



**NORTH WALSHAM ROAD,
HAPPISBURGH,
NORFOLK**

**GEOPHYSICAL SURVEY
(ENF133768)**

Work undertaken for
Happisburgh Estates Ltd

Report produced by
Andrew Failes BA(Hons) MA
and
Gary Taylor BA(Hons) MA MSc

April 2014

National Grid Reference: TG 3770 3067
OASIS Reference No.: archaeol1-176686

APS Report No: 39/14



**ARCHAEOLOGICAL
PROJECT
SERVICES**



CONTENTS

1.	SUMMARY	1
2.	INTRODUCTION	1
2.1	DEFINITION OF AN EVALUATION	1
2.2	BACKGROUND	1
2.3	TOPOGRAPHY AND GEOLOGY	1
3.	GEOPHYSICAL SURVEY	1
3.1	METHODS	1
3.2	RESULTS	3
4.	DISCUSSION.....	3
5.	ACKNOWLEDGEMENTS	4
6.	PERSONNEL.....	4
7.	BIBLIOGRAPHY	4
8.	ABBREVIATIONS	4

Appendix 1	Re-surveyed grid-squares (clip +/-10nT)
Appendix 2	The Archive
Appendix 3	OASIS Record

List of Figures

Figure 1	General location plan
Figure 2	Site location map
Figure 3	Detailed site map, showing survey grid
Figure 4	Field A North: Minimally processed data greyscale plot
Figure 5	Field A South: Minimally processed data greyscale plot
Figure 6	Field B: Minimally processed data greyscale plot
Figure 7	Field A North: Minimally processed data trace plot
Figure 8	Field A South: Minimally processed data trace plot
Figure 9	Field B: Minimally processed data trace plot

Figure 10 Field A: Processed data greyscale plot

Figure 11 Field B: Processed data greyscale plot

Figure 12 Field A: Interpretive plot

Figure 13 Field B: Interpretive plot

Figure 14 Processed geophysical survey greyscale combined plot

Figure 15 Geophysical survey combined interpretive plot

1. SUMMARY

Detailed magnetic gradiometer survey was undertaken in connection with proposed development on land off North Walsham Road, Happisburgh, Norfolk. The survey area totalled c. 8ha.

The survey revealed two linear features of potential archaeological origin in the western part of the site. However, these can be correlated with a footpath and field boundary shown on 19th century and later maps. A few pit-type anomalies were recorded close to the northern edge of the site, but these were isolated with no clear associations and are difficult to interpret on the basis of form alone. Areas of magnetic disturbance were recorded towards the northern and southern ends of the western part of the site. These are probably caused by discarded metal items and pieces of farm machinery were noted at the northern end of the field. Irregular and diffuse anomalies at the southern end of the survey area are probably caused by geological variations.

2. INTRODUCTION

2.1 Definition of an Evaluation

Geophysical survey is a non-intrusive method of archaeological evaluation. Evaluation is defined as 'a *limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site. If such archaeological remains are present Field Evaluation defines their character and extent, quality and preservation, and it enables an assessment of their worth in a local, regional, national or international context as appropriate*' (IfA 2008).

2.2 Background

Archaeological Project Services was commissioned by Happisburgh Estates

Ltd to undertake detailed magnetometer survey totalling some 7.75ha on land off North Walsham Road, Happisburgh, Norfolk in connection with proposed development of the area. The survey was carried out between the 17th and 21st March 2014.

Cropmarks of a medieval or post-medieval trackway have been identified at the site and there are cropmarks of undated ditches directly adjacent to the site, on the west. In addition, Middle Saxon and medieval, 12th-14th century, remains, the latter including evidence of glass-working, have been found immediately to the northeast of the site. Redeposited Roman artefacts were also found at that location.

2.3 Topography and Geology

Happisburgh is located on the northeast Norfolk coast, approximately 27km northeast of Norwich and 28km northwest of Great Yarmouth in the administrative district of North Norfolk (Fig. 1).

The proposed development site is located approximately 300m southwest of the centre of Happisburgh, to the south of North Walsham Road, at National Grid Reference TG 3770 3067 (Fig. 2).

The survey area lies at a height of c. 10m OD on land that slopes gently down to the south.

Local soils are of the Wick 2 Association, sandy loams (Hodge *et al.* 1984, 346). These soils are developed on thin aeolian drift which overlies sands and gravels which in turn seals a solid geology of chalk.

3. GEOPHYSICAL SURVEY

3.1 Methods

Location and layout of the survey area is shown in Figure 3. The field was bare ploughed but not harrowed ground and in good condition for survey.

Survey was undertaken in accordance with English Heritage (2008) and IfA (2011) guidelines and codes of conduct.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. This records subtle changes in the magnetic field resulting from differing features in the soil. Changes as small as 0.2 nanoTesla (nT) in an overall field strength of c. 49,000nT can be accurately detected using this instrumentation, although in practice instrument interference and soil noise can limit sensitivity.

Magnetometers measure changes in the Earth's magnetic field. With two sensors configured as a gradiometer the recorded values indicate the difference between two magnetic measurements separated by a fixed distance. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame with a 1m separation between the sensing elements giving a strong response to deep anomalies.

The mapping of anomalies in a systematic manner allows interpretation of the type of material present beneath the surface. Strong magnetic anomalies are generated by buried iron-based objects or by kilns or hearths, usually resulting in a bipolar (positive/negative) response. More subtle positive anomalies representing pits and ditches can be seen where these contain more topsoil which is normally richer in magnetic iron oxides and provides a contrast with the natural subsoil (but this can vary depending on the nature of the underlying deposits). A negative anomaly may result from upcast bank material. Wall foundations can also show as negative anomalies where the stone is less magnetic than the surrounding soil, or as stronger positive and negative anomalies if of brick, but are not always responsive to the technique.

It should be noted that not all features will be responsive and absence of anomalies

does not necessarily indicate absence of archaeological features.

Sampling interval and data capture

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid. The Grad 601 has a typical depth of penetration of 0.5m to 1.0m although a greater range is possible where strongly magnetic objects have been buried in the site.

