

ARCHAEOLOGICAL
SERVICES
DURHAM UNIVERSITY

on behalf of
URS

Wheatridge Farm
Seaton Delaval
Northumberland

geophysical survey

report 3056
December 2012



Contents

1.	Summary	1
2.	Project background	2
3.	Historical and archaeological background	2
4.	Landuse, topography and geology	3
5.	Geophysical survey	3
6.	Conclusions	6
7.	Sources	6

Appendix 1: Project WSI

Figures

Figure 1:	Site location
Figure 2:	Geophysical survey
Figure 3:	Geophysical interpretation
Figure 4:	Archaeological interpretation
Figure 5:	Trace plots of geomagnetic data

1. Summary

The project

- 1.1 This report presents the results of geophysical surveys conducted in advance of proposed development at Wheatridge Farm, Seaton Delaval, Northumberland. The works comprised geomagnetic survey of approximately 2.9ha of pasture.
- 1.2 The works were commissioned by URS and conducted by Archaeological Services Durham University.

Results

- 1.3 Evidence for former ridge and furrow cultivation was detected in all the areas surveyed and is evident on the ground as upstanding earthworks. Headlands are also evident in Area 5.
- 1.4 Possible soil-filled features, reflecting possible former ditches, and early ploughing at right angles to the ridge and furrow, were detected in Area 1.
- 1.5 Modern services were detected in Areas 1, 3 and 5. Disturbed ground possibly resulting from one of these services was detected in Areas 3, 4 and 5.
- 1.6 There is no recommendation for further geophysical survey.

2. Project background

Location (Figure 1)

- 2.1 The proposed development area was located at Wheatridge Farm, Seaton Delaval, Northumberland (NGR centre: NZ 2968 7613). Five surveys totalling 2.9ha were conducted in four land parcels. To the south was an industrial estate and residential housing; to the west was woodland and the A192 road, to the east was woodland; open farmland lay to the north.

Development proposal

- 2.2 The proposal is for a residential development.

Objective

- 2.3 The principal aim of the surveys was to assess the nature and extent of any sub-surface features of potential archaeological significance within the proposed development area, so that an informed decision may be made regarding the nature and scope of any further scheme of archaeological works that may be required in relation to the development.

Methods statement

- 2.4 The surveys have been undertaken in accordance with a specification provided by URS, and approved by the Archaeological Officer for Northumberland County Council (Appendix 1), and in line with national standards and guidance (see para. 5.1 below).

Dates

- 2.5 Fieldwork was undertaken on 21st November 2012. This report was prepared for 7th December 2012.

Personnel

- 2.6 Fieldwork was conducted by Ashley Hayes and Natalie Swann (supervisor). The geophysical data were processed by Ashley Hayes and Natalie Swann. This report was prepared by Natalie Swann, with illustrations by David Graham, and edited by Duncan Hale, the Project Manager.

Archive/OASIS

- 2.7 The site code is **SDW12**, for **Seaton Delaval Wheatridge Farm 2012**. The survey archive will be supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **Online AccesS to the Index of archaeological investigationS project (OASIS)**. The OASIS ID number for this project is **archaeol3-138678**.

3. Historical and archaeological background

Previous archaeological works

- 3.1 The archaeological background of the site has been discussed in the project specification (Copp 2012); the results are summarised here.
- 3.2 No previous archaeological works have been conducted within the proposed development area (PDA). To the south-east of the site, north-west of Blackhaugh

Drive, geophysical survey and trial trenching revealed evidence of possible prehistoric or Roman occupation.

- 3.3 Modern aerial photographs of the PDA indicate the extensive remains of ridge and furrow cultivation, possibly associated with the former medieval village of Seaton Delaval.

4. Landuse, topography and geology

- 4.1 At the time of survey the proposed development area comprised four fields of rough boggy pasture currently used for the grazing of horses. It was not possible to collect data in the north-central part of the PDA due to flooding. The grid layout in the eastern half of the PDA was modified from that shown in the specification to avoid electric fences and flooding.
- 4.2 The area was predominantly level with a mean elevation of approximately 40m OD. Upstanding earthworks from historic ridge and furrow cultivation are evident across the site.
- 4.3 The underlying solid geology of the area comprises Carboniferous Coal Measures overlain by drift geology of boulder clay.

5. Geophysical survey Standards

- 5.1 The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) *Standard and Guidance for archaeological geophysical survey* (2011); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Guide to Good Practice: Geophysical Data in Archaeology* (Schmidt & Ernenwein 2011).

Technique selection

- 5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.
- 5.3 In this instance, based on the earthworks and previous work in the area it was considered likely that cut features such as ditches and pits might be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) might also be present.
- 5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This

technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

Field methods

- 5.5 A 30m grid was established across each survey area and related to known, mapped Ordnance Survey points and the National Grid using a Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.
- 5.6 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval was 0.25m and the traverse interval was 1m, thus providing 3,600 sample measurements per 30m grid unit.
- 5.7 Data were downloaded on site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

- 5.8 Geoplot v.3 software was used to process the geophysical data and to produce both continuous tone greyscale images and trace plots of the raw (minimally processed) data. The greyscale images and interpretations are presented in Figures 2-4; the trace plots are provided in Figure 5. In the greyscale images, positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. Palette bars relate the greyscale intensities to anomaly values in nanoTesla.
- 5.9 The following basic processing functions have been applied to each data set:

<i>clip</i>	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
<i>zero mean traverse</i>	sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities
<i>destagger</i>	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
<i>interpolate</i>	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

Interpretation: anomaly types

- 5.10 Colour-coded geophysical interpretation plans are provided. Three types of geomagnetic anomaly have been distinguished in the data:

<i>positive magnetic</i>	regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches
<i>negative magnetic</i>	regions of anomalously low or negative magnetic field gradient, which may correspond to features of low magnetic susceptibility such as wall footings and other concentrations of sedimentary rock or voids
<i>dipolar magnetic</i>	paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths

Interpretation: features

General comments

- 5.11 Colour-coded archaeological interpretation plans are provided.
- 5.12 Series of parallel, alternate positive and negative magnetic anomalies have been detected in all the areas surveyed; these reflect the upstanding ridge and furrow earthworks. Across most of the survey areas the anomalies are aligned approximately north/south with the exception of the east part of Area 5 where they are also aligned northeast/southwest and northwest/southeast. Headlands are also evident in this area.
- 5.13 Small, discrete dipolar magnetic anomalies have been detected in all of the survey areas. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments, and in most cases have little or no archaeological significance. A sample of these is shown on the geophysical interpretation plan, however, they have been omitted from the archaeological interpretation plan and the following discussion.

Area 1

- 5.14 Two relatively strong, linear positive magnetic anomalies were detected aligned parallel to the ridge and furrow across the centre of this area. These anomalies may reflect soil-filled features such as former boundary ditches.
- 5.15 Three weak linear positive magnetic anomalies were detected aligned northwest/southeast in the northwest of this survey area. These anomalies may reflect soil-filled features such as furrows from earlier ploughing perpendicular to the extant ridge and furrow.
- 5.16 A chain of dipolar magnetic anomalies was detected in the southwest corner of this area aligned northwest/southeast; this almost certainly reflects a pipe.

Area 2

- 5.17 Ridge and furrow and occasional ferrous/fired litter were the only features identified in this area.

Area 3

- 5.18 A concentration of dipolar magnetic anomalies was detected on the south edge of this area which may reflect a former track or disturbed ground from a modern service that runs through this area.

- 5.19 A chain of dipolar magnetic anomalies was detected aligned northeast/southwest which is likely to reflect another service running between manholes noted on the ground.

Area 4

- 5.20 The concentration of dipolar magnetic anomalies detected in Area 3 extends into this area and may again reflect part of a track or disturbed ground from the easement for the service.

Area 5

- 5.21 The magnetic anomalies in this area reflecting the ridge and furrow cultivation, as described above, are aligned in three different directions; positive magnetic anomalies along the ends of the ridge and furrow almost certainly reflect the headland boundaries between the ploughed areas.
- 5.22 Two linear negative magnetic anomalies were detected in this area, one aligned approximately north/south in the east corner of this area and the other aligned approximately northeast/southwest along the south edge. These anomalies reflect modern services between brick manholes noted on the ground.
- 5.22 The concentration of dipolar magnetic anomalies reflecting probable ground disturbance from the service pipe has also been detected in the southwest corner of this survey area.

