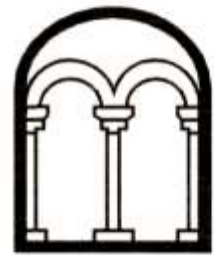


LAND AT BENDISH LANE
WHITWELL
HERTFORDSHIRE

ARCHAEOLOGICAL FIELD EVALUATION

Albion
archaeology



**LAND AT BENDISH LANE
WHITWELL
HERTFORDSHIRE**

ARCHAEOLOGICAL FIELD EVALUATION

Project: BLW2831
OASIS ref.: albionar1-240873

Document: 2016/61
Version 1.1

| Compiled by | Checked by | Approved by |
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20th February 2018

Prepared for:
Archaeological Risk Management

On behalf of
Pigeon Land Ltd



Contents

| | |
|---|-----------|
| 1. INTRODUCTION | 4 |
| 1.1 Project Background | 4 |
| 1.2 Site Location and Description | 4 |
| 1.4 Project Objectives | 7 |
| 2. METHODOLOGY | 8 |
| 2.1 Methodological Standards | 8 |
| 2.2 Trial Trenching | 8 |
| 3. RESULTS | 9 |
| 3.1 Introduction | 9 |
| 3.2 Overburden and Geological Deposits | 9 |
| 3.3 Undated Ditch Terminus | 9 |
| 3.4 Post-medieval Field Boundary | 9 |
| 4. CONCLUSIONS | 10 |
| 5. BIBLIOGRAPHY | 11 |
| 6. APPENDIX 1: TRENCH TABLES | 12 |
| 7. APPENDIX 2: OASIS SUMMARY | 19 |
| 8. APPENDIX 3: HER SUMMERY SHEET | 21 |
| 9. APPENDIX 4: GEOPHYSICAL SURVEY REPORT | 22 |

Figures

Figure 1: Site location

Figure 2: Results of trial trenching

Figure 3: Selected photographs and section drawing

The figures are bound at the back of the report.



Preface

Every effort has been made in the preparation of this document to provide as complete a summary as possible within the terms of the method statement. All statements and opinions in this document are offered in good faith. Albion Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party, or for any loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in this document.

Acknowledgements

The project was commissioned by Archaeological Risk Management on behalf of Pigeon Land Ltd and monitored on behalf of the Local Planning Authority by Andy Instone (Historic Environment Advisor, Hertfordshire County Council).

The fieldwork was undertaken by Kathy Pilkinton (Archaeological Supervisor), Alan King, Mike Emra and Matt Billings (Assistant Archaeological Supervisors). This report was prepared by Kathy Pilkinton.

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Version History

| Version | Issue date | Reason for re-issue |
|---------|------------|-----------------------|
| 1.1 | 20/02/2018 | Inclusion of HER from |

Key terms

The following terms or abbreviations are used throughout this report:

| | |
|------|---|
| ARM | Archaeological Risk Management |
| CIfA | Chartered Institute for Archaeologists |
| HEA | Historic Environment Advisor for Hertfordshire County Council |
| HHER | Hertfordshire Historic Environment Record |
| PDA | Proposed development area |
| WSI | Written Scheme of Investigation |



Non-Technical Summary

A planning application (15/02555/1) is being submitted for a residential development on Land at Bendish Lane, Whitwell, Hertfordshire.

A programme of archaeological field evaluation has been carried out in support of that application.

The field evaluation comprised two stages of work: Stage 1 geophysical survey followed by Stage 2 trial trenching.

The Stage 1 geophysical survey identified no features of probable archaeological origin.

The trial trenching took place between 14th and 16th March 2016. It comprised the excavation of eighteen 1.8m-wide and 30m-long trenches.

Two trenches contained archaeological features. A ditch terminus in Trench 6 suggests the possibility of activity beyond the south-east limit of the proposed development area (PDA). However, the lack of artefactual evidence leaves the date and function of the ditch uncertain. In Trench 5 a poorly defined linear feature is indicative of a hedge line rather than a ditched boundary. A boundary in this location is shown on the 1840 Tithe map but the First Edition 25-inch OS map suggests it had been removed by 1881.

Deep colluvial deposits found across the site appear to infill a palaeochannel running roughly E-W across the centre of the PDA. This channel may be visible as a natural anomaly on the geophysical survey. Three sherds of late Bronze Age/ early Iron Age pottery were recovered from this layer. Their abraded condition suggests they are likely to be residual. No other evidence of prehistoric activity was found at the site.

The results of the trial trenching suggest that the PDA does not contain significant archaeological remains that could address regional research priorities. In archaeological terms, the potential impact of the proposed development can, therefore, be assessed as neutral.



1. INTRODUCTION

1.1 **Project Background**

A planning application (15/02555/1) is being submitted for residential development on Land at Bendish Lane, Whitwell, Hertfordshire.

A programme of archaeological field evaluation has been carried out in support of that application and in accordance with *National Planning Policy Framework – Section 12: Conserving and enhancing the historic environment* (March 2012).

The field evaluation comprised two stages of work: Stage 1 geophysical survey, followed by Stage 2 trial trenching. The scope and methodology for the works was set out in a Written Scheme of Investigation (Albion Archaeology 2016) that was approved by the Historic Environment Advisor for Hertfordshire County Council prior to commencement of the fieldwork.

1.2 **Site Location and Description**

The proposed development area (PDA) lies to the south-west of Whitwell, St Paul's Walden, North Hertfordshire, centred at TL 1788 2108. It is bounded by Bendish Lane to the north, by residential development along Bendish Lane and Horn Hill to the north-east and south-east, and by agricultural land to the west.

It comprises approximately 5.6ha of arable land of which 2.46ha is proposed as the area of built development and 0.54ha comprises two infiltration basins and an ecological pond (Figures 1 and 2).

1.3 **Archaeological and Historical Background**

The following text is taken from the desk-based Assessment of Archaeological Significance (ARM 2015) and is a review of documents and records located within a radius of approximately 1km centred on the application site that are held by the Hertfordshire Historic Environment Record (HHER) and Hertfordshire Record Office.

HHER references are given in round brackets and Listed Building references in square brackets.

1.3.1 **Prehistoric and Roman**

There is little evidence of prehistoric activity within the 1km area of search, other than a Palaeolithic (Acheulian) handaxe (MHT 9085), found at Pickering's Farm or Bendish, close to the River Mimram. It was found lying on the surface above a chalk terrace, nearly 1km to the north-west of the application site.

The only evidence of Roman activity was a find of some Roman coins (MHT 1598) in or before 1884. Although the HHER lists the finds at the centre of the application site, they have only a four-figure NGR and could, therefore, have been found anywhere within the 1km square.



1.3.2 Medieval

St Paul's Walden is first mentioned in 888 as *Waledene* (*Cartularium saxonicum*), *Waldene*, *Waldenei* (Domesday Book), and *Powles Walden* in 1558. The name is thought to mean 'Valley of the Britons or serfs' v. *weala*, *denu*. Although it lay in Hitchin Hundred, when it was given to the Abbot of St Albans in 888 it was apportioned to Cashio Hundred, which comprised all the Hertfordshire manors belonging to St Albans. It was also sometimes known as Walden Abbots.

Whitwell is first mentioned in 1278 as *Wytewelle*, *Wetewelle*, *Whitewelle* (1321), and *Whytwell Myle* (1539). It means literally 'the White Spring', possibly because of the chalk soil. It was also known as Whitwell Street, probably because of its row development along either side of High Street. It is the principal settlement within the parish of St Paul's Walden, with a small hamlet at Bendish. At the Dissolution the manor of *Waldenbury* came to Henry VIII. The manor and a watermill called *Walden Mill* or *Whytwell Mill* were seized and subsequently granted to the Dean and Chapter of St Paul's, London in 1544.

None of the HHER entries for the medieval period is directly associated with the application site. Traces of probable medieval field boundaries (MHT 17245) have been identified as cropmarks and soil marks in an area c. 500m to the north of the site, where air photographs appear to show probable plough headlands, ridge and furrow, lost boundaries and disused chalk pits.

Other HHER entries are associated with medieval buildings in the historic core of Whitwell. They include the reputed site of the medieval chapel of St Clement (MHT 16406), probably located at the top of Horn Hill but whose exact location has never been identified. It was built by the abbots of St Albans as a retreat. Documentary evidence suggests the chapel was ruinous by the mid-18th century, and had all but disappeared by the early 19th century. A late medieval open hall house with a two-storeyed north crosswing at No 64 High Street (MHT 16404), [1176962] is a Grade II Listed Building. It became a tannery in the 18th century before being divided into five cottages and in 1963 was restored as 'Moonrakers'. The Grade II Listed Eagle and Child, at No 81 High Street (MHT 30620), [1176961], is a 16th-century or earlier timber-framed house, which became an inn in 1725. The original house survives as the east crosswing.