Readings are logged consecutively into the data logger which is downloaded daily either into a portable computer whilst on site or directly to the office computer. At the end of each job, data is transferred to the office for processing and presentation.

Processing and presentation of results

Processing is performed using specialist ArcheoSurveyor 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 (Destripe or zero mean traverse). Despiking is also performed to reduce the effect of the anomalies resulting from small iron objects often found on agricultural land. Further processing can then be carried out which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following are the processing techniques carried out on the processed gradiometer data used in this report:

1. DeStripe (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)
2. Despike (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)
Parameters: X radius = 1; Y radius = 1; Threshold = 3SD; Spike replacement =

mean

3. Clip (excludes extreme values allowing better representation of detail in the mid range): -2 to 2nT.

3.2 Results

The presentation of the data for the site involves a print-out of the raw or minimally processed data as greyscale and trace plots (Figs 4, 5, 6, 7, 8, 9; clipped for display but otherwise unprocessed), together with greyscale plots of the processed data (Figs 10, 11, 14). Magnetic anomalies have been identified and plotted onto an interpretative drawing (Fig. 12, 13, 15) and are described below.

Linear positive anomalies

A strong positive linear anomaly of potential archaeological origin was recorded in the southern part of the western Field A. This is very straight and although its alignment differs from that of the extant boundaries, it does correspond with the position of a removed field boundary shown on historic maps.

Alongside this immediately to the west is a slight positive linear anomaly. This may be another ditch, the two perhaps defining the side of track. However, this slight linear anomaly is not quite parallel with the stronger signal but is gradually diverging from it northwards. It is therefore perhaps more likely to be an agricultural trend.

Negative linear anomalies

A single negative linear anomaly of potential archaeological origin was recorded in the northern part of Field A. This extends from the northern end of the linear positive anomaly noted above and courses in a northeasterly direction. Although not clear in the area of the junction with the positive linear anomaly, this negative linear anomaly appears to resume a short distance to the southwest, and extends southwestward. This negative linear anomaly corresponds with the former route of a footpath shown on 19th and 20th century maps.

Area positive anomalies

A few discrete positive anomalies were recorded in the northern part of the survey area. These are quite strong and discrete and may have an archaeological origin, possibly representing pit-type features. However, they are quite isolated and difficult to interpret on the basis of form alone.

Magnetic disturbance

Strong area bipolar response generally results from larger metal items (either buried or at the surface) but may also be caused by concentrations of debris at field margins or by metal elements in fencing of boundaries. Two areas of large bipolar (magnetic) responses were recorded, one close to the northern edge of western Field A and the other towards the southern end of the same field. Those in the northern part of the field were probably the result of discarded pieces of farm machinery which were noted during the survey.

Iron spikes (discrete bipolar anomalies)

Iron items within the topsoil give a distinctive localised bipolar (strong positive with associated strong negative) response. Such items usually derive from relatively recent management or agricultural use of the land – broken or discarded pieces of agricultural machinery or other modern debris. These are fairly numerous and widely scattered with no particular concentrations.

Geological response

Along the southern side of the survey area are amorphous and diffuse responses which probably reflect changes in the background geology.

4. DISCUSSION

Detailed magnetic gradiometer survey has revealed a number of linear features of potential archaeological origin, located in the western field of the site. However, these elements are identifiable with features recorded on 19th and 20th century

maps. The positive linear response in the southern part of Field A corresponds with a field boundary shown on the 1841 Happisburgh tithe map, but removed by 1886. A slight positive linear anomaly located just to the west may be another ditch, the two perhaps defining a trackway. However, this slighter linear anomaly does not parallel the stronger signal and is perhaps more likely to be an agricultural trend. The negative linear anomaly in the northern part of Field A marks the course of a former footpath that is shown crossing the area on maps between 1841 and 1957, though the path had been re-directed or closed by 1970.

A few discrete positive anomalies that may represent pits were noted in the northern part of the survey area. These are dispersed with no clear associations and, hence, are difficult to interpret. However, investigations immediately to the northeast revealed medieval remains including pits and evidence of industrial activity in the form of a possible oven and glass-working debris. There may be some association between the isolated pit-type features recorded by the geophysical survey and the medieval remains previously identified to the northeast.

Bipolar responses, both large areas anomalies and smaller spikes, occur widely. The areas of stronger magnetic disturbance are probably caused by discarded metal items and pieces of farm machinery were noted in the area of some of these signals. The slighter iron spikes probably indicate a scatter of small metal items.

Probable geological variations were identified close to the southern edge of the site.

5. ACKNOWLEDGEMENTS

Archaeological Project Services wishes to acknowledge Happisburgh Estates Ltd who commissioned this project, and also Hugh Ivens who made the initial enquiry

and arranged access; Gary Taylor and Tom Lane (APS) edited the report.

6. PERSONNEL

Project coordinator: Gary Taylor
Geophysical Survey: Andy Failes, Tom Hooley, Povilas Sepauskas
Survey processing and reporting: Andy Failes, Gary Taylor

7. BIBLIOGRAPHY

English Heritage, 2008 *Geophysical Survey in Archaeological Field Evaluation*.

Hodge, CAH., Burton, RGO., Corbett, WM., Evans, R., and Seale, RS, 1984 *Soils and their use in Eastern England*, Soil Survey of England and Wales 13

IfA, 2008 *Standard and Guidance for Field Evaluation*.

IfA, 2011 *Standard and Guidance for Geophysical Survey*.