6. Conclusions

- 6.1 2.9ha of geomagnetic survey was undertaken at Wheatridge Farm, Seaton Delaval, Northumberland prior to proposed development.
- 6.2 Evidence for former ridge and furrow cultivation was detected in all the areas surveyed and is evident on the ground as upstanding earthworks. Headlands are also evident in Area 5.
- 6.3 Possible soil-filled features, reflecting possible former ditches, and early ploughing at right angles to the ridge and furrow, were detected in Area 1.
- 6.3 Modern services were detected in Areas 1, 3 and 5. Disturbed ground possibly resulting from one of these services was detected in Areas 3, 4 and 5.
- 6.4 There is no recommendation for further geophysical survey.

7. Sources

- Copp, A 2012 *Wheatridge Farm, Seaton Delaval; WSI for archaeological geophysical survey*. Unpublished report for Miller Homes, URS Leeds
- David, A, Linford, N, & Linford, P, 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage
- Gaffney, C, Gater, J, & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*. Technical Paper 6, Institute of Field Archaeologists

IfA 2011 *Standard and Guidance for archaeological geophysical survey*. Institute for
Archaeologists
Schmidt, A, & Ernenwein, E, 2011 *Guide to Good Practice: Geophysical Data in
Archaeology*. Archaeology Data Service

Appendix: Project WSI

URS


WSI for
Archaeological
Geophysical
Survey

Wheatridge Farm, Seaton
Delaval

October 2012

Prepared for:
Miller Homes (North East) Ltd

UNITED
KINGDOM &
IRELAND



millershomes



REVISION SCHEDULE					
Rev	Date	Details	Prepared by	Reviewed by	Approved by
1	1 October 2012	Draft	Andrew Copp Senior Archaeological Consultant	Neil Macnab Principal Archaeological Consultant	Annette Roe Technical Director
2	5 October 2012	Draft Following URS Internal Review	Andrew Copp Senior Archaeological Consultant	Neil Macnab Principal Archaeological Consultant	Annette Roe Technical Director

URS Infrastructure & Environment UK Limited
 West One
 Wellington Street
 Leeds
 LS1 1BA

WSI FOR ARCHAEOLOGICAL GEOPHYSICAL
 SURVEY
 October 2012



Limitations

URS Infrastructure & Environment UK Limited ("URS") has prepared this Report for the sole use of Miller Homes (North East) Limited ("Client") in accordance with the Agreement under which our services were performed (**Proposal approved 10/09/12**). No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken between 27 September 2012 and 1 October 2012 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

Where field investigations are carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in issuing this Report.

Copyright

© This Report is the copyright of URS Infrastructure & Environment UK Limited. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.



TABLE OF CONTENTS	1	INTRODUCTION	4
	1.1	Project background	4
	1.2	Site description	4
	2	ARCHAEOLOGICAL BACKGROUND	5
	3	PROJECT OBJECTIVES	6
	3.1	General Objectives	6
	4	SCOPE OF WORKS	6
	5	WORKS SPECIFICATION	7
	5.1	General Works	7
	5.2	Specific Works	7
	5.3	Data processing	8
	6	COMPLETION OF FIELDWORK	8
	7	MONITORING, PROGRESS REPORTS & MEETINGS ..	8
	8	REPORTING	8
	9	RESOURCES AND TIMETABLE	9
	10	ARCHIVE PREPARATION AND DEPOSITION	9
	11	CONFIDENTIALITY AND PUBLICITY	10
	12	COPYRIGHT	10
	13	ACCESS ARRANGEMENTS AND SITE INFORMATION	10
	14	INSURANCES AND HEALTH AND SAFETY	10
	15	GENERAL PROVISIONS	11
	16	REFERENCES	11

List of Tables

Table 1– Archaeological geophysical survey requirements

Appendices

Appendix 1 – Archaeological standards and guidelines

Appendix 2 - Figures



1 INTRODUCTION

1.1 Project background

This Specification has been prepared by URS in consultation with the archaeological officer, Northumberland County Council, it describes a programme of archaeological detailed magnetometry geophysical survey that shall be carried out on behalf of Miller Homes (North East) Limited on land at Wheatridge Farm.

The assessment is part of a structured programme of investigations that are being carried out at the predetermination stage of the planning process to comply with Policy E12 (Blyth Valley District Local Plan) and recently published national planning guidance outlined in the National Planning Policy Framework (NPPF, 2012).

Policy E12, Archaeology requires an archaeological assessment is carried out 'where any part of the site ... falls within a known or potential site of archaeological significance ... or an area of archaeological potential ...' (Policy E12i), in order to determine the approximate quality, importance and extent of the archaeological remains. If the assessment indicates that important archaeological remains may exist on a proposed development site then an archaeological evaluation shall be carried out and the results submitted to the Local Planning Authority prior to the determination of the planning application (Policy E12ii). The evaluation will help to define the character and extent of the archaeological remains and provide useful information for identifying potential options for minimising or avoiding damage.

Paragraph 128 of the NPPF states that:

In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation. (NPPF Para 128)

The Specification and accompanying drawings detail the requirements for geophysical survey to inform the design of trial trench layout (should it be required).

The proposed works include 2.88ha. of detailed magnetometry geophysical survey to be carried out over two areas at the site (see Section 4).

The works specified in this document will be let by competitive tender by URS (the Consultant) to an (archaeological) Contractor.

1.2 Site description

The proposed development area of c.7.1ha is located at Ordnance Survey (OS) grid ref. NZ2968 7613 in a triangle of former agricultural land between the A192, 'Wheatfields' and 'Double Row', on the northern outskirts of Seaton Delaval, northeast of Newcastle (Figure 1). The land is currently in use as a paddock for a number of horses which are kept within temporary plots within the field defined by



temporary electric fencing. In general terms the site has an open aspect to the north but is enclosed to the south, west and east by buildings and trees. To the north the site is bounded by a mature hedgerow and beyond by agricultural fields, but to the south and east the presence of buildings reflects the areas past industrial coal mining heritage. In the southwest is a modern housing estate that has been built around 'Wheatfields' and to the west is a narrow belt of trees between the site and the A192 road. The perimeter field boundary is composed of a wire fence on posts with a gated entrance to the southwest.

A number of buried and overhead services were noted during a site visit. High voltage electricity wires are mounted on a series of wooden poles that cross the western side of the site on an approximate north-south alignment and to the southwest are a series of brick built inspection chambers that may indicate buried water or foul water services.

The records of the British Geological Survey (BGS) indicate that the site is underlain by a deposit of boulder clay which covers Carboniferous Coal Measures (BGS, Sheet 20, Newcastle upon Tyne, 1:50,000 Series Geological Map, solid and Drift).

2 ARCHAEOLOGICAL BACKGROUND

Modern aerial photographs of the development area indicate the presence of extensive remains of ridge and furrow type earthworks that could be part of a medieval or later cultivation system, possibly associated with the former medieval village of Seaton Delaval that is located further to the southeast (c.2.8km). On the ground these earthworks appear to be better preserved at the north end of the site and it is likely that they have been ploughed-out at the southern end. The earthworks include a number of possible house platforms which could indicate possible settlement activity within the site.

No previous archaeological work has been carried out at the site, although to the southeast, immediately northwest of Blackhaugh Drive, reconnaissance surveys that included geophysical survey and evaluation trial trenching did produce evidence for occupation. Although undated the excavations produced evidence of a probable timber structure which is tentatively assigned to the prehistoric or Roman period. Further to the east prehistoric flintwork that is Neolithic in date was identified at two locations to the east of Hownham Close during the geophysical survey in 2002 (approx. 400m from the site).

In the wider area a Neolithic or Bronze Age cist burial is recorded on the Northumberland Historic Environment Record, approx. 900m to the south of the site. Aerial photography has also recorded a Neolithic causewayed enclosure or farmstead at Lookout Farm, approx. 2.8km to the east and there are other undated cropmarks to the northwest and northeast that indicate occupation in the vicinity of the site that could be prehistoric or Romano-British in date. A possible Romano-British homestead is recorded on the HER approx. 1.2km to the south of the site, but there are no known Roman remains at the site or within 1km of the site.

In 1838 the Seaton Delaval Coal Company opened a colliery adjacent to the eastern boundary of the site. The colliery was served by railway lines, sidings and wagon ways and a number of buildings were constructed for the colliery and the miners, some of which survive including the former mine owners house (English Heritage List Entry 1041320, Head Office/showroom of Delcor Furniture Limited). The mine closed in 1960 and the colliery is now mature woodland and contains a number of ventilation air shafts.



3 PROJECT OBJECTIVES

3.1 General Objectives

The general survey objectives are detailed below:

- to investigate the archaeological potential of the site;
- assess the presence /absence of potential archaeological anomalies that might be present;
- provide evidence to establish the potential of key target areas that could be investigated by trial trench evaluation;
- to determine the level of risk that the archaeological resource would present to the proposed development; and
- to inform the layout of further reconnaissance or evaluation fieldwork or to aid the determination of a suitable mitigation works specification and programme.