1.3.3 Post-medieval and modern

Most of the post-medieval and modern HHER entries within the area of search lie within Whitwell Conservation Area. They include a number of Listed Buildings which are not discussed further as they are not considered relevant to the application site. The same applies to the numerous entries for Bury Farm, which lies on the boundary of the 1km area of search, well to the north-east of the application site.

Two registered parks and gardens fall partially within the area of search. To the north-east stands St Paul's Walden Bury (MHT 7338), an 18th-century formal landscape with 20th-century additions. It is Listed Grade I on the Register of Historic Parks and Gardens [GD 1047], [G 1128], and many of its garden features are Listed Grade II* and Grade II. The Bury, its associated early-18th-century country house [1307601], is Grade II* Listed and Bury Farmhouse (Home



Farm) [1177181] and associated buildings are Grade II Listed. All are on the periphery of the study area and are not, therefore, considered further, though it may be noted that the application site formed part of the Home Farm estate.

There was also an 18th-century landscaped park at the Hoo (MHT 7330), on the south-east fringe of the area of search. The house was demolished in 1958 and the park largely returned to arable, though the remains of the garden are included in the Parks and Garden Register (GD 1909). Only a small area of the park falls within the area of search, and its listed structures lie well outside its boundary.

Those Listed Buildings in closest proximity to the application site include: 'Fairmile,' a pair of 18th-century houses at Nos 6 and 8 Horn Hill [1103272]; 'Trafalgar Cottage', an early 19th-century brick villa with a hipped slate roof at No 16 Horn Hill (MHT 30617), [1103273]; and two contemporary pairs of cottages to the south, 'Well House' at No 18 Horn Hill and Nos 22-24 Horn Hill (MHT 30618) [1177005]. All are Grade II listed.

Another Grade II Listed Building close to the application site is Lamb Cottage [1197016], on Lilley Bottom Road to the north of Bendish Lane, a 17th-century, part timber-framed building, which was formerly the Lamb Public House.

A windmill (MHT 30615) is shown on Dury and Andrews 1766 Map of Hertfordshire near Shacklegate Lane, well to the south-east of the application site, but does not appear on later maps. Further to the south-east, post-medieval chalk pits (MHT 30616), are recorded near Leggats End Plantation, Shacklegate Lane, and 19th-century allotments (MHT 18832) are recorded in Whitwell village.

Tanning was a major industry in Whitwell, as was straw plaiting for hat making, but the village was mainly dependent on agriculture and watercress growing. Nine Wells Watercress Beds on Lilley Bottom Road (MHT 12595) are a survival of 19th-century watercress beds run by the Sansom family, using water from artesian wells. They include packing sheds, a narrow gauge tramway and a shop.

A by-way at Long Lane (MHT 13232), surfaced in the 18th-19th century, meets at the junction of Horn Hill and By-way No 36, which runs north-south along the western boundary of the application site. Although documented from at least 1766, the latter is not recorded on the HHER; nor is the chalk pit shown on early OS Maps.

Another site unrecorded on the HHER is St Mary's Church, which stands adjacent to the application site on Bendish Lane. It is shown as St Mary's Church on the OS First Edition 25-inch map of 1881 and as St Mary's Mission Chapel on the OS Third Edition 25-inch map of 1924, and is still marked as a place of worship on modern maps. It is built of red brick and dated 1869.



1.3.4 Previous Archaeological work

No archaeological work has taken place on or adjacent to the application site. The archaeological work that has taken place within the area of search has been confined to the historic core of Whitwell, and none has produced significant results.

It has included: an archaeological evaluation at the former Eagle and Child Public House, at No 67 High Street in 1997 (EHT 4183), followed by an excavation in 1998 (EHT 4184), the results of which are not recorded in the HHER; a watching brief during residential development at Bradway, Whitwell in 1999 (EHT 4538) which revealed no archaeological features; a watching brief during residential development on land off Bradway, Whitwell in 2002 (EHT 5089) which revealed only 19th-20th-century deposits; and an historic building recording at No 28 High Street in 2008 (EHT 6712, MHT 16207).

1.3.5 Geophysical survey

A detailed magnetometer survey was carried out to assist with the archaeological evaluation of the site and help position trial trenches (Appendix 3).

No features of probable or possible archaeological origin were identified. The areas of magnetic variation aligned E-W across the centre of the site were attributed to natural Head deposits in the area. The remaining features were natural or modern and included disturbance from nearby fencing and magnetic spikes (Stratascan 2016).

1.4 Project Objectives

The principal purpose of the evaluation was to gather information on possible sub-surface archaeological heritage assets at the site. The archaeological trial trenching endeavoured to determine the:

- location, extent, nature, and date of any archaeological features or deposits that may be present within the application site;
- integrity and state of preservation of any archaeological features or deposits that may be present within the application site.
- nature of palaeo-environmental remains to determine local environmental conditions.



2. METHODOLOGY

The methodological approach to the project is summarised below. A full methodology is provided in the WSI (Albion Archaeology 2016).

2.1 Methodological Standards

The standards and requirements set out in the following documents were adhered to throughout the project:

| | |
|----------------------|--|
| • Albion Archaeology | <i>Procedures Manual: Volume 1 Fieldwork</i> (2nd edn, 2001). |
| • CIfA | <i>Charter and by-law; Code of conduct</i> (2014) |
| | <i>Standard and guidance for archaeological field evaluation</i> (2014) |
| | <i>Standard and guidance for the collection, documentation, conservation and research of archaeological materials</i> (2014) |
| | <i>Standard and guidance for archaeological geophysical survey</i> (2014) |
| • EAA | <i>Standards for Field Archaeology in the East of England</i> (2003) |
| • Historic England | <i>Management of Research Projects in the Historic Environment PPN3: Archaeological Excavation</i> (2015) |
| | <i>Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation. 2nd ed.</i> (2011) |
| | <i>Geophysical Survey in Archaeological Field Evaluation</i> (2008) |

The project archive will be deposited at The Museum Resource Centre for the North Hertfordshire District Council Museums Service. Details of the project and its findings will be submitted to the OASIS database in accordance with the guidelines issued by English Heritage and the Archaeology Data Service (ref. no. albionar1-240873).

2.2 Trial Trenching

The trial trenching took place between 14th and 16th March 2016. It comprised the excavation of eighteen 1.8m-wide and 30m-long trenches.

The trenches were positioned to achieve an even coverage of the proposed built area, infiltration basins and ecological pond.

The trenches were opened by a mechanical excavator fitted with a flat-edged bucket, operated by an experienced driver under close archaeological supervision. All excavation and recording was carried out by experienced Albion staff with external specialists consulted as necessary. Any potential archaeological features were investigated by hand and recorded using Albion Archaeology's pro forma sheets. The trenches were subsequently drawn and photographed as appropriate.



3. RESULTS

3.1 Introduction

All deposits revealed within the trial trenches are summarised below and shown on Figures 2 and 3. Context numbers in square brackets refer to the cuts [***] and round brackets to fills or layers (***). Detailed information is provided within Appendix 1.

3.2 Overburden and Geological Deposits

Topsoil comprised dark brown clayey silt with occasional stones. It was 0.25–0.35m thick.

The underlying geological deposits comprised light grey-brown clayey chalk.

3.2.1 Colluvial deposits

Upper colluvial deposits were present as subsoil in most trenches. They comprised mid grey-brown clayey silt. Depth varied considerably across the site from 0.05m in Trench 14 to 0.85m in Trench 15. Trenches 2, 9 and 17 contained no subsoil.

Lower colluvial deposits were present in the down-slope trenches: 4, 7, 8, 10, 12, 13, 15, and 16. These comprised mid brown clayey silt and reached a maximum thickness of 0.7m in Trench 15 at the bottom of the slope.

A darker 0.3m-thick colluvial layer (1504) was present in Trench 15 where sondages were excavated into the deposit. It was present at a depth of *c.* 1m below ground level. The deposit contained three abraded flint- and sand-tempered pottery sherds (18g), representing one vessel, broadly datable to the late Bronze Age/early Iron Age.