8. ABBREVIATIONS

GSGB Geological Survey of Great Britain

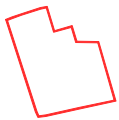
IfA Institute for Archaeologists



Figure 1 - General location plan



TG



The Site



© Ordnance Survey 2002. All Rights Reserved.
Licence No. 100020146


	Archaeological Project Services	
Project Name: Happisburgh, North Walsham Road		
Scale 1:25000	Drawn by: GT	Report No: 39/14

Figure 2 - Site location map

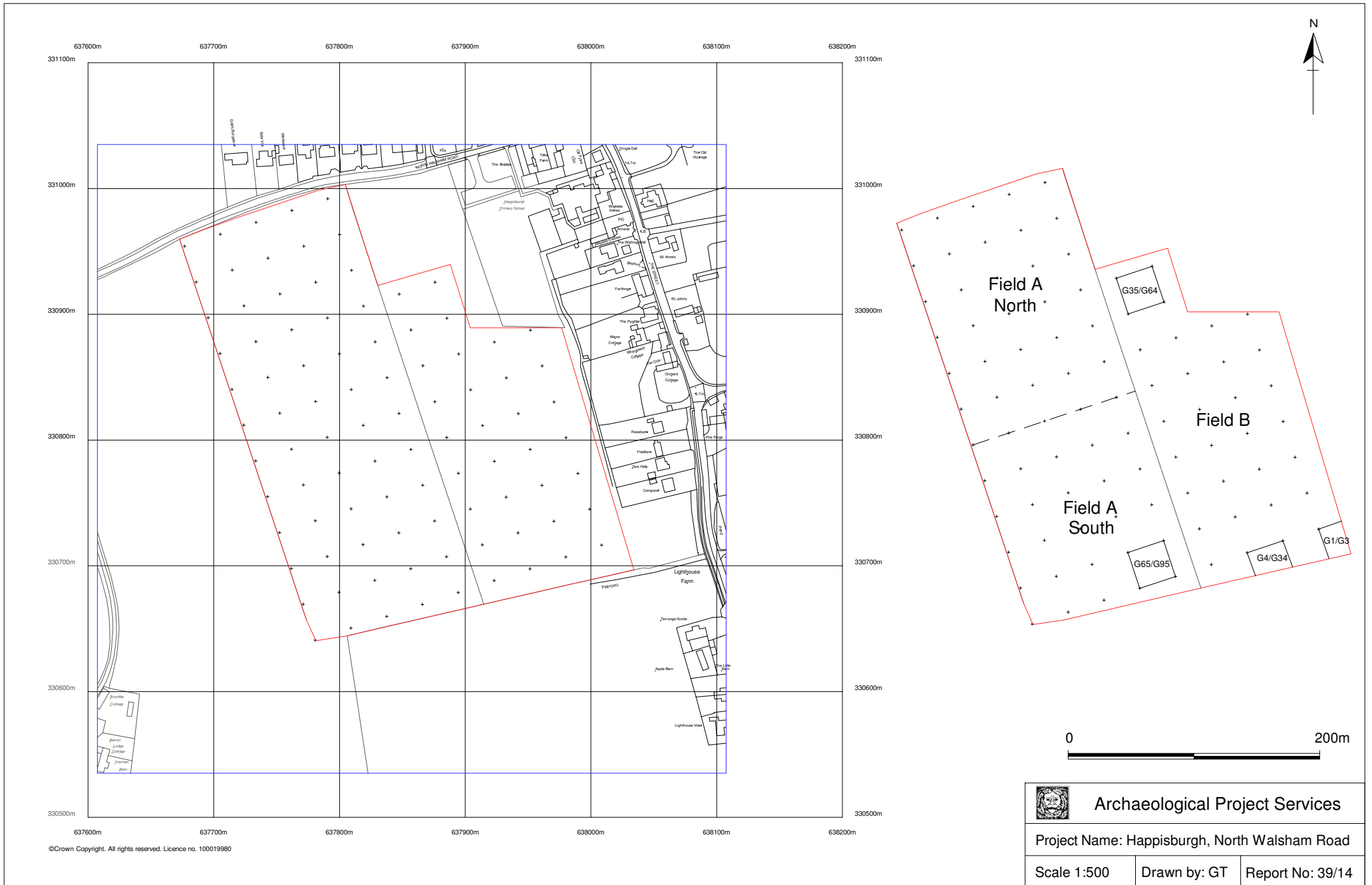


Figure 3 - Detailed site map, showing survey grid

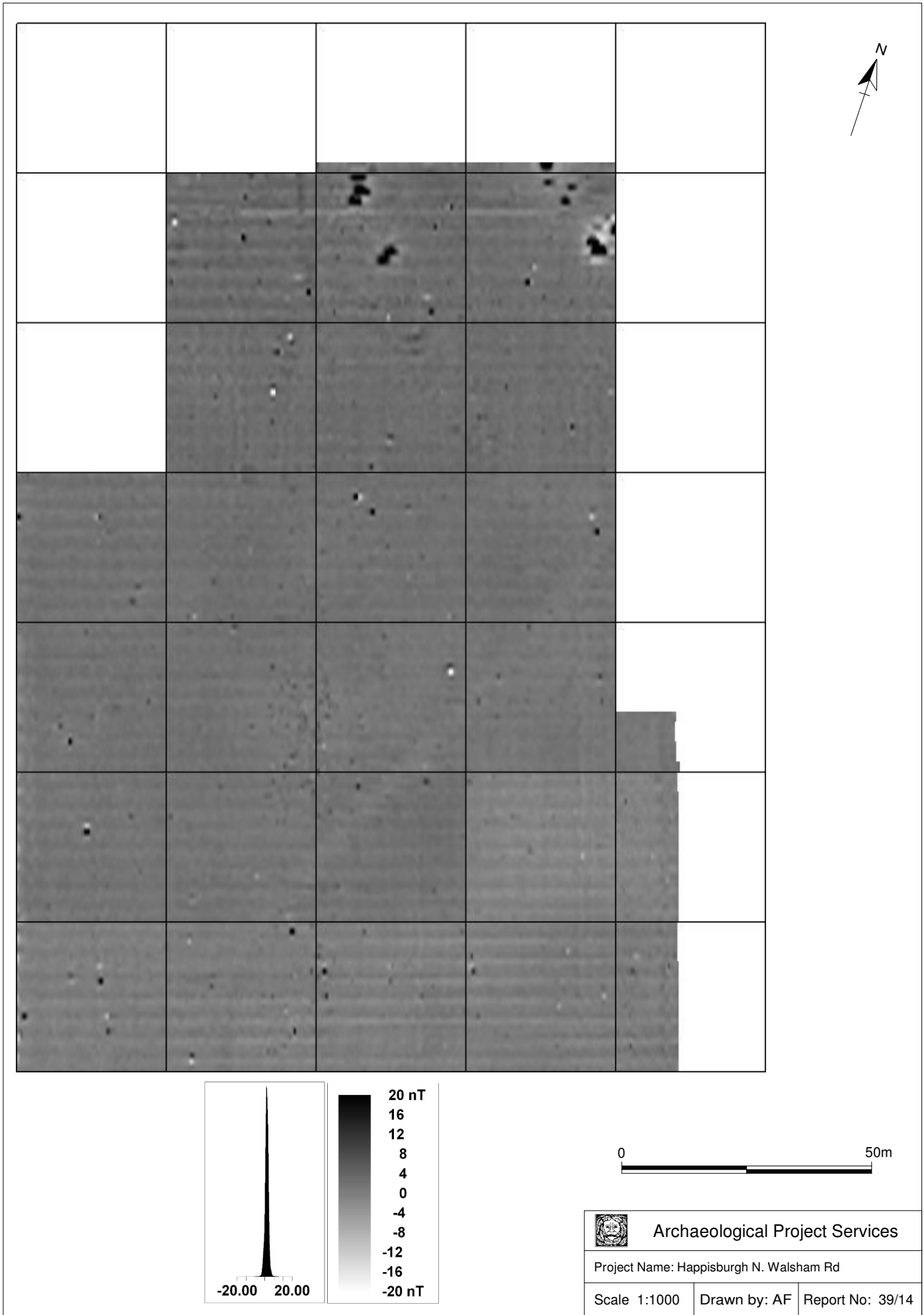
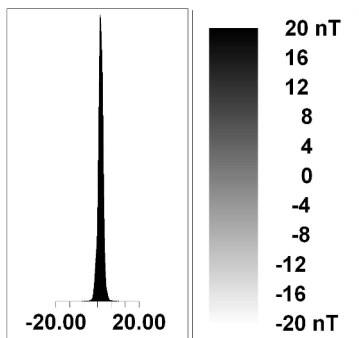
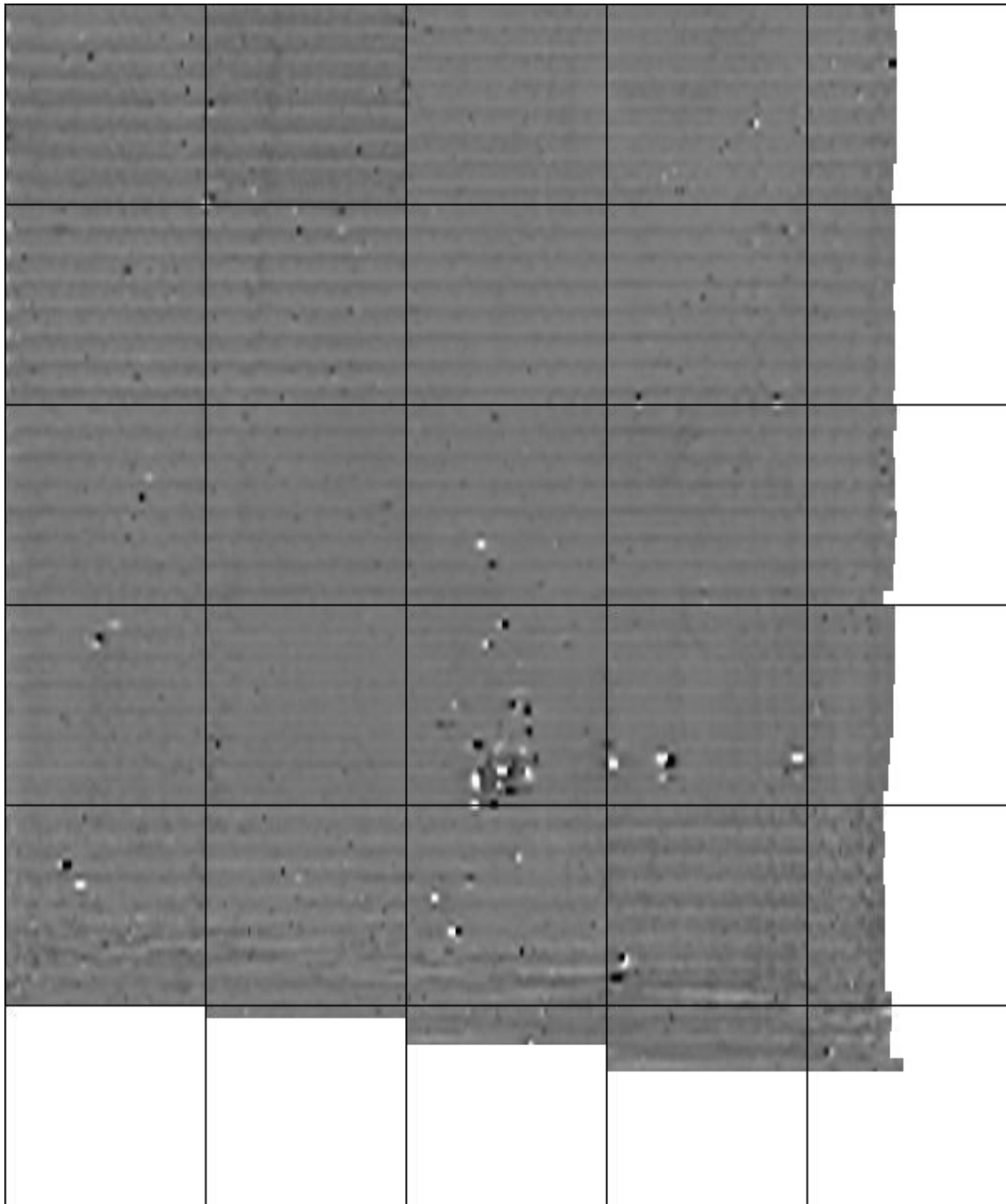