4 SCOPE OF WORKS

The areas for geophysical survey are shown on Figure 2 and described in Table 1 and will consist of two blocks of 30 x 30m survey grids in Area A (west side of the field) and Area B (east side), either side of the overhead electricity powerlines.

The total area for detailed magnetometry survey amounts to 2.88ha (28,800m²) that represents approximately 40% of the total area of the site.

If significant archaeological anomalies are detected or inferred survey, then areas might be extended, but only after agreement from URS.

It may be necessary for the Contractor to undertake a preliminary assessment of ground conditions prior to the commencement of the fieldwork. The Contractor will notify URS of any areas that in their opinion are unsuitable for survey.

The client will negotiate the re-location of the animals prior to the start of the work.

Table 1 Archaeological geophysical survey requirements

Area	No. of survey grids (30x30m)	Area (m ²)	Description
A	12	10,800	Investigate area that contains ridge and furrow earthworks
B	20	18,000	Investigate area that contains ridge and furrow earthworks and other earthworks including possible house platforms



5 WORKS SPECIFICATION

5.1 General Works

All survey work will be carried out in accordance with this Specification and current good practice (English Heritage 2008, Geophysical Survey in Archaeological Field Evaluation), the Standard and Guidance for archaeological geophysical survey prepared by the Institute for Archaeologists (IfA 2011), the IfA Code of Conduct (IfA 2010) and other current and relevant best practice and standards and guidance (refer to Appendix 1).

The Contractor shall prepare and submit a Method Statement for the works prior to commencement of fieldwork for approval by URS.

The survey(s) will be undertaken by an experienced operator to provide consistent results with regard to pattern recognition and to provide initial screening of noise resulting from recent ferrous disturbance and local magnetic pollution.

During the survey a record should be made of surface conditions and sources of modern geophysical interference that might have a bearing on subsequent interpretation of field data.

The survey grid/transects must be established by electronic means using a survey-grade GPS (English Heritage, 2003) or equivalent metric survey device and accurately tied to the Ordnance Survey National Grid. This should be internally accurate to ± 100 mm, and the grid locatable on the Ordnance Survey 1:2500 map. An estimate of the precision of survey control is to be included in the Method Statement and it will also address how the survey transects will be laid out. If appropriate the Contractor must ensure that any survey stations are tied into permanent landscape features recorded on the latest Ordnance Survey edition to enable the accurate relocation of archaeological anomalies detected by survey.

5.2 Specific Works

Detailed magnetometer survey will be carried out over the designated survey area using either a Geoscan FM 36 Fluxgate Gradiometer or a Bartington GRAD 601 Fluxgate Gradiometer (or similar electronic instrument). Readings should be taken at 4 readings per metre at 1m traverses within a 1m grid system.

The data should be downloaded at regular intervals on-site into a laptop computer for initial processing and storage. This will ultimately be transferred to a desktop computer for further processing, interpretation and archiving. Geoplot v.3 software (or comparable) will be used to interpolate the data to form an array of regularly spaced values at 0.25m x 0.25m intervals. Continuous tone greyscale images of raw data and an x/y trace plot will also be produced. Palette bars relating the greyscale intensities to anomaly values in ohms will be included with the images.

The raw and processed data should be presented in the report. The processed drawings should be accurately located and presented in relation to the OS base plan and the survey markers should be accurately plotted to aid in the laying out of subsequent evaluation or excavation areas. Interpretation plots shall be included in the report.



5.3 Data processing

The processing of datasets will be concurrent with the fieldwork and immediately after completion of fieldwork the processing of the remaining data will be completed.

6 COMPLETION OF FIELDWORK

The Contractor shall prepare and submit a Completion Statement to URS within one working day of completing the survey.

The survey areas will be left in a tidy and workman-like condition and the Contractor will ensure that all materials brought onto site are removed.

An OASIS entry shall be completed at the end of the fieldwork, irrespective of whether a formal report is required. The Contractor will complete the online form at <http://ads.ahds.ac.uk/project/oasis/> within one month following completion of the fieldwork. Archaeological contractors are advised to contact OASIS (oasis@ads.ahds.ac.uk) for technical advice.

7 MONITORING, PROGRESS REPORTS & MEETINGS

The archaeological geophysical survey will be subject to monitoring visits by URS who will have unrestricted access to the site, site records or any other information. The work will be inspected to ensure that it is being carried out to the required standards and that it will achieve the stated objectives.

Verbal progress reports will be provided to URS upon request and weekly written progress reports will be provided to URS if requested. In addition, progress meetings between URS, the Local Authority Planning Archaeologist and the Contractor may be held on site during the course of the works.

The Contractor will only accept instruction from URS.

8 REPORTING

An Interim Statement of the results of the fieldwork will be prepared and submitted within 2 days of the completion of the fieldwork.

A fieldwork report will be submitted in draft within 2 weeks of the completion of fieldwork. The preparation of the survey archive and fieldwork report will be undertaken in accordance with this Archaeological Design and relevant archaeological standards and national guidelines (refer to Appendix 1). The report will include the following

- a non-technical summary;
- site location;
- archaeological and historical background;
- full detailed methodology;
- aims and objectives;
- results (to include full description, assessment of condition, quality and significance of the results);
- general and detailed plans showing the location of the results and identifying any areas unsuitable for survey, accurately positioned on an

OS base map (to a known scale commensurate with the objectives of the survey);

- colour/grey scale plots to aid interpretation. The plots will be contoured (if appropriate) to allow trends to be shown superimposed over data without obscuring it;
- an interpretative plot(s);
- an assessment of potential with recommendations for further survey;
- images to illustrate the survey work in progress;
- publication proposals if warranted;
- a cross-referenced index of the project archive

The report will comment on the potential for extrapolating the results onto adjacent areas.

An electronic copy of the draft report and drawing/figures will be submitted to the Consultant who will forward a copy to the Local Authority Planning Archaeologist for comment. In finalising the report the comments of the Consultant and Local Authority Planning Archaeologist will be taken into account.

Six bound copies, one unbound master-copy and a digital version of the finalised report will be submitted within 1 week of the receipt of comments on the draft report. The digital report shall comprise a CD containing a complete version of the report in PDF format and separate digital text (in Microsoft Word format) and CAD mapping files (in ESRI GIS or AutoCAD format) and any other illustrations or plates (in appropriate format).

9 RESOURCES AND TIMETABLE

All archaeological personnel involved in the project should be suitably qualified and experienced professionals. The Contractor shall provide the Consultant with staff CV's of the Project Manager, Site Supervisor and Site assistants' CV's. All site assistants should have an appropriate understanding of fieldwork procedures.

The fieldwork programme will commence in late 2012 once permission to carry out the survey has been obtained and the survey will be completed at the earliest opportunity.

URS will inform the Contractor of the start date for the works and the Contractor will provide URS with a programme for the works (fieldwork and reporting) within 2 days of the start date.

10 ARCHIVE PREPARATION AND DEPOSITION

The archive of finds and records generated during the fieldwork will be kept secure at all stages of the project. All records and materials produced will be quantified, ordered, indexed and internally consistent. The archive will be produced to the standards outlined by English Heritage MoRPHE Guidelines (English Heritage 2006; Brown 2007).

The Contractor will, prior to the start of fieldwork, liaise with an appropriate accredited repository to obtain agreement in principle to accept the documentary, digital and photographic archive for long-term storage. The Contractor will be



responsible for identifying any specific requirements or policies of the recipient repository in respect of the archive, and for adhering to those requirements.

Archaeological material recovered from fieldwork is irreplaceable and data recorded in the course of fieldwork can and should be copied and additionally held securely in a separate location in line with current best practice until it can be deposited in the recipient repository (English Heritage 2011).

The deposition of the archive forms the final stage for each phase of development at the application site. The Contractor shall provide the Clients Archaeological Consultant with copies of communication with the accredited repository and written confirmation of the deposition of the archive. The Clients Archaeological Consultant will deal with the transfer of ownership and copyright issues.

11 CONFIDENTIALLY AND PUBLICITY

The archaeological works may attract the interest of the public and the press. All communication regarding this project is to be directed through the Consultant. The Contractor will refer all inquiries to the Consultant without making any unauthorised statements or comments.

The Contractor will not disseminate information or images associated with the project for publicity or information purposes without the prior written consent of the Consultant.

12 COPYRIGHT

The Contractor shall assign copyright in all reports, documentation and images produced as part of this project to the Client. The Contractor shall retain the right to be identified as the author or originator of the material. This applies to all aspects of the project. It is the responsibility of the Contractor to obtain such rights from sub-contracted specialists.