3.3 Undated Ditch Terminus

A single V-shaped ditch terminus [603] was revealed within Trench 6. It was *c.* 1m wide and 0.5m deep; it produced no dating evidence. The ditch appeared to be on a NW-SE alignment.

3.4 Post-medieval Field Boundary

A NE-SW aligned double ditch [503] and [506] was present in Trench 5. The northern ditch was *c.* 1m wide and 0.3m deep; the southern ditch was 0.7m wide and 0.4m deep. The poorly defined edges and sterile fills of the ditches suggest the remains of a hedged boundary.



4. CONCLUSIONS

Two trenches contained archaeological features. A ditch terminus in Trench 6 suggests the possibility of activity beyond the south-east limit of the PDA. However, the lack of artefactual evidence leaves the date and function of the ditch uncertain. In Trench 5 a poorly defined linear is indicative of a hedge line rather than a ditch. A boundary in this location is shown on the 1840 Tithe map but the First Edition 25-inch OS map suggests it had been removed by 1881.

Deep colluvial deposits found across the site appear to infill a palaeochannel running roughly E-W across the centre of the PDA. This channel may be visible as a natural anomaly on the geophysical survey. Three sherds of late Bronze Age/early Iron Age pottery were recovered from this layer. Their abraded condition suggests they are likely to be residual. No other evidence of prehistoric activity was found at the site.

The results of the trial trenching suggest that the PDA does not contain significant archaeological remains that could address regional research priorities. In archaeological terms, the potential impact of the proposed development can, therefore, be assessed as neutral.



5. BIBLIOGRAPHY

Albion Archaeology 2016. *Land at Bendish Lane, Whitwell, St Paul's Walden, Hertfordshire: Written Scheme of Investigation for a Programme of Archaeological Field Evaluation*. Report 2016/27, ver. 1.1

ARM 2015, *Land at Bendish Lane, Whitwell, St Paul's Walden, Hertfordshire: Assessment of Archaeological Significance*. May 2015.

Stratascan 2016. *Geophysical Survey Report: Bendish Lane, Whitwell, Hertfordshire*. Job reference J9521



6. APPENDIX 1: TRENCH TABLES

Trench: 1

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17879; Northing: 21105)

OS Grid Ref.: TL (Easting: 17904; Northing: 21089)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|--|-------------------------------------|--------------------------|
| 100 | Topsoil | Friable dark grey brown clay silt moderate small stones, occasional medium-large stones Thickness: NW 0.32m, SE 0.34m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 101 | Subsoil | Friable mid grey brown clay silt occasional flecks chalk, occasional small-medium stones Thickness: NW 0.24m, SE 0.40m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 102 | Natural | Friable light grey brown clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 2

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17930; Northing: 21118)

OS Grid Ref.: TL (Easting: 17900; Northing: 21123)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 200 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium and Large Stones, Thickness: W 0.29m, E 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 201 | Natural | Hard white chalk | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 3

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17956; Northing: 21103)

OS Grid Ref.: TL (Easting: 17930; Northing: 21089)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 300 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium and Large Stones Thickness: NE 0.25m SW 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 301 | Subsoil | Friable, mid grey brown, clay silt, occasional small to medium stones, occasional chalk flecks Thickness: SW 0.43m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 302 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

**Trench: 4**

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17951; Northing: 21066)

OS Grid Ref.: TL (Easting: 17935; Northing: 21040)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 400 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NE 0.26m SW 0.29m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 401 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: NE 0.34m SW 0.33m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 402 | Colluvium | Friable mid grey brown clay silt frequent small-large stones Thickness: NE 0.60m SW 0.41m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 403 | Natural | Firm light grey brown silty clay occasional flecks chalk, occasional small-large stones Thickness: SW 0.09m | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 5

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17931; Northing: 21015)

OS Grid Ref.: TL (Easting: 17958; Northing: 21002)

Reason: Target Possible Field Boundary

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|----------|--|-------------------------------------|--------------------------|
| 500 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NW 0.34m E 0.36m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 501 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: NW 0.10m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 502 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |
| 503 | Ditch | Linear NE-SW sides: U-shaped base; concave dimensions: max breadth 1.02m, max depth 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 504 | Fill | Friable light brown orange clay silt frequent small chalk Small to large flint Fragments Thickness: 0.16m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 505 | Fill | Friable mid brown clay silt frequent small chalk Occasional Small to Medium Flint Fragments Thickness: 0.16m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 506 | Recut | Linear NE-SW sides: U-shaped base; concave dimensions: max breadth 0.7m, max depth 0.41m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 507 | Fill | Firm mid orange brown clay silt moderate small chalk Moderate Medium to Large Flint Fragments Thickness: 0.23m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 508 | Backfill | Friable mid brown grey clay silt frequent small chalk Occasional Small to Medium Flint Fragments Thickness: 0.18m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**Trench: 6**

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18002: Northing: 21013)

OS Grid Ref.: TL (Easting: 17983: Northing: 20989)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|--|-------------------------------------|--------------------------|
| 600 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: SW 0.24m NE 0.27m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 601 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: SW 0.10m NE 0.13m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 602 | Natural | Firm, light grey brown, clay chalk | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 603 | Ditch | Linear NW-SE sides: U-shaped base: concave dimensions: max breadth 0.96m, max depth 0.48m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 604 | Fill | Loose mid grey brown clay silt moderate small-medium chalk Thickness: 0.48m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Trench: 7

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 17989: Northing: 21054)

OS Grid Ref.: TL (Easting: 17973: Northing: 21028)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 700 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: SW 0.29m NE 0.22m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 701 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: SW 0.21m NE 0.18m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 702 | Colluvium | Friable mid grey brown clay silt frequent small-large stones Thickness: SW 0.36m NE 0.70m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 703 | Natural | Firm, light grey brown, chalky clay | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 8

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18002: Northing: 21089)

OS Grid Ref.: TL (Easting: 17972: Northing: 21082)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 800 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: 0.33m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 801 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: E 0.13m - W 0.70m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 802 | Colluvium | Friable mid grey brown clay silt occasional small-medium chalk Thickness: 0.18m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 803 | Natural | Hard white chalk Patches of Light Grey Brown Chalky Clay | <input type="checkbox"/> | <input type="checkbox"/> |

**Trench: 9**

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18002; Northing: 21122)

OS Grid Ref.: TL (Easting: 17972; Northing: 21120)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 900 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: W 0.29m E 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 901 | Natural | Hard white chalk Patches of Light Grey Brown Chalky Clay Thickness: W 0.04m E 0.06m | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 10

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18013; Northing: 21072)

OS Grid Ref.: TL (Easting: 18026; Northing: 21045)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 1000 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NW 0.35m - SE 0.30m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1001 | Subsoil | Friable mid grey brown clay silt occasional flecks chalk, moderate small-medium stones, occasional large stones Thickness: NW 0.50m - SE 0.61m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1002 | Colluvium | Firm dark grey brown silty clay frequent large stones, moderate small-medium stones Thickness: NW 0.25m - SE 0.29m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1003 | Natural | Firm mid orange brown silty clay moderate large stones Thickness: SE 0.03m | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 11

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18027; Northing: 21018)

OS Grid Ref.: TL (Easting: 18055; Northing: 21007)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|--|-------------------------------------|--------------------------|
| 1100 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1101 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: NW 0.33m SE 0.52m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1102 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

**Trench: 11**

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18027; Northing: 21018)

OS Grid Ref.: TL (Easting: 18055; Northing: 21007)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|--|-------------------------------------|--------------------------|
| 1100 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: 0.28m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1101 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: NW 0.33m SE 0.52m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1102 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 12

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18051; Northing: 21053)

OS Grid Ref.: TL (Easting: 18067; Northing: 21027)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 1200 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NW 0.13m SE 0.15m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1201 | Colluvium | Friable mid grey brown clay silt occasional flecks chalk, moderate small-medium stones, occasional large stones Thickness: NW 0.10m SE 0.95m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1202 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 13

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18023; Northing: 21102)

OS Grid Ref.: TL (Easting: 18041; Northing: 21078)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|---|-------------------------------------|--------------------------|
| 1300 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: SE 0.31m NW 0.26m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1301 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: SE 0.35m NW 0.08m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1302 | Colluvium | Friable mid grey brown clay silt occasional flecks chalk, moderate small-medium stones, occasional large stones Thickness: SE 0.48m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1303 | Natural | Friable light grey brown chalky clay Loose, mid orange brown, silty clay, frequent small to large chalk fragments Thickness: SE 0.05m NW 0.04m | <input type="checkbox"/> | <input type="checkbox"/> |