Figure 4 - Field A North: Minimally processed data greyscale plot




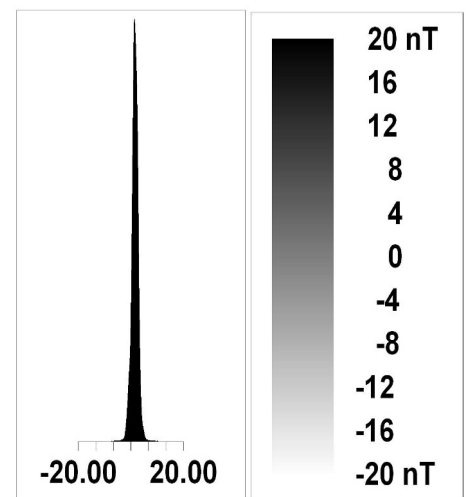
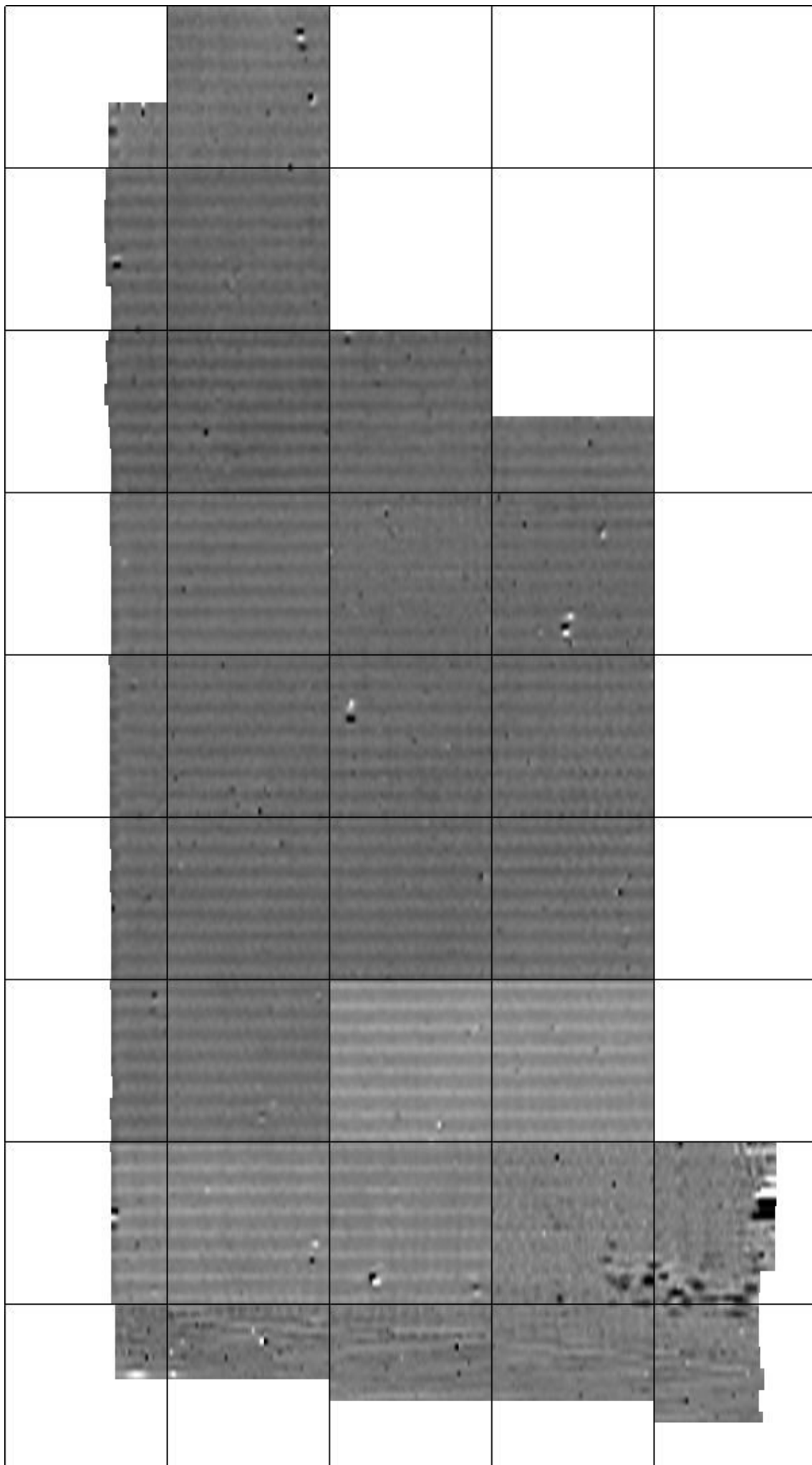
	Archaeological Project Services	
Project Name: Happisburgh N. Walsham Rd		
Scale 1:1000	Drawn by: AF	Report No: 39/14

Figure 5 - Field A South: Minimally processed data greyscale plot




	Archaeological Project Services	
Project Name:	Happisburgh N. Walsham Rd	
Scale 1:1000	Drawn by: AF	Report No: 39/14