The Contractor may apply in writing to use or disseminate any of the project archive or documentation (including images). Such permission will not be unreasonably withheld.

The results of the archaeological works shall be submitted to the Client, the Local Authority Planning Archaeologist and if required to English Heritage by the Consultant and will ultimately be made available for public access.

13 ACCESS ARRANGEMENTS AND SITE INFORMATION

Access to the application site to carry out archaeological investigations will be arranged /organised by the Consultant.

Should the Contractor require adjustment to the location of fieldwork interventions or works areas due to local conditions, this shall be agreed with the Consultant prior to its implementation.

14 INSURANCES AND HEALTH AND SAFETY

The Contractor will provide the Consultant with details of their public and professional indemnity insurance cover.

The Contractor will have their own Health and Safety policies compiled using national guidelines, which conform to all relevant Health and Safety legislation and



best practice. A copy of the Contractors Health and Safety policy will be submitted along with their tender to the Consultant, who will forward this on to the Client.

The Contractor shall prepare Risk Assessments and a project specific Health and Safety Plan and submit these to the Consultant for approval prior to the commencement of the fieldwork. If amendments are required to the Risk Assessment during the works the Consultant and any other interested party must be provided with the revised document at the earliest opportunity.

The Contractor shall be responsible for identifying any buried or overhead services and taking the necessary precautions to avoid damage to such services, prior to the fieldwork.

15 GENERAL PROVISIONS

The Contractor will undertake the works in accordance with the specifications issued by the Consultant and in any subsequent written variations. No variation from, or changes to, the specification will occur except by prior agreement with the Consultant (where appropriate in consultation with the Local Authority Planning Archaeologist).

The site will be left in a tidy and workman-like condition and the Contractor will ensure that all materials brought onto site are removed.

The Contractor shall make the minimum of disturbance during the fieldwork and will avoid any unnecessary damage. If appropriate, access for temporary parking and the location of site welfare shall be agreed with the Contractor prior to the commencement of the fieldwork. The provision of welfare facilities shall be the responsibility of the Contractor.

16 REFERENCES

ADS, 2002, Geophysical Data in Archaeology: A Guide to Good Practice

Brown, D.H. 2007, Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation. IFA Archaeological Archives Forum (Reading)

English Heritage, 2003, Where on Earth Are We? The Global Positioning System (GPS) in archaeological field survey. English Heritage (London)

English Heritage, 2006, Management of Research Projects in the Historic Environment. The MoRPHE Project Managers' Guide. English Heritage (Swindon)

English Heritage, 2008, Geophysical Survey in Archaeological Field Evaluation. English Heritage Research and Professional Services Guidelines No 1 (second edition). English Heritage (Swindon)

English Heritage, 2011, Safeguarding Archaeological Information. Procedures for minimising risk to undeposited archaeological archives (draft guidance)

IfA, 2007, Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation

IfA, 2010, Code of Conduct. Institute for Archaeologists (Reading)

IfA, 2011, Standard and Guidance for Archaeological Geophysical Survey. Institute for Archaeologists (Reading)



Appendix 1

Archaeological standards and guidelines

WSI FOR ARCHAEOLOGICAL GEOPHYSICAL
SURVEY
October 2012

Archaeological Standards and Guidelines

AAF, 2007, Archaeological Archives. A guide to best practice in creation, compilation, transfer and curation. Archaeological Archives Forum

AEA, 1995, Environmental Archaeology and Archaeological Evaluations. Recommendations concerning the environmental archaeology component of archaeological evaluations in England. Working Papers of the Association for Environmental Archaeology No 2

Barber, B., Carver, J., Hinton, P. and Nixon, T., 2008, Archaeology and development. A good practice guide to managing risk and maximising benefit. Construction Industry Research and Information Association Report C672

Bayley, J. (ed) 1998, Science in Archaeology. An agenda for the future. English Heritage (London)

Bewely, R., Donoghue, D., Gaffney, V., Van Leusen, M., Wise, M., 1998, Archiving Aerial Photography and Remote Sensing Data: A guide to good practice. Archaeology Data Service

Brown, A. and Perrin, K., 2000, A Model for the Description of Archaeological Archives. English Heritage Centre for Archaeology/ Institute of Field Archaeologists (Reading)

Brown, D.H. 2007, Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation. IFA Archaeological Archives Forum (Reading)

Cowton, J., 1997, Spectrum. The UK Museums Documentation Standard. Second edition. Museums Documentation Association

Darvill, T. and Atkins, M., 1991, Regulating Archaeological Works by Contract. IFA Technical Paper No 8, Institute of Field Archaeologists (Reading)

Davis, M.J., Gdaniec, K.L.A., Bryce, M. and White, L. 2004, Study of the Mitigation of Construction Impacts on Archaeological Remains. Museum of London Archaeology Service (London)

Eiteljorg, H., Fernie, K., Huggett, J. and Robinson, D., 2002, CAD: A guide to good practice. Archaeology Data Service (York)

EA, 2005, Guidance on Assessing the Risk Posed by Land Contamination and its Remediation on Archaeological Resource Management. English Heritage/ Environment Agency Science Report P5-077/SR (Bristol)

EH, 1995, A Strategy for the Care and Investigation of Finds. English Heritage Ancient Monuments Laboratory (London)

EH, 2000, Managing Lithic Scatters. Archaeological guidance for planning authorities and developers. English Heritage (London)

EH, 2002, Human Bones from Archaeological Sites. Guidelines for producing assessment documents and analytical reports. English Heritage (London)

EH, 2002, With Alidade and Tape: graphical and plane table survey of archaeological earthworks. English Heritage (Swindon)



- EH, 2003, Where on Earth Are We? The Global Positioning System (GPS) in archaeological field survey. English Heritage (London)
- EH, 2003, (revised 2008), Metric Survey Specifications for English Heritage. English Heritage (Swindon)
- EH, 2003, Twentieth-Century Military Sites. Current approaches to their recording and conservation. English Heritage (Swindon)
- EH, 2004, Human Bones from Archaeological Sites: Guidelines for producing assessment documents and analytical report. English Heritage Centre for Archaeology Guidelines
- EH, 2004, Geoarchaeology, Using earth sciences to understand the archaeological record. English Heritage (Swindon)
- EH, 2005, Discovering The Past Shaping The Future. Research Strategy 2005-2010. English Heritage (Swindon)
- EH, 2006, Our Portable Past: a statement of English Heritage policy and good practice for portable antiquities/surface collected material in the context of field archaeology and survey programmes (including the use of metal detectors). English Heritage (Swindon)
- EH, 2006, Management of Research Projects in the Historic Environment. The MoRPHE Project Managers' Guide. English Heritage (Swindon)
- EH, 2007, Understanding the Archaeology of Landscapes. A guide to good recording practice. English Heritage (Swindon)
- EH, 2007, 3D Laser Scanning for Heritage. Advice and guidance to users on laser scanning in archaeology and architecture. English Heritage (Swindon)
- EH, 2007, Geoarchaeology. Using earth sciences to understand the archaeological record. (London)
- EH, 2008, Luminescence Dating. Guidelines on using luminescence dating in archaeology. English Heritage (Swindon)
- EH, 2008, Geophysical Survey in Archaeological Field Evaluation. English Heritage Research and Professional Services Guidelines No 1 (second edition). English Heritage (Swindon)
- EH, 2008, Management of Research Projects in the Historic Environment. PPN 3: Archaeological Excavation
- EH, 2008, Management of Research Projects in the Historic Environment. The MoRPHE Project manager's Guide
- EH, 2009, Metric Survey Specifications for Cultural Heritage. 2nd edition. English Heritage (Swindon)
- EH, 2011, Safeguarding Archaeological Information. Procedures for minimising risk to undeposited archaeological archives (draft guidance)
- EH, 2011, Traversing the Past. The total station theodolite in archaeological landscape survey
- Ferguson, L. and Murray, D., 1997, Archaeological Documentary Archives. IFA Paper 1, Institute of Field Archaeologists (Reading)