**Trench: 14**

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18031: Northing: 21125)

OS Grid Ref.: TL (Easting: 18058: Northing: 21111)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 1400 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NW 0.24m SE 0.25m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1401 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small and Medium Stones, Occasional Chalk Flecks Thickness: SE 0.06m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1402 | Natural | Hard white chalk Patches of Light Grey Brown Chalky Clay Thickness: NW 0.03m SE 0.05m | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 15

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18075: Northing: 21097)

OS Grid Ref.: TL (Easting: 18068: Northing: 21067)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|-------------------------------------|
| 1500 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NE 0.30m SW 0.29m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1501 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small to Medium Stones, Occasional Chalk Flecks Thickness: NE 0.63m SW 0.82m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1502 | Natural | Loose, light grey brown, clayey chaly, frequent small stones | <input type="checkbox"/> | <input type="checkbox"/> |
| 1503 | Colluvium | Firm mid brown clay silt frequent small-medium stones Thickness: NE 0.55m SW 0.70m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1504 | Colluvium | Friable dark grey brown clay silt moderate small-medium stones Thickness: NE 0.32m | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Trench: 16

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18105: Northing: 21074)

OS Grid Ref.: TL (Easting: 18083: Northing: 21054)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|-----------|--|-------------------------------------|--------------------------|
| 1600 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NE 0.29m SW 0.34m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1601 | Colluvium | Friable mid grey brown clay silt occasional flecks chalk, moderate small-medium stones, occasional large stones Thickness: NW 0.10m SE 0.95m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1602 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |



Trench: 17

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18138; Northing: 21036)

OS Grid Ref.: TL (Easting: 18108; Northing: 21036)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 1700 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: W 0.20m E 0.20m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1701 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |

Trench: 18

Max Dimensions: Length: 30.00 m. Width: 1.80 m. Depth to Archaeology Min: m. Max: m.

Co-ordinates: OS Grid Ref.: TL (Easting: 18129; Northing: 21070)

OS Grid Ref.: TL (Easting: 18151; Northing: 21049)

Reason: Archaeological Evaluation

| Context: | Type: | Description: | Excavated: | Finds Present: |
|----------|---------|---|-------------------------------------|--------------------------|
| 1800 | Topsoil | Friable, Dark Grey Brown, Clay Silt, Moderate Small Stones, Occasional Medium to Large Stones Thickness: NW 0.25m SE 0.23m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1801 | Subsoil | Friable, Mid Grey Brown, Clay Silt, Occasional Small and Medium Stones, Occasional Chalk Flecks Thickness: NW 0.19m | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 1802 | Natural | Firm, light grey brown, clay chalk | <input type="checkbox"/> | <input type="checkbox"/> |



7. APPENDIX 2: OASIS SUMMARY

OASIS ID: albionar1-240873

Project details

| | |
|--|---|
| Project name | Land at Bendish Lane, Whitwell |
| Short description of the project | A planning application is being submitted for a residential development on Land at Bendish Lane, Whitwell, Hertfordshire. The field evaluation comprised two stages of work: Stage 1 geophysical survey, followed by Stage 2 trial trenching. The trial trenching comprised the excavation of eighteen 1.8m-wide 30m- long trenches. Two trenches were found to contain archaeological features. A ditch terminus in Trench 6 suggests the possibility of activity beyond the south-east limit of the proposed development area (PDA). However, the lack of artefactual evidence leaves the date and function of the ditch uncertain. In Trench 5 a poorly defined linear feature is indicative of a hedge line rather than a ditch. A boundary in this location is present on the 1840 Tithe map but the First Edition 25-inch OS map suggests it had been removed by 1881. Deep colluvial deposits found across the site appear to infill a palaeochannel running roughly E-W across the centre of the PDA. This channel may be visible as a natural anomaly on the geophysical survey. Three sherds of late Bronze Age/early Iron Age pottery were recovered from this layer. No other evidence of prehistoric activity was found at the site. The results of the trial trenching suggest that the PDA does <u>not</u> contain significant archaeological remains that could address regional research priorities. In archaeological terms, the potential impact of the proposed development can, therefore, be assessed as neutral. |
| Project dates | Start: 14-03-2016 End: 16-03-2016 |
| Previous/future work | No / Not known |
| Any associated project reference codes | BLW2831 - Contracting Unit No. 15/02555/1 - Planning Application No. |
| Type of project | Field evaluation |
| Current Land use | Cultivated Land 4 - Character Undetermined |
| Monument type | DITCH Uncertain BOUNDARY Post Medieval |
| Significant Finds | POTTERY Early Iron Age |
| Methods & techniques | "Sample Trenches" , "Targeted Trenches" |
| Development type | Rural residential |
| Prompt | National Planning Policy Framework - NPPF |
| Position in the planning process | Pre-application |

Project location

| | |
|------------------|---|
| Country | England |
| Site location | HERTFORDSHIRE NORTH HERTFORDSHIRE ST PAUL'S WALDEN Bendish Lane, Whitwell |
| Study area | 2.46 Hectares |
| Site coordinates | TL 1788 2108 Point |



Project creators

| | |
|---------------------------|--------------------|
| Name of Organisation | Albion Archaeology |
| Project brief originator | No Brief |
| Project design originator | Albion Archaeology |
| Project director/manager | Robert Wardill |
| Project supervisor | Kathleen Pilkinton |

Project archives

| | |
|----------------------------|---|
| Physical Archive recipient | North Herts Museums Service Resource Centre |
| Physical Contents | "Ceramics" |
| Physical Archive notes | Museum and landowner to be consulted re transfer of pottery |
| Paper Archive recipient | North Herts Museums Service Resource Centre |
| Paper Contents | "Ceramics", "other" |
| Paper Media available | "Context sheet", "Correspondence", "Drawing", "Microfilm", "Miscellaneous Material", "Photograph", "Report" |

Project bibliography 1

| | |
|-------------------------------|---|
| Publication type | Grey literature (unpublished document/manuscript) |
| Title | Land at Bendish Lane, Whitwell, Hertfordshire: Archaeological Trial Trench Evaluation |
| Author(s)/Editor(s) | 'Pilkinton, K' |
| Other bibliographic details | 2016/61 |
| Date | 2016 |
| Issuer or publisher | Albion Archaeology |
| Place of issue or publication | Bedford |
| Description | A4 comb bound report |
| Entered by | Helen Parslow (hl.parslow@albion-arch.com) |
| Entered on | 22 March 2016 |



8. APPENDIX 3: HER SUMMERY SHEET

| | | |
|--|---|---------------------------|
| Site name and address: Land at Bendish Lane, Whitwell, Hertfordshire | | |
| County: Hertfordshire | District: North Herts | |
| Village/Town: Whitwell | Parish: St. Paul's Walden | |
| Planning application reference: 15/02555/1 | | |
| HER Enquiry reference: n/a | | |
| Client name, address, and tel. no.: Pigeon Land Ltd | | |
| Nature of application: Residential Development | | |
| Present land use: Arable | | |
| Size of application area: 2.46ha | Size of area investigated: 972m ² | |
| NGR (to 8 figures): TL 1788 2108 | | |
| Site code (if applicable): BLW2831 | | |
| Site director/Organization: Rob Wardill / Albion Archaeology | | |
| Type of work: Archaeological trial trench evaluation | | |
| Date of work: | Start: 14/03/2016 | Finish: 16/03/2016 |
| Location of finds & site archive/Curating museum: The Museum Resource Centre for the North Hertfordshire District Council Museums Service. | | |
| Related HER Nos: | Periods represented: Undated, Post-Medieval, LBA/EIA | |
| Relevant previous summaries/reports: ARM 2015, <i>Land at Bendish Lane, Whitwell, St Paul's Walden, Hertfordshire: Assessment of Archaeological Significance</i> . May 2015. Stratascan 2016. <i>Geophysical Survey Report: Bendish Lane, Whitwell, Hertfordshire</i> . Job reference J9521 | | |
| Summary of fieldwork results: Two trenches contained archaeological features. A ditch terminus in Trench 6 suggests the possibility of activity beyond the south-east limit of the PDA. However, the lack of artefactual evidence leaves the date and function of the ditch uncertain. In Trench 5 a poorly defined linear is indicative of a hedge line rather than a ditch. A boundary in this location is shown on the 1840 Tithe map but the First Edition 25-inch OS map suggests it had been removed by 1881. Deep colluvial deposits found across the site appear to infill a palaeochannel running roughly E-W across the centre of the PDA. This channel may be visible as a natural anomaly on the geophysical survey. Three sherds of late Bronze Age/ early Iron Age pottery were recovered from this layer. Their abraded condition suggests they are likely to be residual. No other evidence of prehistoric activity was found at the site. | | |
| Author of summary: K.Pilkinton | | Date of summary: 19/02/18 |