Figure 6 - Field B: Minimally processed data greyscale plot

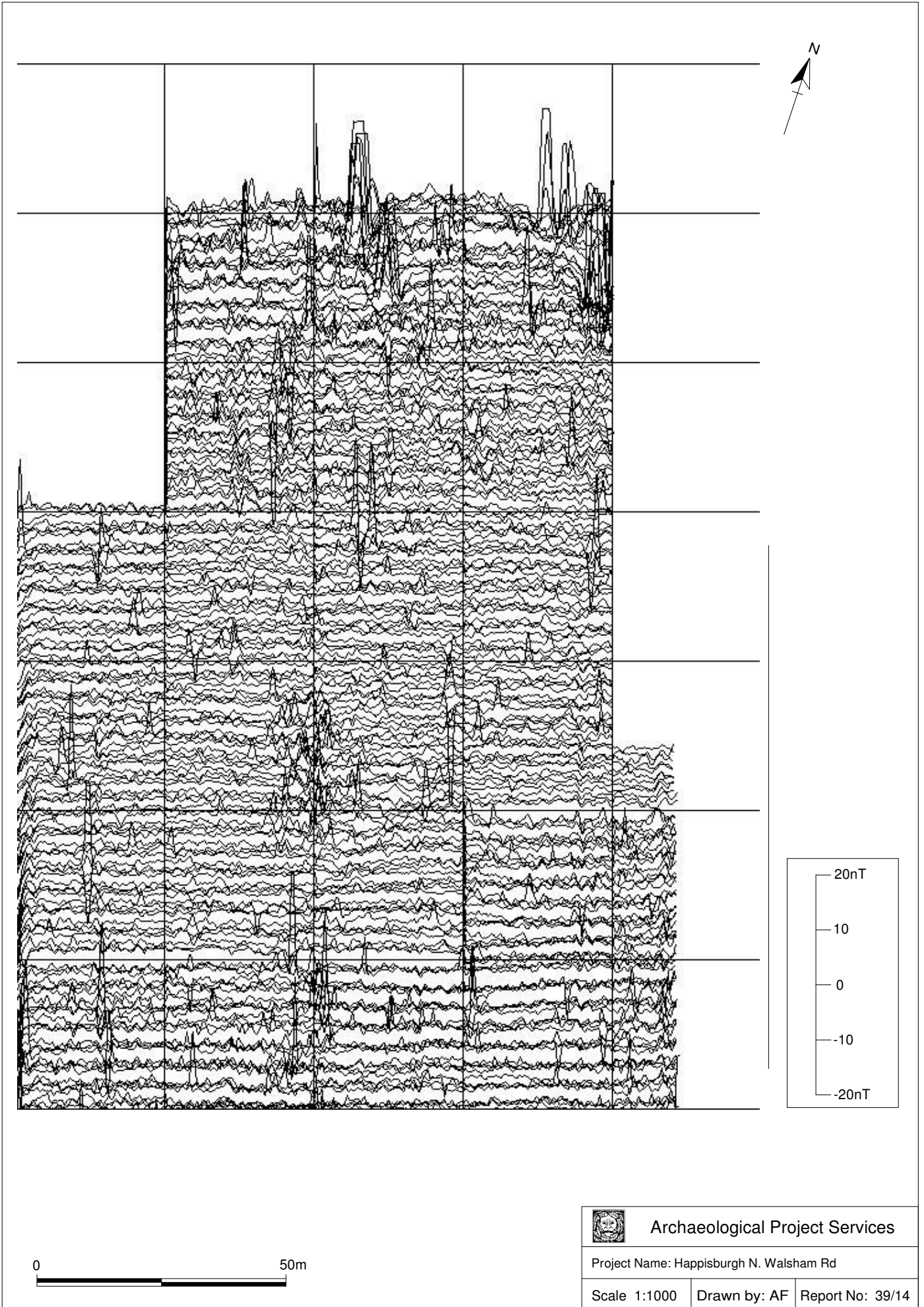
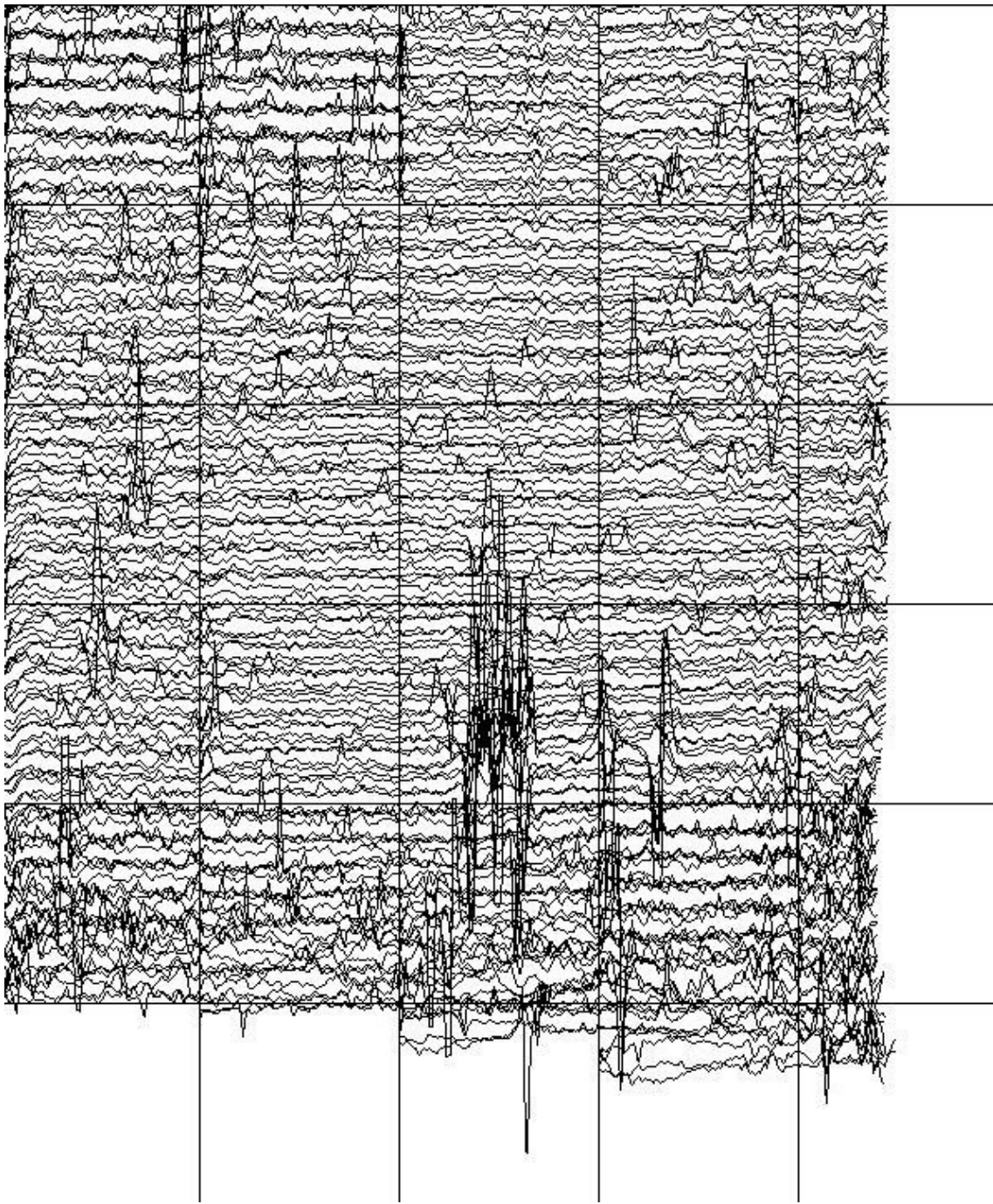
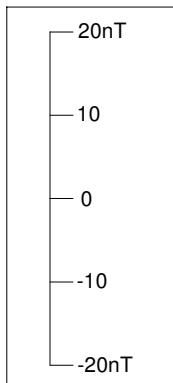