- Gaffney, C. and Gater, J., with Ovenden, S., 2002, The Use of Geophysical Techniques in Archaeological Evaluations. IFA Technical Paper 9, Institute of Field Archaeologists (Reading)
- Gillings, M. and Wise, A., 1999, GIS: A guide to good practice. Archaeology Data Service (York)
- Handley, M., 1999, Microfilming Archaeological Archives. IFA Technical Paper 2, Institute of Field Archaeologists (Reading)
- IFA, 1992, Guidelines for Finds Work. Institute of Field Archaeologists (Reading)
- IFA, 2004, Guidelines to the Standards for Recording Human Remains. Institute of Field Archaeologists Paper No 7 (Reading)
- IfA, 2008, Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology. Institute for Archaeologists (Reading)
- IfA, 2010, Code of Conduct. Institute for Archaeologists (Reading)
- IfA, 2008, Standard and Guidance for Archaeological Watching Brief. Institute for Archaeologists (Reading)
- IfA, 2008, Standard and Guidance for Archaeological Field Evaluation. Institute for Archaeologists (Reading)
- IfA, 2008, Standard and Guidance for Archaeological Excavation. Institute for Archaeologists (Reading)
- IfA, 2008, Standard and Guidance for Archaeological Investigation and Recording of Standing Buildings or Structures. Institute for Archaeologists (Reading)
- IfA, 2008, Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials. Institute for Archaeologists (Reading)
- IfA, 2008, Draft Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives. Institute for Archaeologists (Reading)
- IfA, 2011, Standard and Guidance for historic environment desk-based assessment. Institute for Archaeologists (Reading)
- IfA, 2011, Standard and Guidance for archaeological geophysical survey. Institute for Archaeologists (Reading)
- Mays, S., Brickley, M. and Dodwell, N., 2002, Human Bones from Archaeological Sites. Guidelines for Producing Assessment Documents and Analytical Reports. Centre for Archaeology Guidelines, English Heritage (Portsmouth)
- McKinley, J.I. and Roberts, C., 1993, Excavation and Post-excavation Treatment of Cremated and Inhumed Human Remains. Institute of Field Archaeologists Technical Paper No. 13 (Reading)
- MDA and SMA 2000, Standards in Action: Working with Archaeology Guidelines. Museum Documentation Centre and Society of Museum Archaeologists. Museums Documentation Association and Society of Museum Archaeologists
- MGC, 1992, Standards in the Museum Care of Archaeological Collections. Museums and Galleries Commission



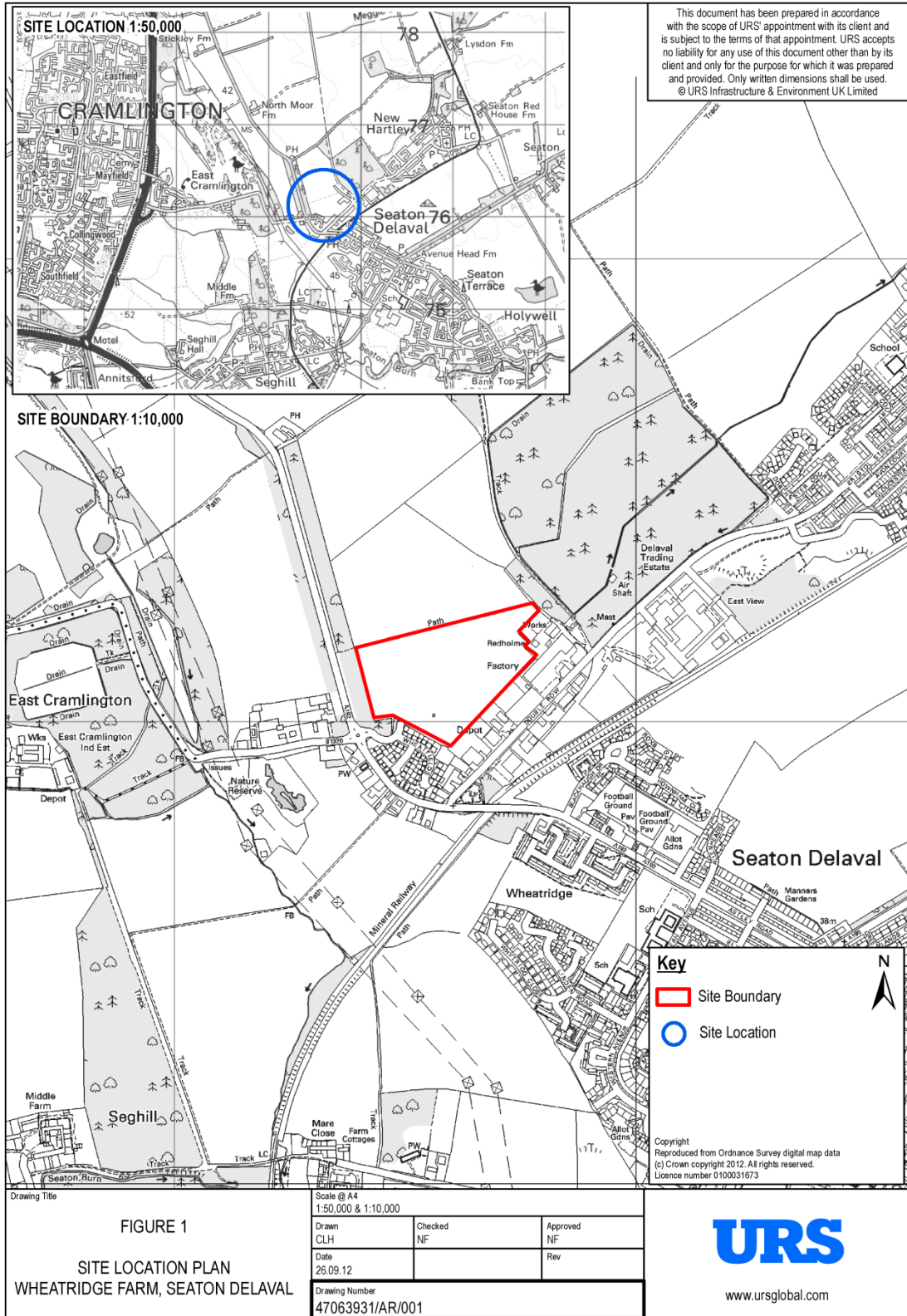
- Owen, J., 1995, Towards an Accessible Archaeological Archive. The Transfer of archaeological archives to museums: guidelines for use in England, Northern Ireland, Scotland and Wales. Society of Museum Archaeologists
- RCHME 1999, Recording Archaeological Field Monuments: A descriptive specification. RCHME (Swindon)
- RCHME 2007, MIDAS: A manual and data standard for monuments inventories. RCHME (Swindon)
- Schofield, A J, (ed) 1998, Interpreting Artefact Scatters. Oxbow Monograph 4 (Oxford)
- Richards, J. and Robinson, D. (eds), 2001, Digital Archives From Excavation and Fieldwork: A guide to good practice. Archaeology Data Service
- Schmidt, A., 2001, Geophysical Data in Archaeology: A guide to good practice. Archaeology Data Service
- SMA, 1993, Guidelines on the Selection, Retention and Dispersal of Archaeological Collections. Society of Museum Archaeologists
- SMA, 1995, Towards an Accessible Archaeological Archive – the Transference of Archaeological Archives to Museums: Guidelines for use in England, Northern Ireland, Scotland and Wales. Society of Museum Archaeologists
- UKIC, 1983, Packaging and Storage of Freshly Excavated Artefacts from Archaeological Sites. (United Kingdom Institute for Conservation, Conservation Guidelines No 2)
- UKIC, 1984, Environmental Standards for Permanent Storage of Excavated material from Archaeological Sites. (United Kingdom Institute for Conservation, Conservation Guidelines No 3)
- UKIC, 1990, Guidance for Conservation Practice. United Kingdom Institute for Conservation
- UKIC, 1990, Guidelines for the Preparation of Excavation Archives for Long-term Storage. United Kingdom Institute for Conservation Archaeology Section
- UKIC, 2001, Excavated Artefacts and Conservation. (United Kingdom Institute for Conservation, Conservation Guidelines No 1, revised)

