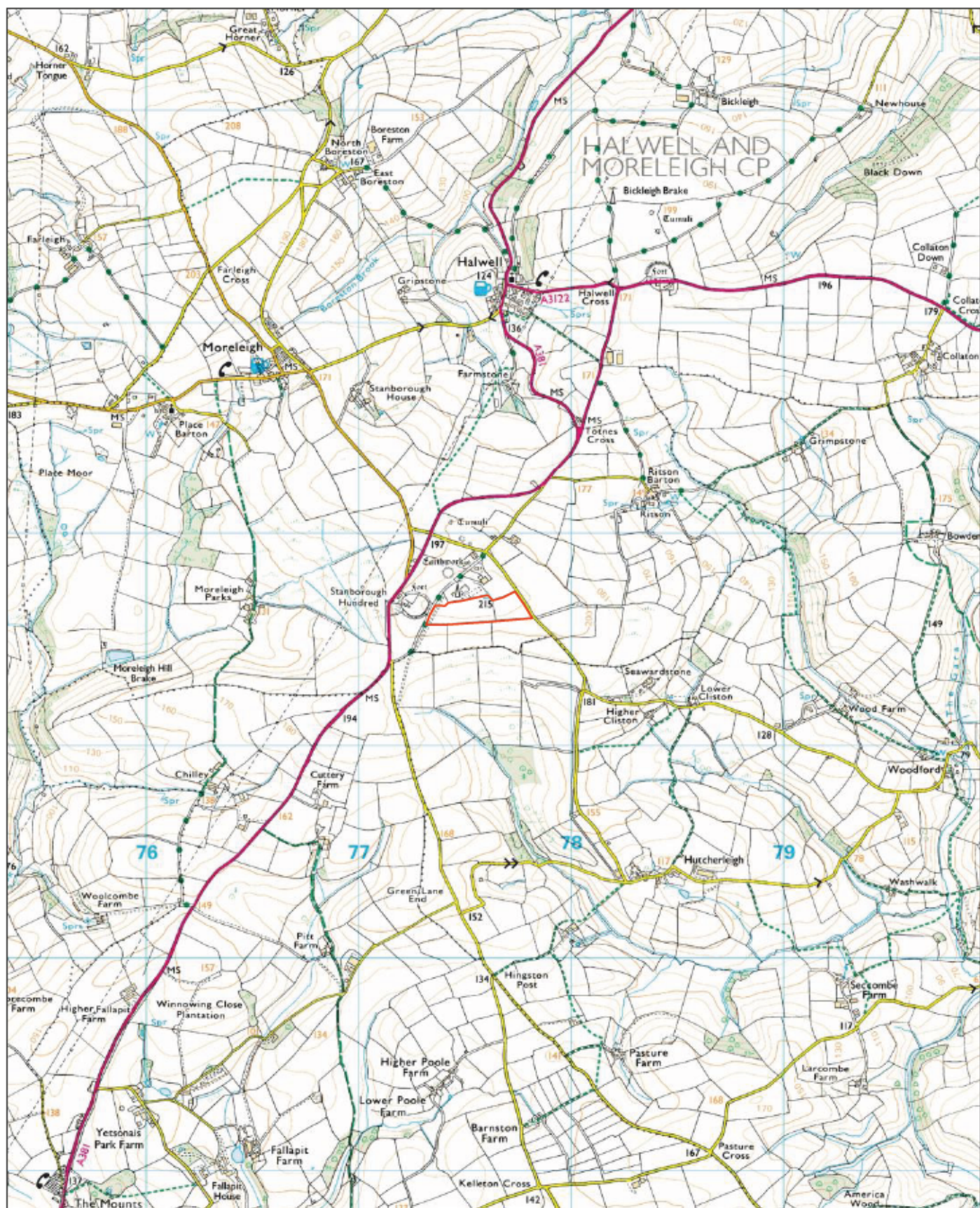
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APPENDIX 1: FIGURES