9. APPENDIX 4: GEOPHYSICAL SURVEY REPORT

GEOPHYSICAL SURVEY REPORT

STRATASCAN™



Project name:
Bendish Lane, Whitwell, Hertfordshire

Client:
Albion Archaeology

February 2016

Job ref:
J9521

Report author:
Thomas Richardson MSc ACIfA

GEOPHYSICAL SURVEY REPORT

Project name:

Bendish Lane, Whitwell, Hertfordshire

Client:

Albion Archaeology

Job ref:

J9521

Techniques:

**Detailed magnetic survey –
Gradiometry**

Survey date:

1st-2nd February 2016

Site centred at:

TL 180 211

Post code:

SG4 8HX

Field team:

Joe Perry BA

Ed Price BA

Project manager:

Simon Haddrell BEng(Hons) AMBCS PCIfA

Report written By:

Thomas Richardson MSc ACIfA

CAD illustrations by:

Thomas Richardson MSc ACIfA

Checked by:

David Elks MSc ACIfA

TABLE OF CONTENTS

| | |
|---|-----------|
| LIST OF FIGURES..... | 2 |
| 1 SUMMARY OF RESULTS | 3 |
| 2 INTRODUCTION | 3 |
| 2.1 Background synopsis..... | 3 |
| 2.2 Site location | 3 |
| 2.3 Description of site | 3 |
| 2.4 Geology and soils | 3 |
| 2.5 Site history and archaeological potential | 3 |
| 2.6 Survey objectives | 4 |
| 2.7 Survey methods | 4 |
| 2.8 Processing, presentation and interpretation of results..... | 4 |
| 2.8.1 Processing | 4 |
| 2.8.2 Presentation of results and interpretation..... | 4 |
| 3 RESULTS..... | 5 |
| 3.1 Probable Archaeology..... | 5 |
| 3.2 Possible Archaeology | 5 |
| 3.3 Medieval/Post-Medieval Agriculture..... | 5 |
| 3.4 Other Anomalies | 5 |
| 4 DATA APPRAISAL & CONFIDENCE ASSESSMENT..... | 6 |
| 5 CONCLUSION..... | 6 |
| 6 REFERENCES..... | 7 |
| APPENDIX A – METHODOLOGY & SURVEY EQUIPMENT..... | 8 |
| APPENDIX B – BASIC PRINCIPLES OF MAGNETIC SURVEY | 9 |
| APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES..... | 10 |

LIST OF FIGURES

| | | |
|-----------|----------|---|
| Figure 01 | 1:25 000 | Location plan of survey area |
| Figure 02 | 1:1250 | Location of survey grids and referencing |
| Figure 03 | 1:1250 | Colour plot of gradiometer data showing extreme values |
| Figure 04 | 1:1250 | Plot of minimally processed gradiometer data |
| Figure 05 | 1:1250 | Abstraction and interpretation of gradiometer anomalies |

1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 5.1 hectares of arable land. The survey has not identified any anomalies of archaeological origin. The anomalies detected relate to Head deposits running across the site, modern ferrous objects, and fencing.

2 INTRODUCTION

2.1 *Background synopsis*

Stratascan were commissioned to undertake a geophysical survey of an area outlined for residential development. This survey forms part of an archaeological investigation being undertaken by Albion Archaeology.

2.2 *Site location*

The site is located to the south of Bendish Lane, Whitwell, Hertfordshire at OS ref. TL 180 211.

2.3 *Description of site*

The survey area is approximately 5.9 hectares, however areas of overgrown vegetation at field boundaries reduced the surveyable area to approximately 5.1 hectares of arable land. The site lies on a north facing slope with no further obstructions.

2.4 *Geology and soils*

The underlying geology is Holywell Nodular Chalk Formation and New Pit Chalk Formation (undifferentiated) – chalk across the majority of the site, with an area of Chalk Rock Member – chalk running along the southern boundary of the site (British Geological Survey website). There is no recorded drift geology for the majority of the site, however a band of Head – clay, silt, sand, and gravel runs east to west across the centre of the site (British Geological Survey website).

The overlying soils are known as Swaffham Prior, which are typical brown calcareous earths. These consist of coarse calcareous and fine loamy soils over chalk rubble (Soil Survey of England and Wales, Sheet 6 South East England).

2.5 *Site history and archaeological potential*

Extract from 'Land at Bendish Lane, Whitwell, St. Paul's Walden, Hertfordshire – Assessment of Archaeological Significance' (ARM 2015):

The assessment of archaeological significance of land at Bendish Lane, Whitwell indicates that proposed development will have no impact on the significance or setting of designated heritage assets of archaeological interest.

The application site appears to have been in continuous agricultural use since at least 1840, and there is no documentary or cartographic evidence of undesignated heritage assets of archaeological interest on the site.

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*.

Given the conducive cretaceous chalk geology, 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**

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)

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 Bendish Lane has not identified any anomalies that have been characterised as being either of a *probable* or *possible* archaeological origin. 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 medieval or post-medieval agriculture has been identified within the survey area.

3.4 *Other Anomalies*

- 1 Areas of magnetic variation running east to west across the centre of the site. These are natural responses related to the Head deposits in the area.
- 2 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, but on this site have not affected a significant proportion of the area.
- 3 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

Cretaceous chalk geologies, such as those at the Bendish Lane site, generally give good responses to magnetic survey. Whilst no archaeological anomalies have been detected this is in keeping with the known history of the site. The Head deposits on the site are causing some variation in the survey data, however this is unlikely to be strong enough to mask any archaeological features. Given the conducive geology and known history of the site it can be determined that the survey is likely to have been effective and would have detected archaeological features were they present.

5 CONCLUSION

The survey at Bendish Lane has not identified any anomalies of archaeological origin. This correlates with the known history of the site, suggesting the area has a mostly agricultural past. The anomalies detected relate to Head deposits running across the site, modern ferrous objects, and fencing.

6 REFERENCES

ARM, 2015. *Land at Bendish Lane, Whitwell, St. Paul's Walden, Hertfordshire – Assessment of Archaeological Significance*

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

Chartered Institute For Archaeologists. *Standard and Guidance for Archaeological Geophysical Survey*.
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English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation*.

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 6 South East England*.

APPENDIX A – METHODOLOGY & SURVEY EQUIPMENT

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.

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 manufactured by Bartington Instruments Ltd. The instrument consists 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. Each gradiometer has a 1m separation between the sensing elements so enhancing the response to weak anomalies.

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.

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.

Data capture

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.

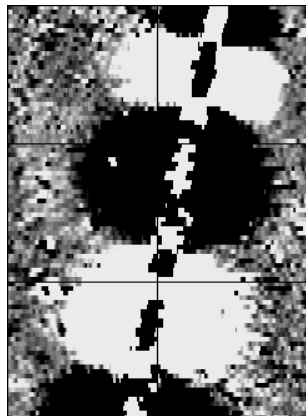
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement 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.

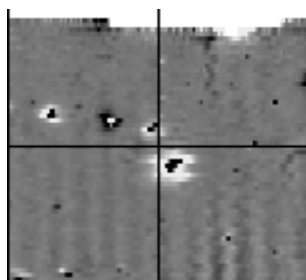
APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES

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

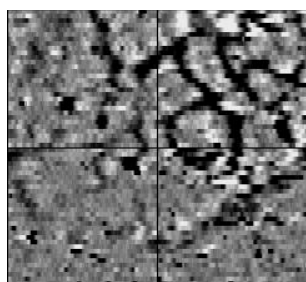


This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very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

Positive anomaly with associated negative response

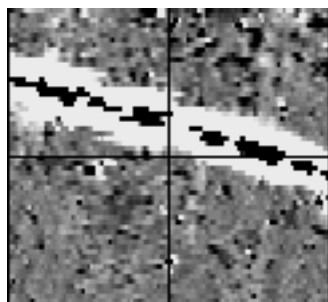
See bipolar and dipolar.