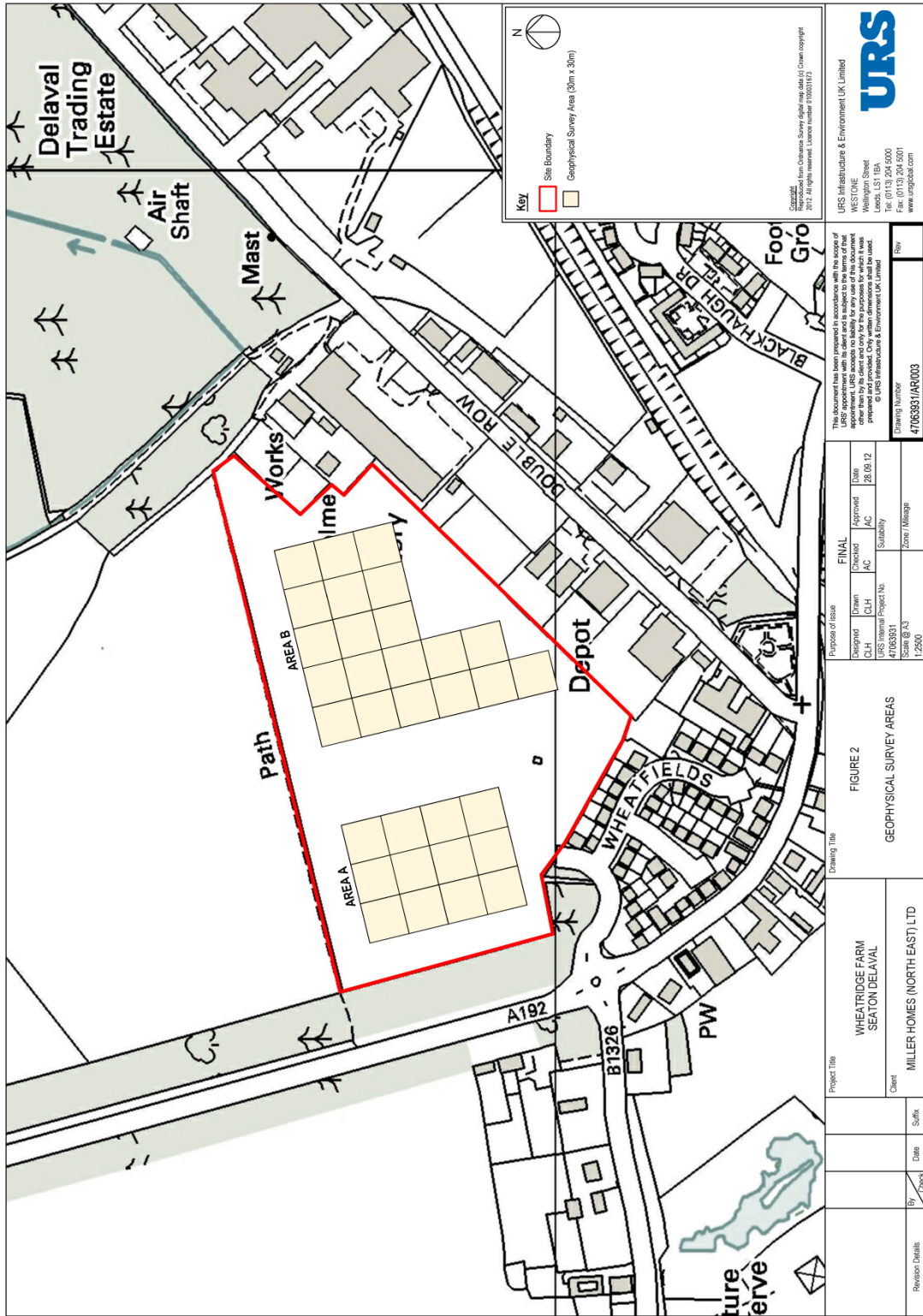


Appendix 2

Figures

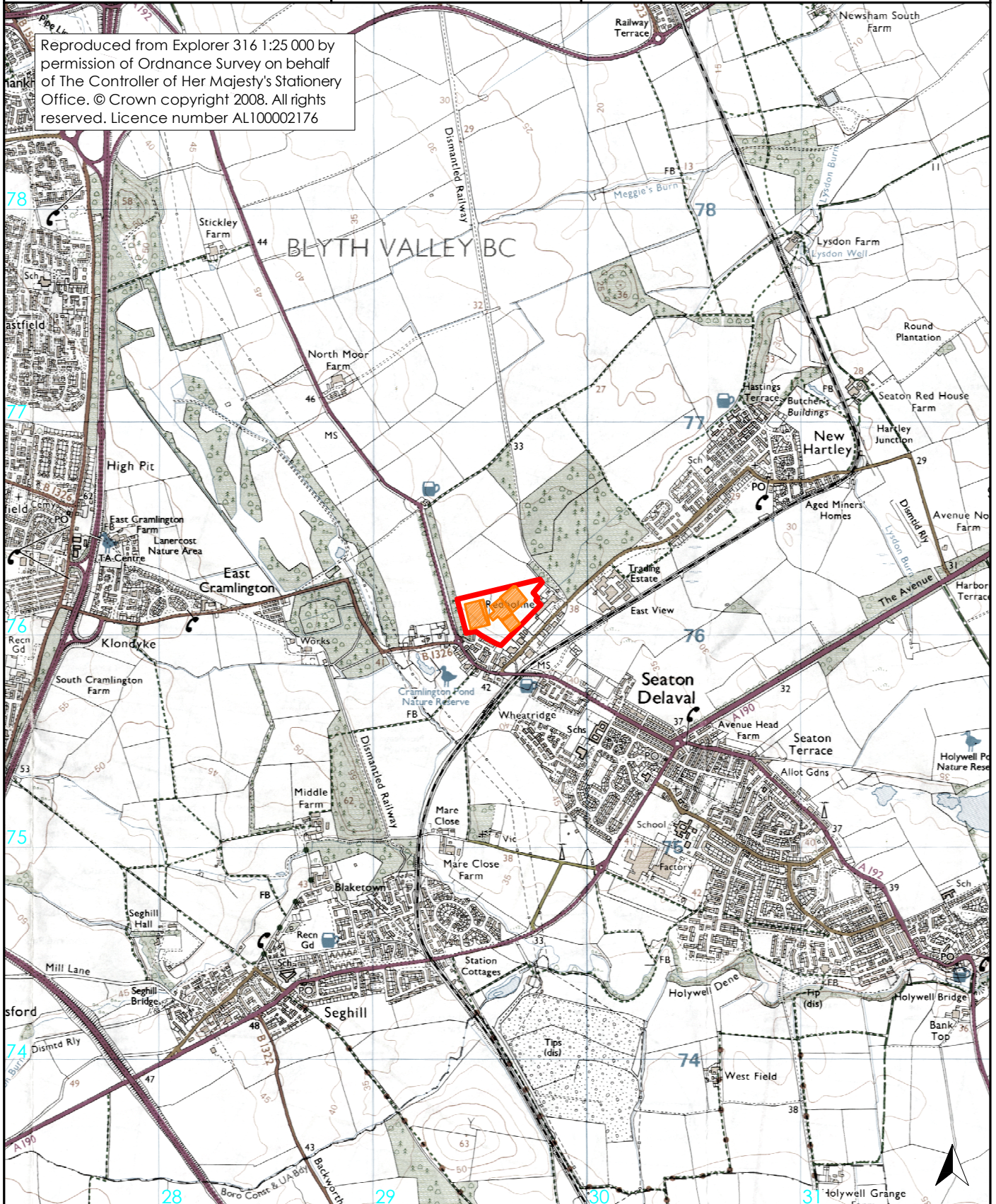
WSI FOR ARCHAEOLOGICAL GEOPHYSICAL
SURVEY
October 2012






Revision Details		By	Check	Date	Suffix
Project Title		WHEATRIDGE FARM SEATON DELAVAL			
Client		MILLER HOMES (NORTH EAST) LTD			
Drawing Title		FIGURE 2 GEOPHYSICAL SURVEY AREAS			
Purpose of Issue		Approved	Checked	Drawn	Date
Checked by		CLH	AC	AC	28.09.12
UFS Internal Project No.		47063931			
Scale @ A3		1:2500			
Drawing Number		47063931/AR003			
<p>This document has been prepared in accordance with the scope of URS report. URS works on a liability for services of the document only. It is not intended to be used for any other purpose than that for which it was prepared. © URS Infrastructure & Environment UK Limited.</p>					
<p>URS Infrastructure & Environment UK Limited WES D016 Wellington Street Leeds, LS1 7BA Tel: (0113) 204 5000 Fax: (0113) 204 5001 www.ursdata.com</p>					