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2012

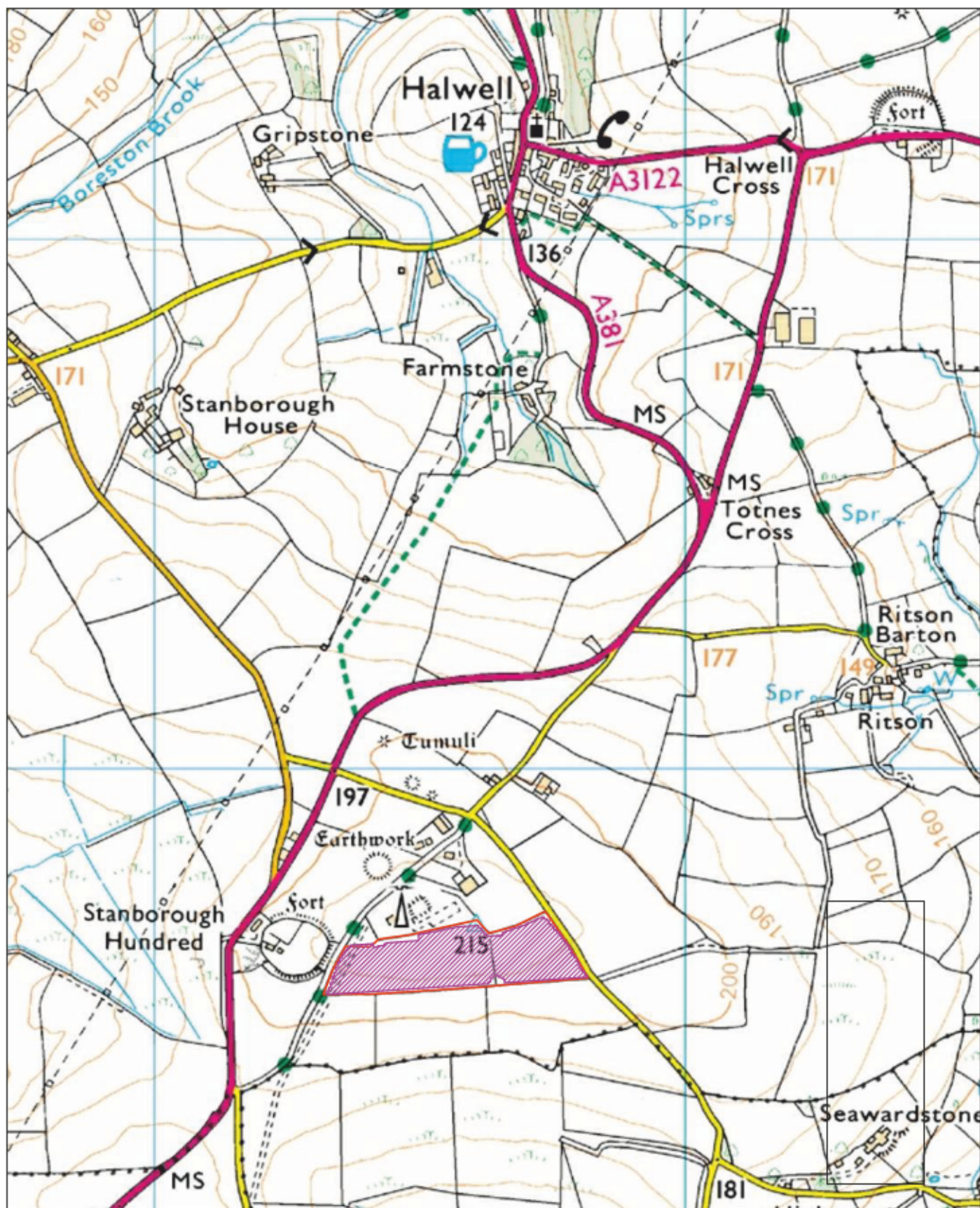
PROJECT: Gara Barton, Devon
SCALE: 1:25,000 at A4
REPORT No: CP 10323
CLIENT: Wardell Armstrong LLP
DRAWN BY: MDR
DATE: September 2012
FIGURE No: 1

 outline of proposed development area




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Figure 1 : Location map



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PROJECT: Gara Barton, Devon
SCALE: 1:10,000 at A4
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FIGURE No: 2

 outline of proposed development area
 geophysical survey area



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Figure 2 : Location of the geophysical survey area