Positive linear



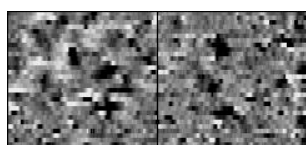
A linear response which is entirely positive in polarity. These are usually related to in-filled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity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

Positive linear anomaly with associated negative response



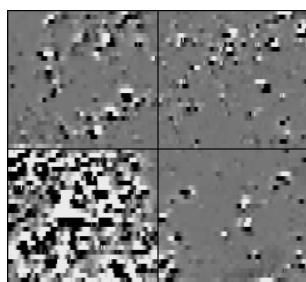
A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field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

Positive point/area



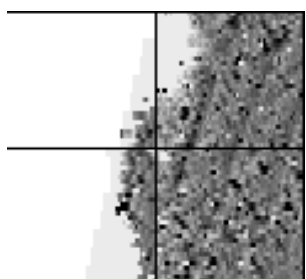
These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by in-filled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally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

Magnetic debris



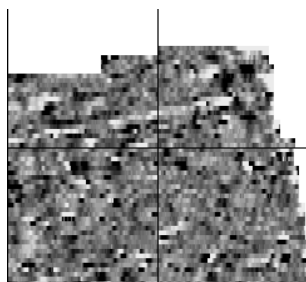
Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low ($\pm 3nT$) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly ($\pm 250nT$) 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

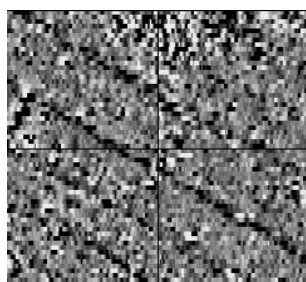


A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative to the background top soil is built up. See also ploughing activity.

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).

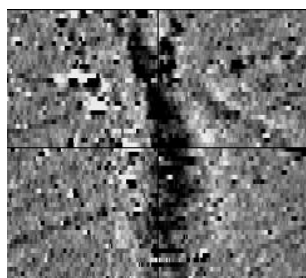
Strength of response

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

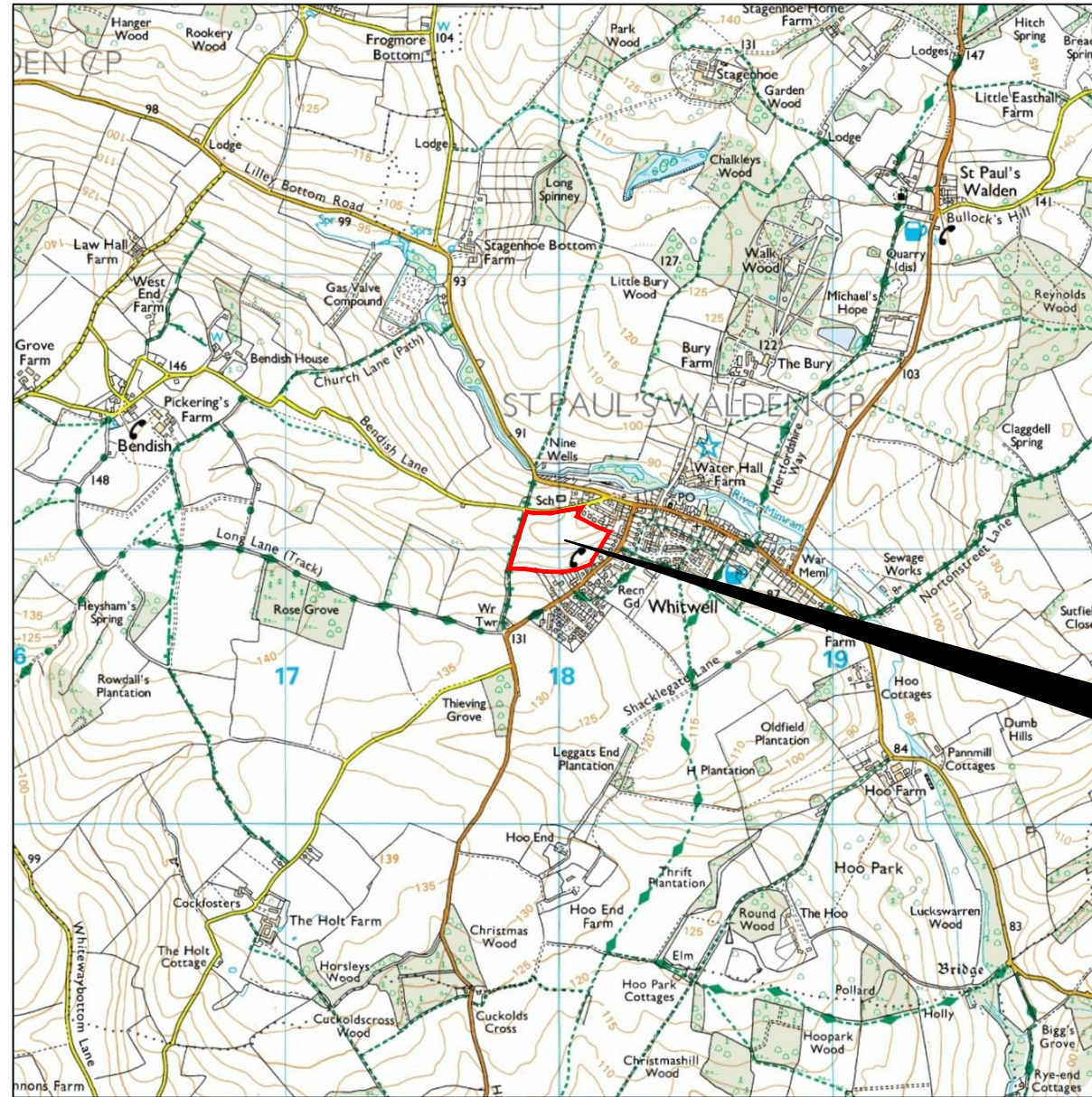


Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be 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.

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 21
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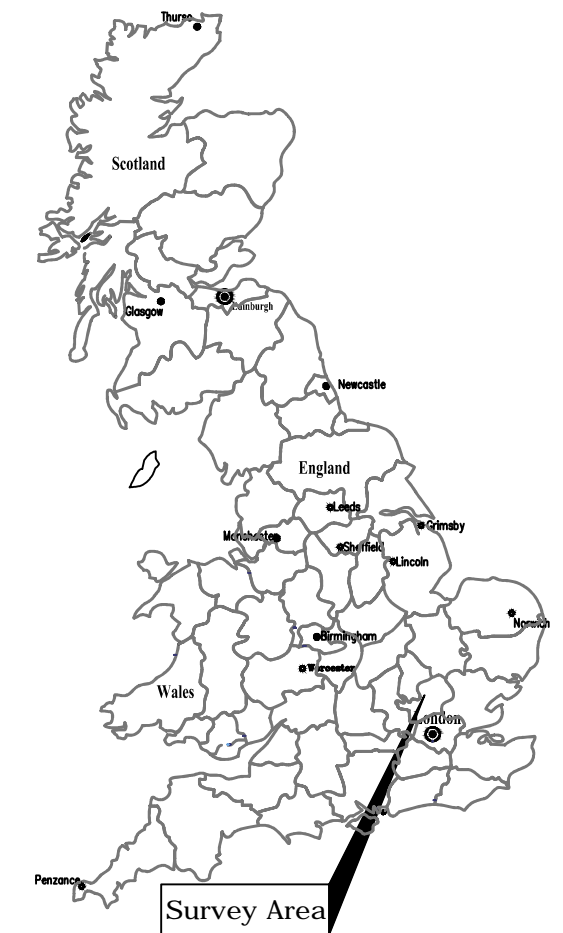
Survey Area

16 17 18 19 20

Amendments

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

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Site centred on NGR TL 180 211