Reproduced from Explorer 316 1:25 000 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright 2008. All rights reserved. Licence number AL100002176



 proposed development area

 survey

0  1km
scale 1:25 000 for A4 plot

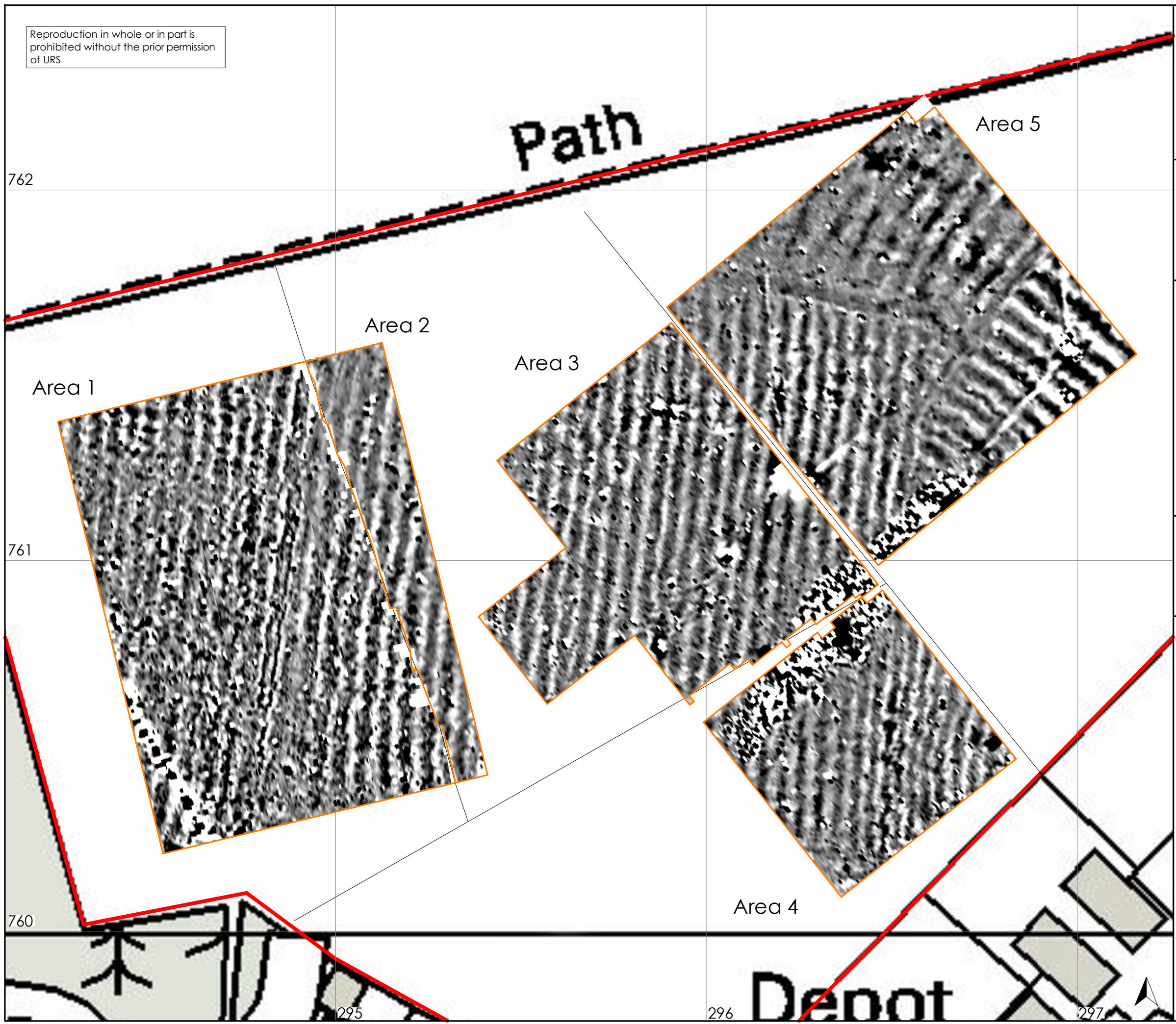
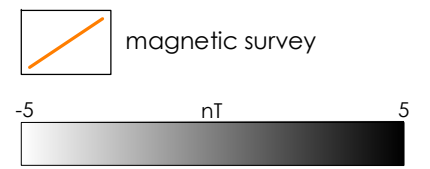
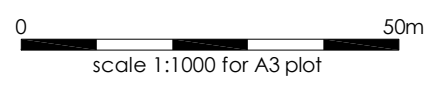
Reproduction in whole or in part is prohibited without the prior permission of URS

on behalf of
URS

Wheatridge Farm
Seaton Delaval
Northumberland

geophysical survey
report 3056

Figure 2: Geophysical survey



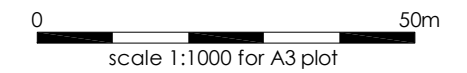
Reproduction in whole or in part is prohibited without the prior permission of URS

on behalf of URS

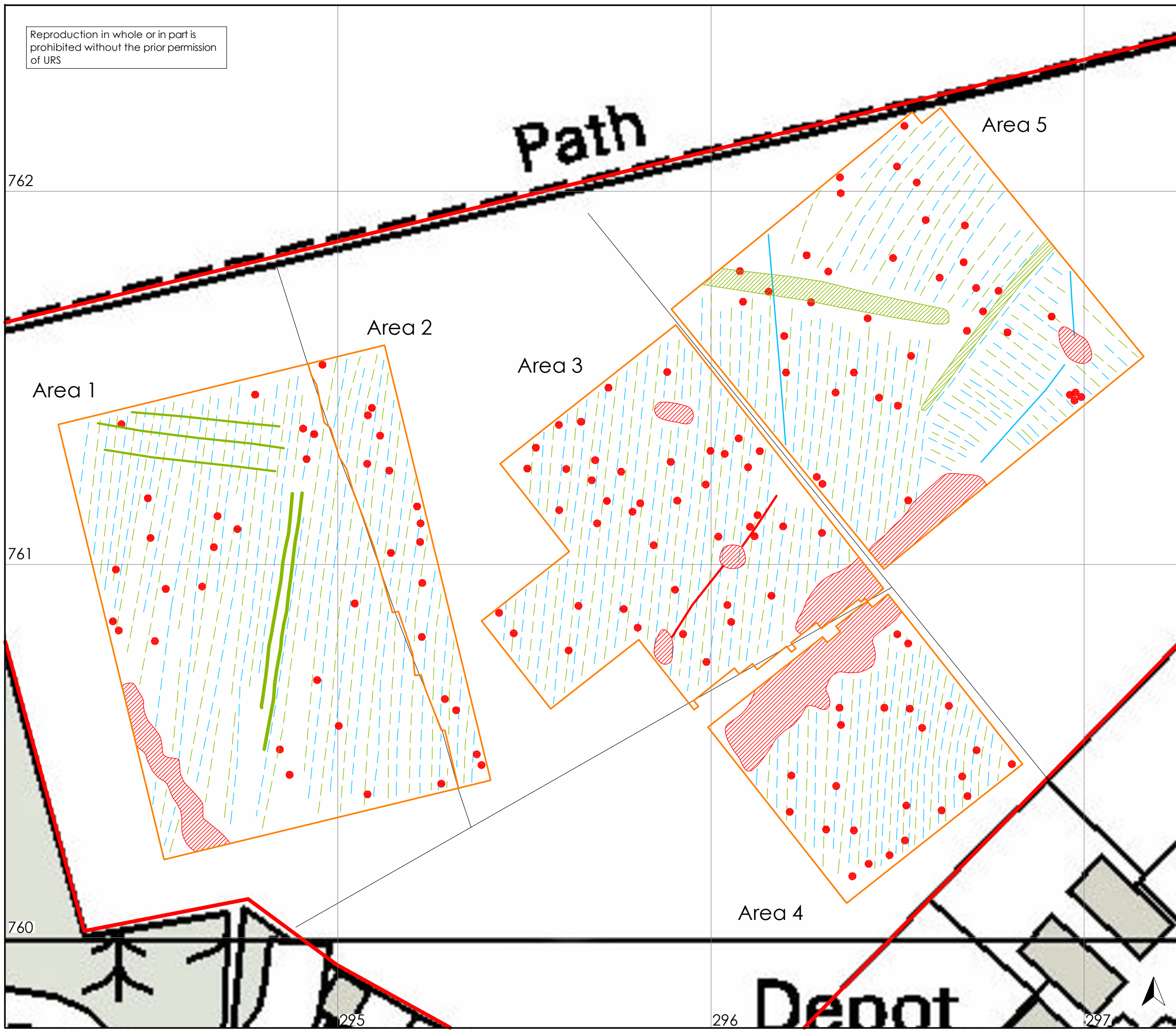
Wheatridge Farm
Seaton Delaval
Northumberland

geophysical survey
report 3056

Figure 3: Geophysical interpretation



- magnetic survey
- dipolar magnetic anomaly
- positive magnetic anomaly
- negative magnetic anomaly

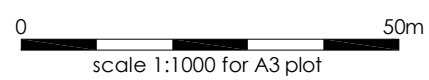


Reproduction in whole or in part is prohibited without the prior permission of URS