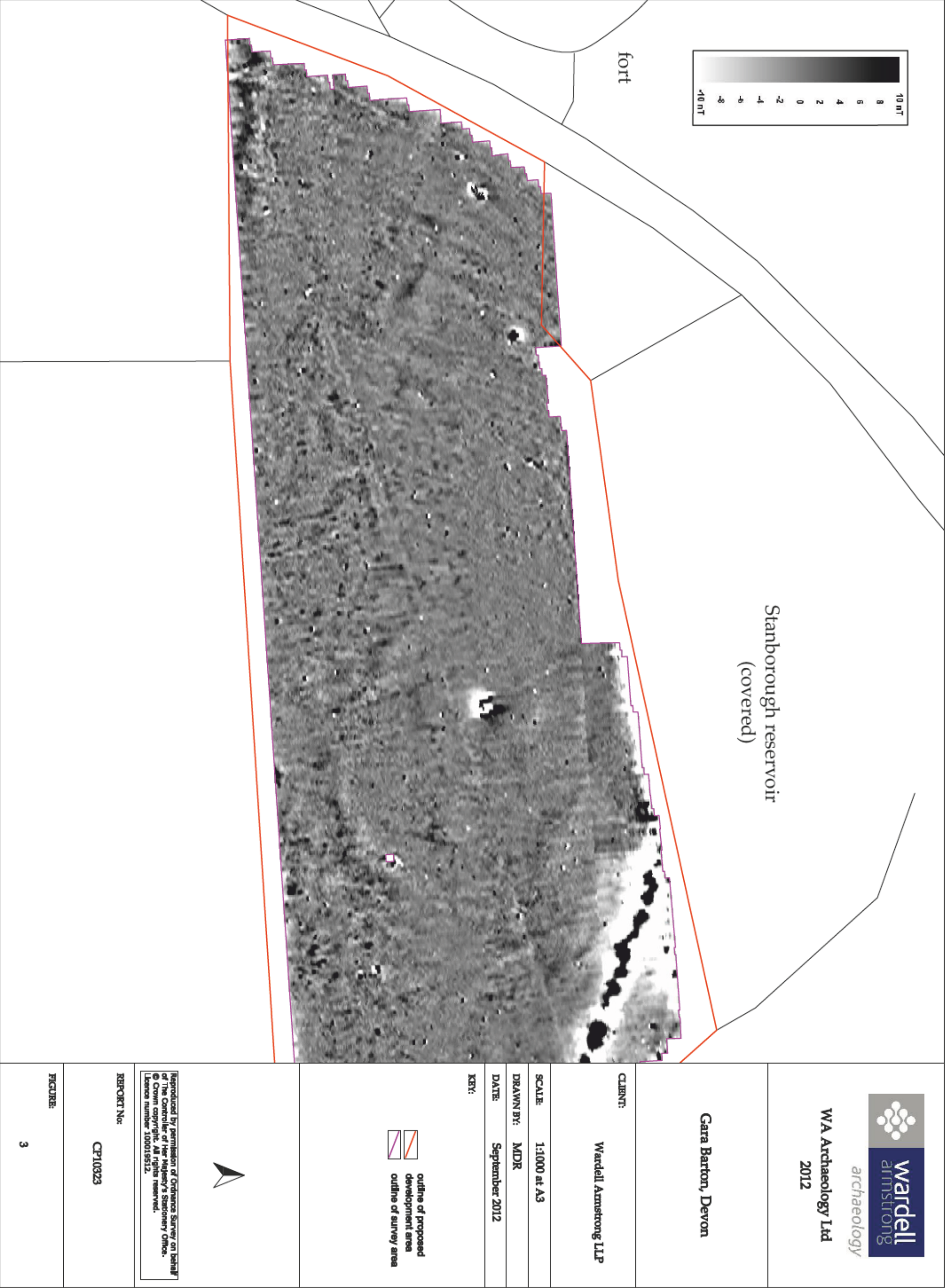


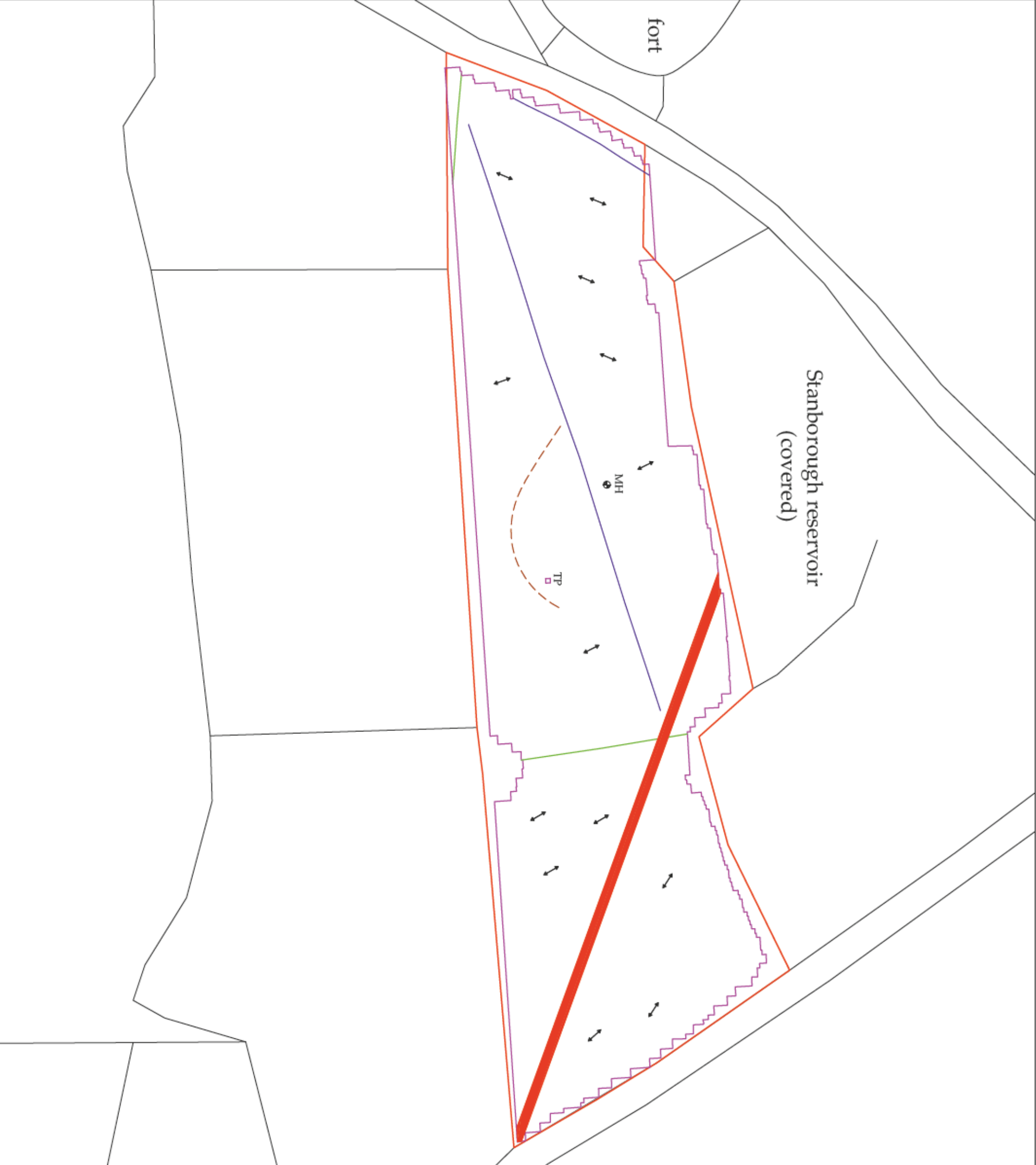
Figure 3 : Geophysical survey (west end)



Figure 4 : Geophysical survey (east end)



Figure 5 : Geophysical interpretation



WA Archaeology Ltd
2012

Gara Barton, Devon









CLIENT: Wardell Armstrong LLP

SCALE: 1:1000 at A3

DRAWN BY: MDR

DATE: September 2012

KEY:

-  outline of proposed development area
-  outline of survey area
-  possible land drain
-  direction of ploughing
-  former field boundary
-  possible soil-filled feature
-  service pipe
-  manhole cover



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FIGURE:

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Figure 6 : Archaeological interpretation