Client
ALBION ARCHAEOLOGY

Project Title Job No. J9521
**BENDISH LANE, WHITWELL,
 HERTFORDSHIRE**

Subject
LOCATION PLAN OF SURVEY AREA

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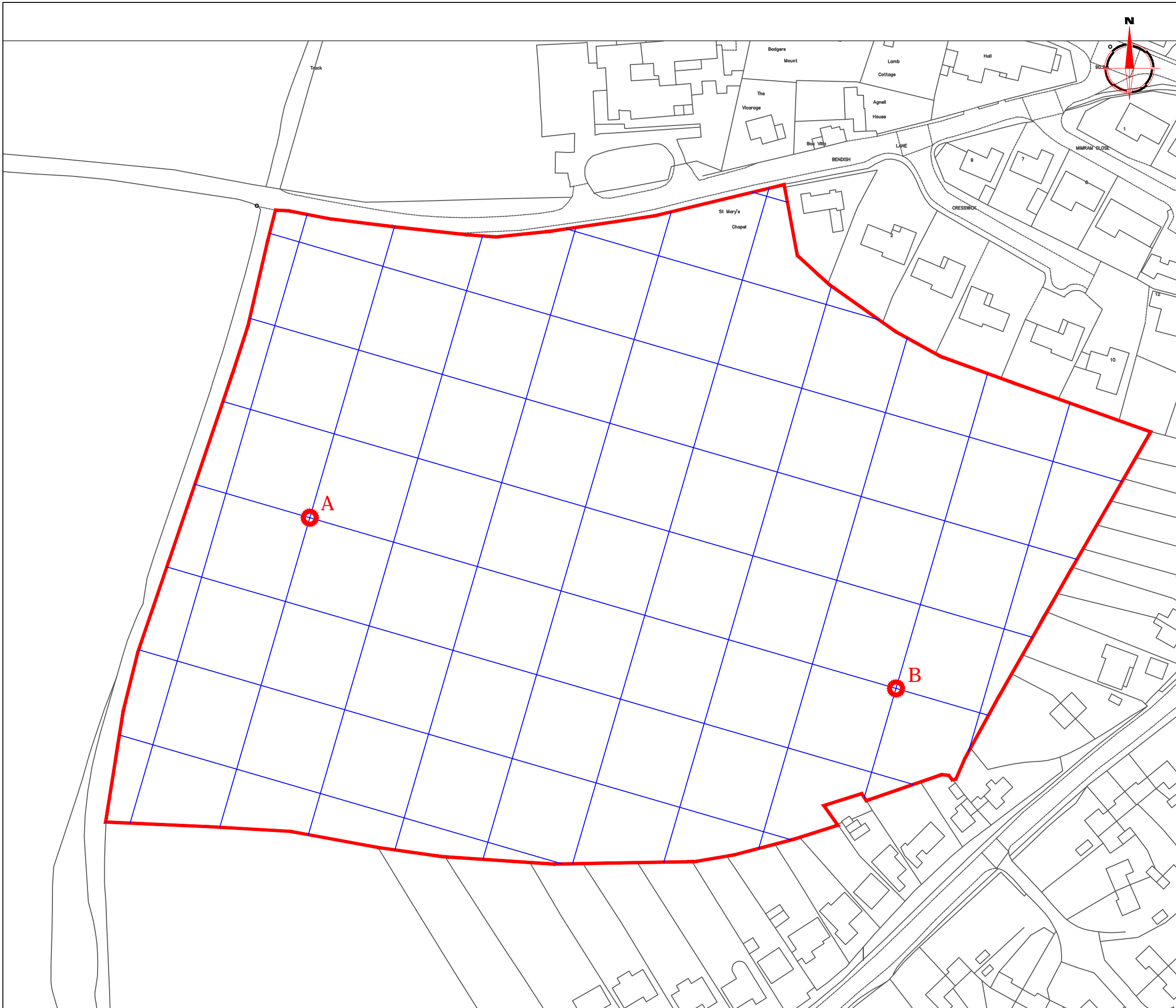


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Scale 1:25000
 0m 500m 1000m

| | | |
|------------------------------|--------------------------|-------------------------|
| Plot A3 | Checked by DGE | Issue No. 01 |
| Survey date FEB 16 | Drawn by TR | Figure No. 01 |



Amendments

| Issue No. | Date | Description |
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OS GRID REFERENCES

| | |
|----------|----------------------|
| A | 517892.57, 221034.30 |
| B | 518094.20, 220975.61 |

Client
ALBION ARCHAEOLOGY

Project Title Job No. J9521
**BENDISH LANE, WHITWELL,
HERTFORDSHIRE**

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**LOCATION OF SURVEY GRIDS AND
REFERENCING**

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Amendments

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

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Plotting parameters

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

Client
ALBION ARCHAEOLOGY

Project Title Job No. J9521
**BENDISH LANE, WHITWELL,
HERTFORDSHIRE**

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

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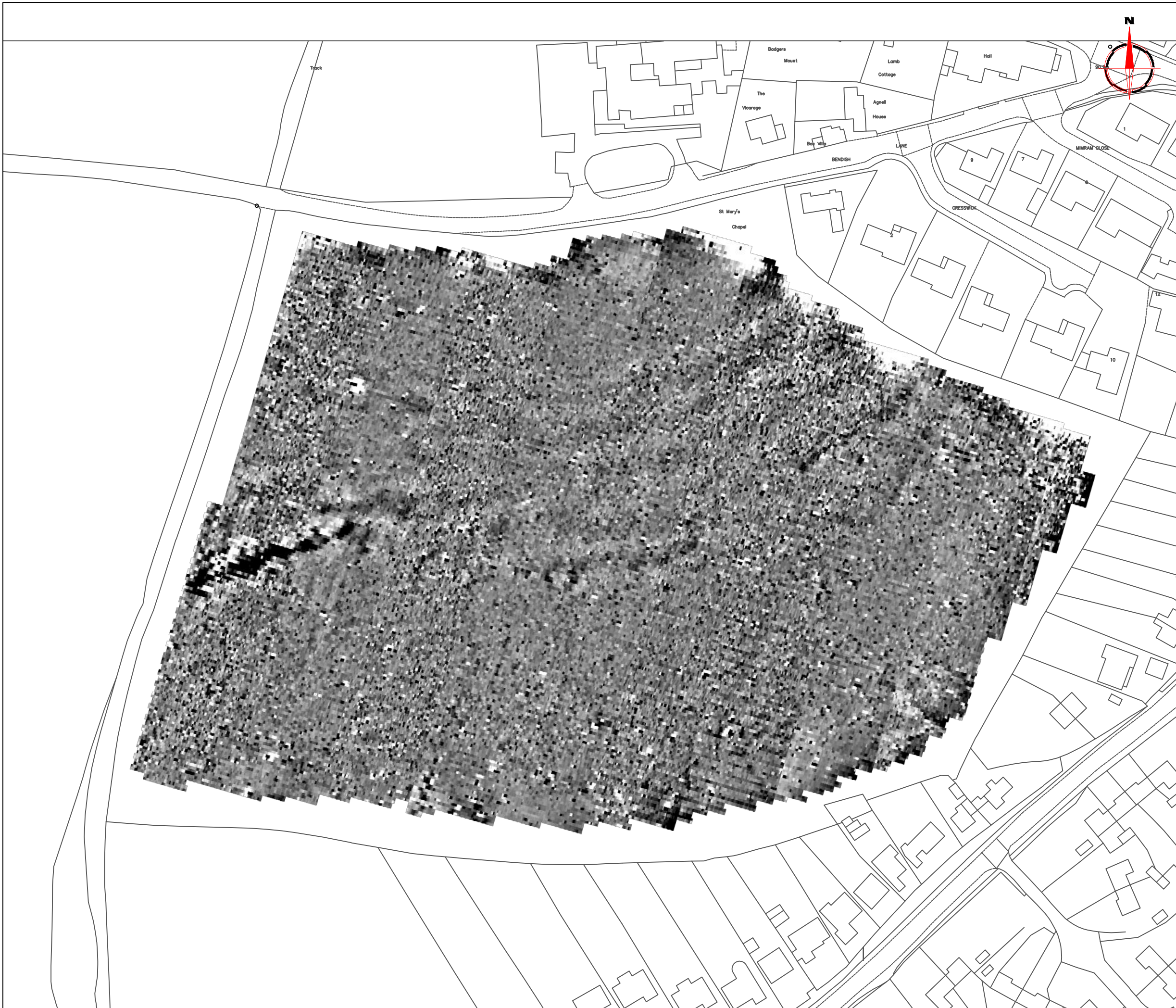
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Scale **1:1250**

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| Plot A3 | Checked by DGE | Issue No. 01 |
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Amendments

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

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Plotting parameters

Maximum +2nT (black)
Minimum -2nT (white)