Figure 7 - Field A North: Minimally processed data trace plot



0 50m




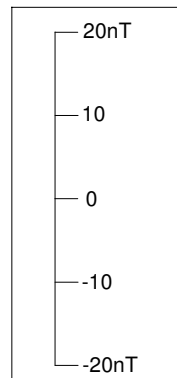
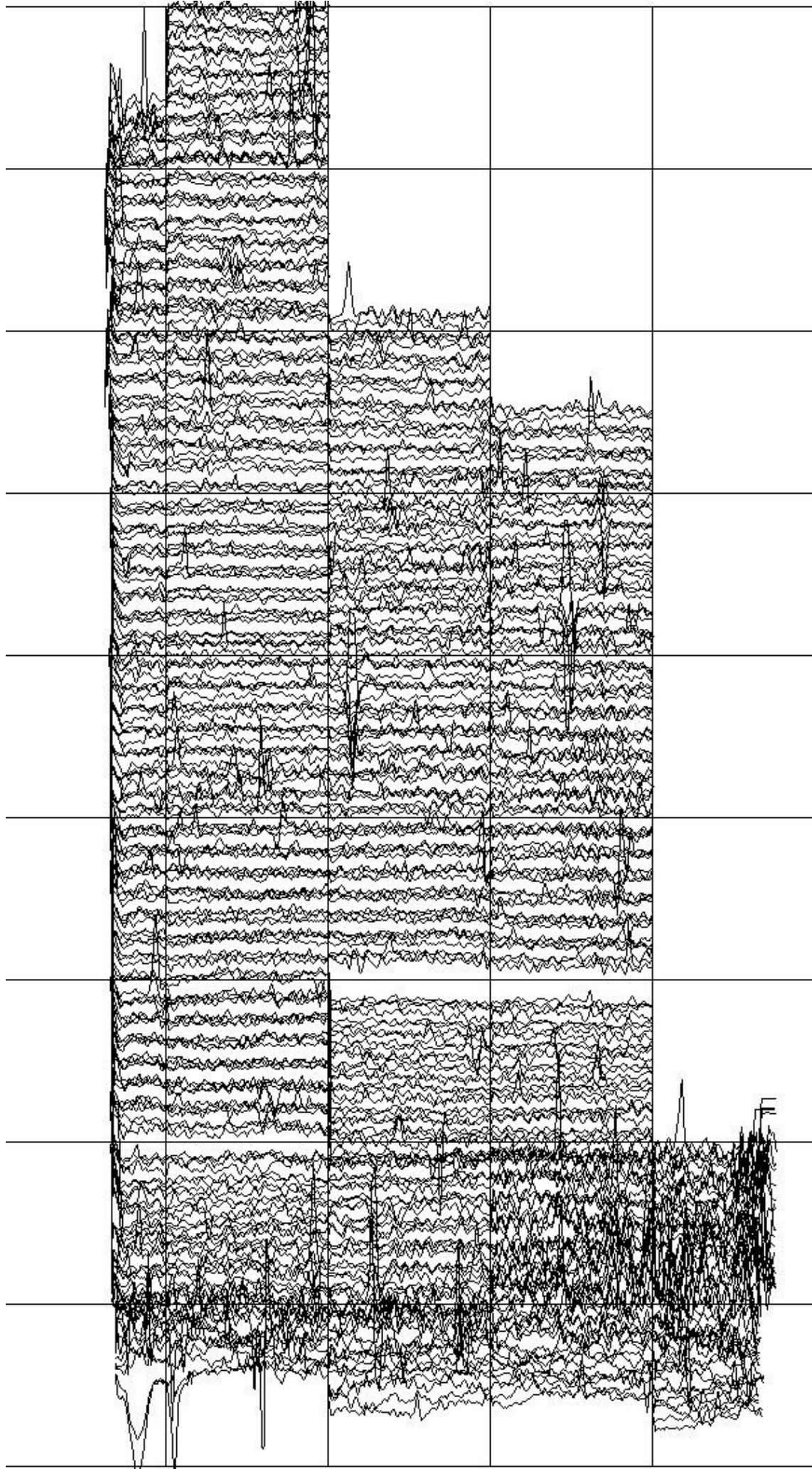
	Archaeological Project Services	
Project Name: Happisburgh N. Walsham Rd		
Scale 1:1000	Drawn by: AF	Report No: 39/14