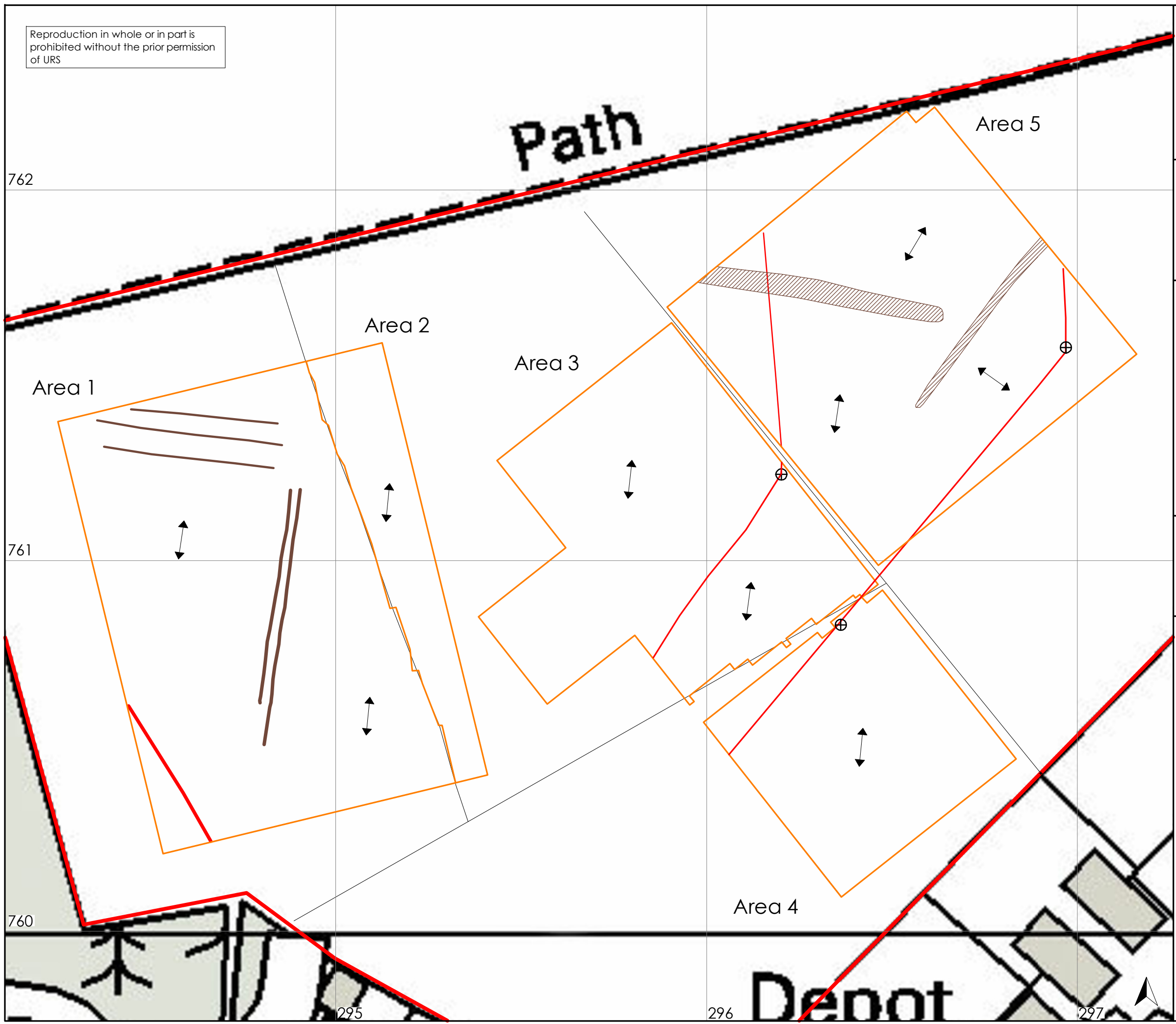
on behalf of
URS

Wheatridge Farm
Seaton Delaval
Northumberland
geophysical survey
report 3056

Figure 4: Archaeological interpretation



- magnetic survey
- soil-filled feature
- service pipe
- ridge and furrow
- inspection cover



on behalf of
URS

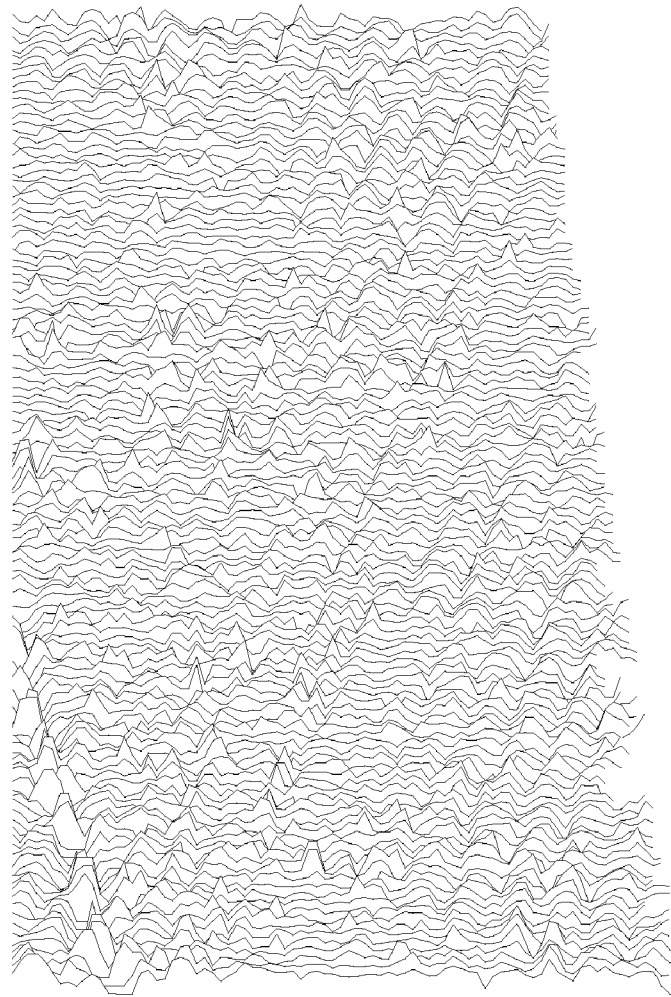
Wheatridge Farm
Seaton Delaval
Northumberland

geophysical survey
report 3056

Figure 5: Trace plots of geomagnetic data

0 50m
scale 1:1000 for A3 plot

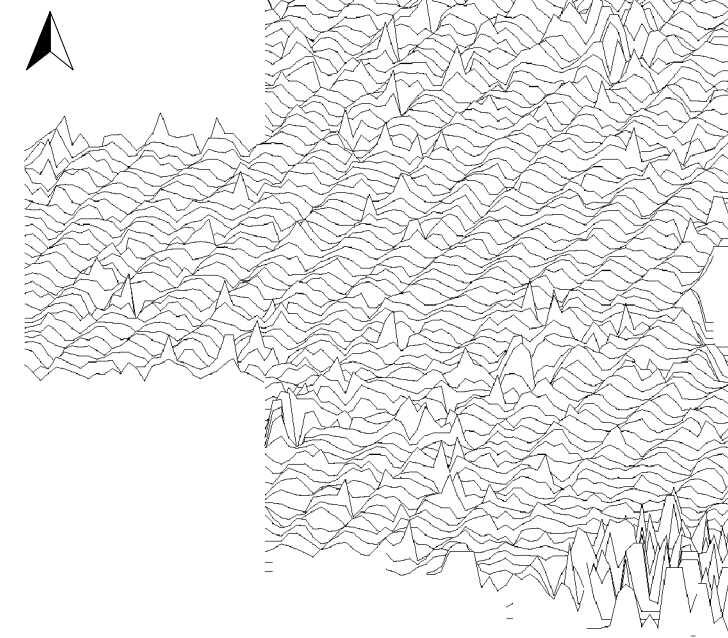
Area 1
46.30nT/cm



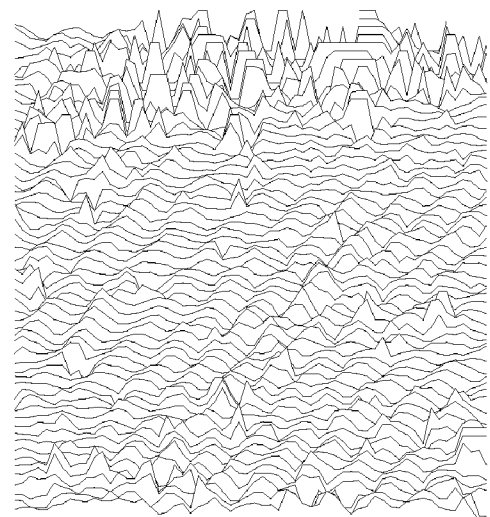
Area 2
35.80nT/cm



Area 3
31.60nT/cm



Area 4
40.00nT/cm



Area 5
40.00nT/cm