Zero Mean

Client
ALBION ARCHAEOLOGY

Project Title Job No. J9521
**BENDISH LANE, WHITWELL,
HERTFORDSHIRE**

Subject
**PLOT OF MINIMALLY PROCESSED
GRADIOMETER DATA**

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|------------------------------|--------------------------|-------------------------|
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| Survey date FEB 16 | Drawn by TR | Figure No. 04 |



| 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 - possibly related to land drain |
| | | 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 |
| Client | | |
| ALBION ARCHAEOLOGY | | |
| Project Title | | Job No. J9521 |
| BENDISH LANE, WHITWELL, HERTFORDSHIRE | | |
| Subject | | |
| ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES | | |
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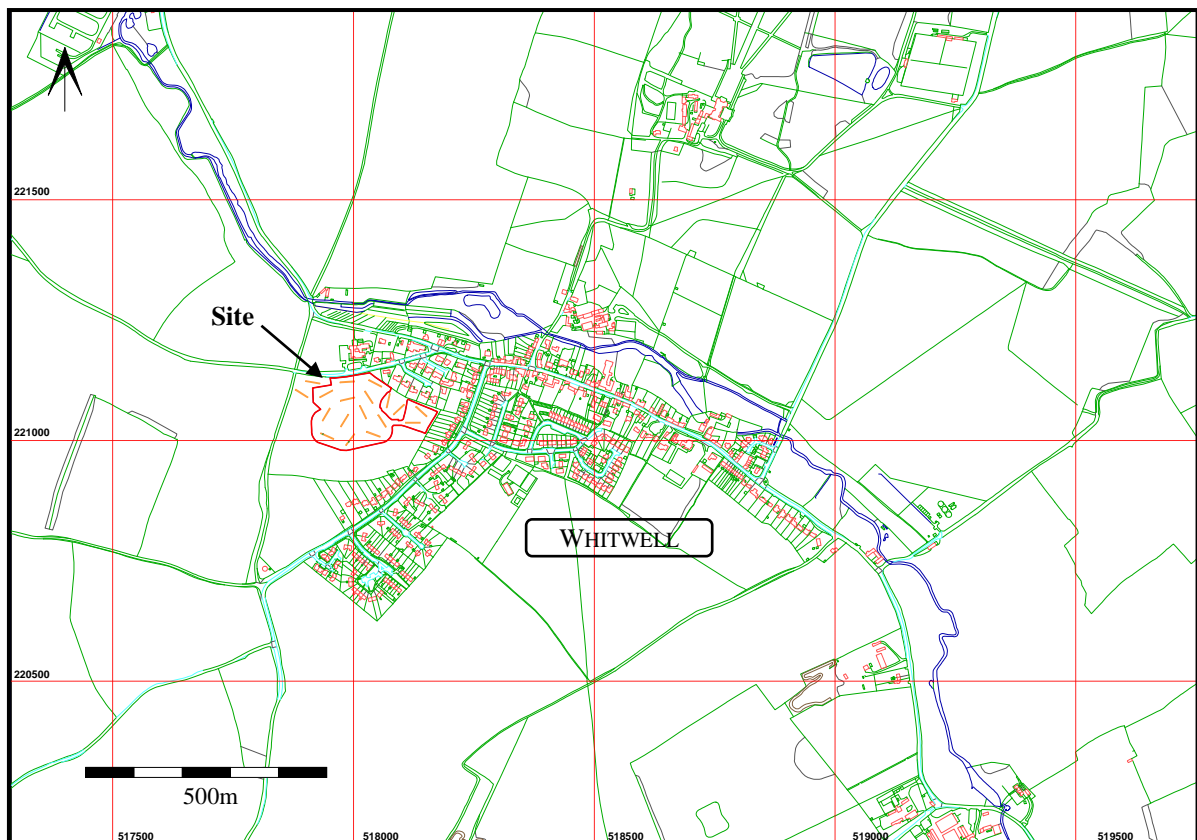


Figure 1: Site location

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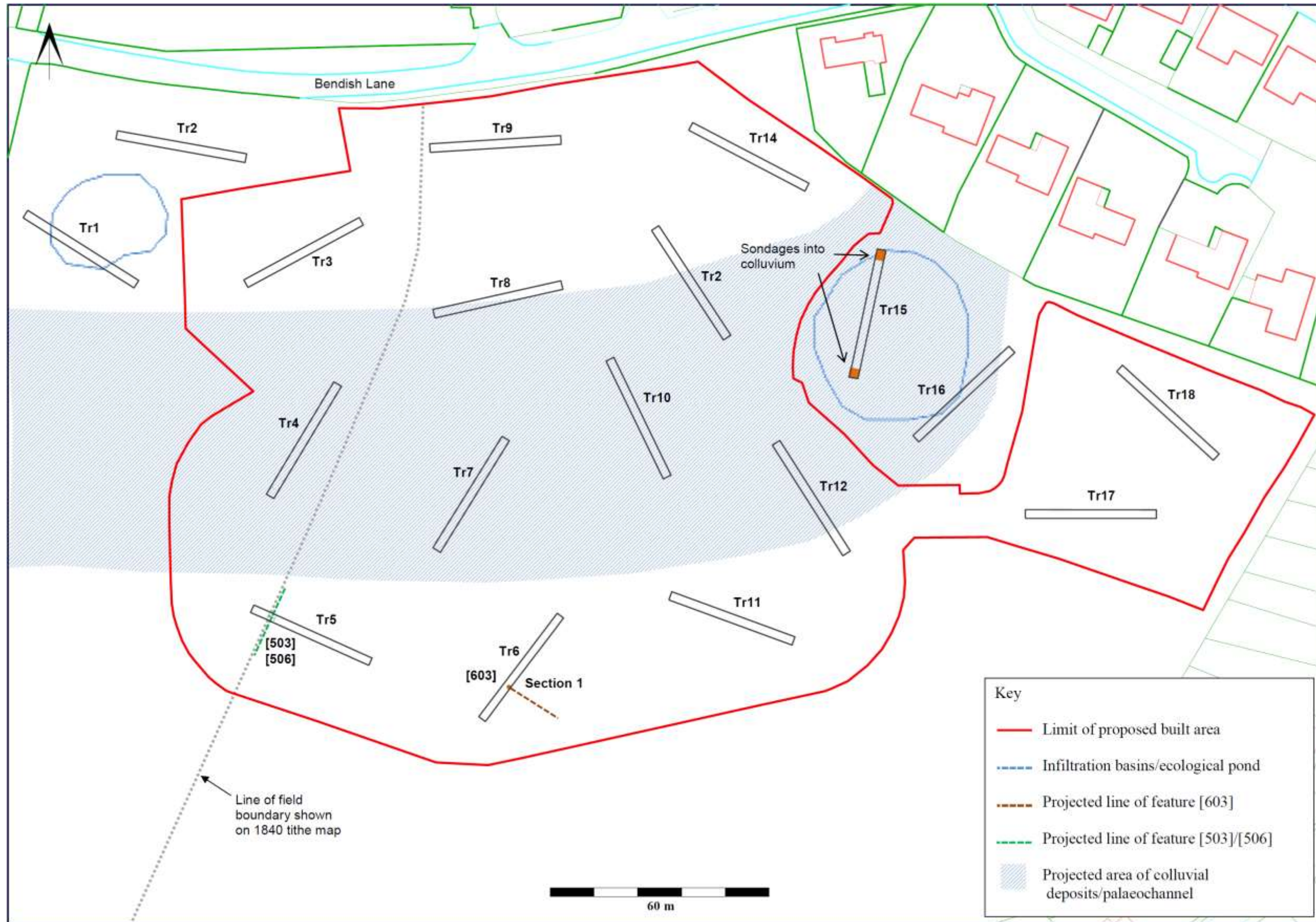
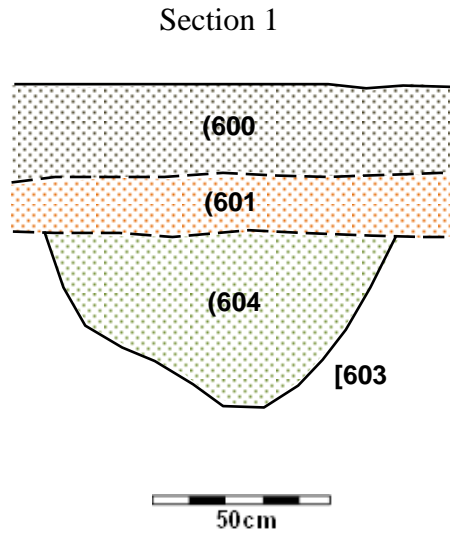


Figure 2: Results of trial trenching

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Trench 13 from SE showing limit of colluvial deposits (1m scale)



Ditch terminus [603] from NW (1m scale)



Trench 15 showing north sondage into colluvial deposits (1m scale)



Features [503] and [506] from SW (1m scale)

Figure 3:
Selected photographs
and section drawing

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Bedfordshire

Albion
archaeology



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