Figure 8 - Field A South: Minimally processed data trace plot



Archaeological Project Services

Project Name: Happisburgh N. Walsham Rd

Scale 1:1000

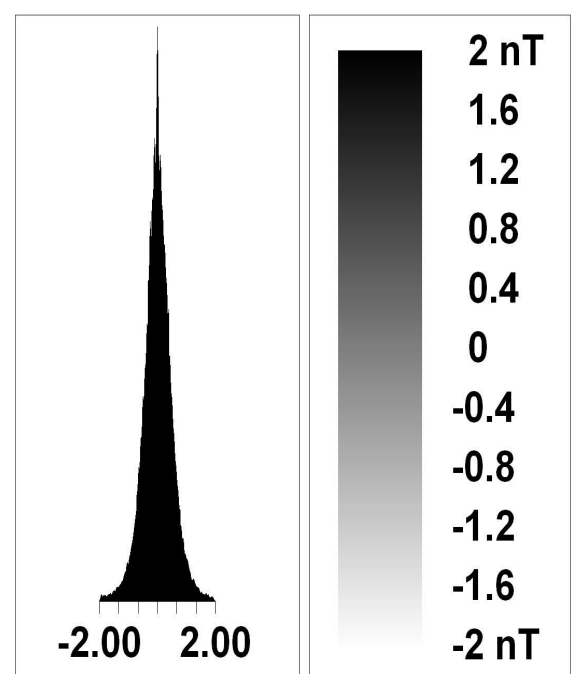
Drawn by: AF

Report No: 39/14

Figure 9 - Field B: Minimally processed data trace plot



0 50m




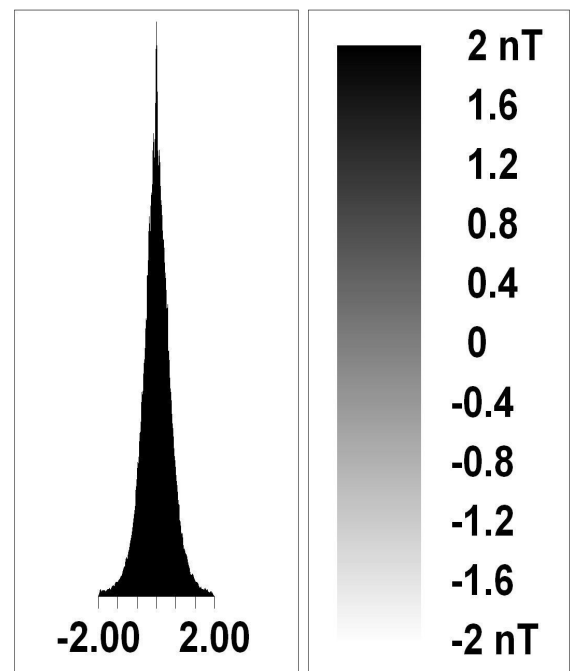
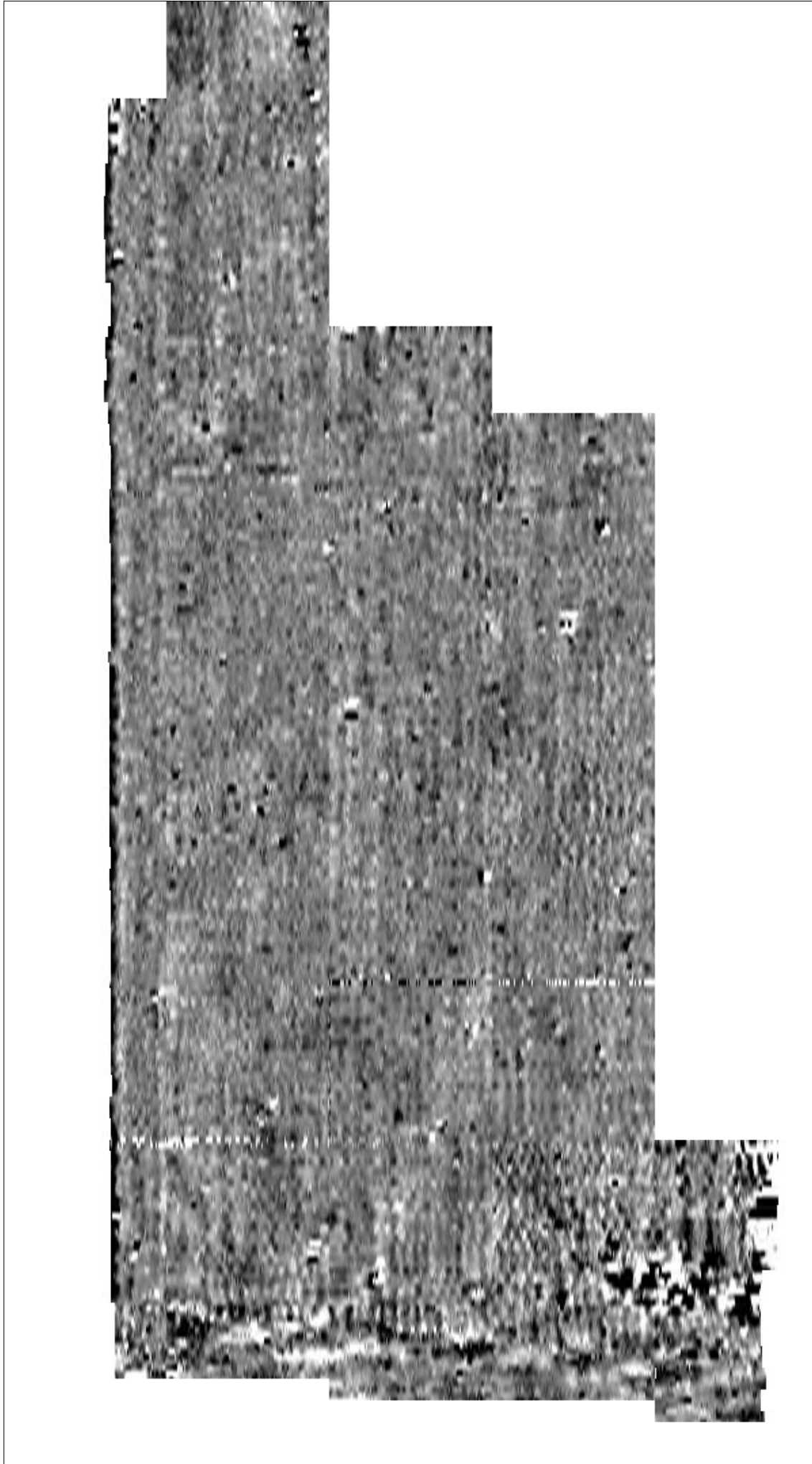
	Archaeological Project Services	
Project Name: Happisburgh N. Walsham Rd		
Scale 1:1000	Drawn by: AF	Report No: 39/14

Figure 10 - Field A: Processed data greyscale plot



0 50m



Archaeological Project Services

Project Name: Happisburgh N. Walsham Rd

Scale 1:1000

Drawn by: AF

Report No: 39/14

Figure 11 - Field B: Processed data greyscale plot

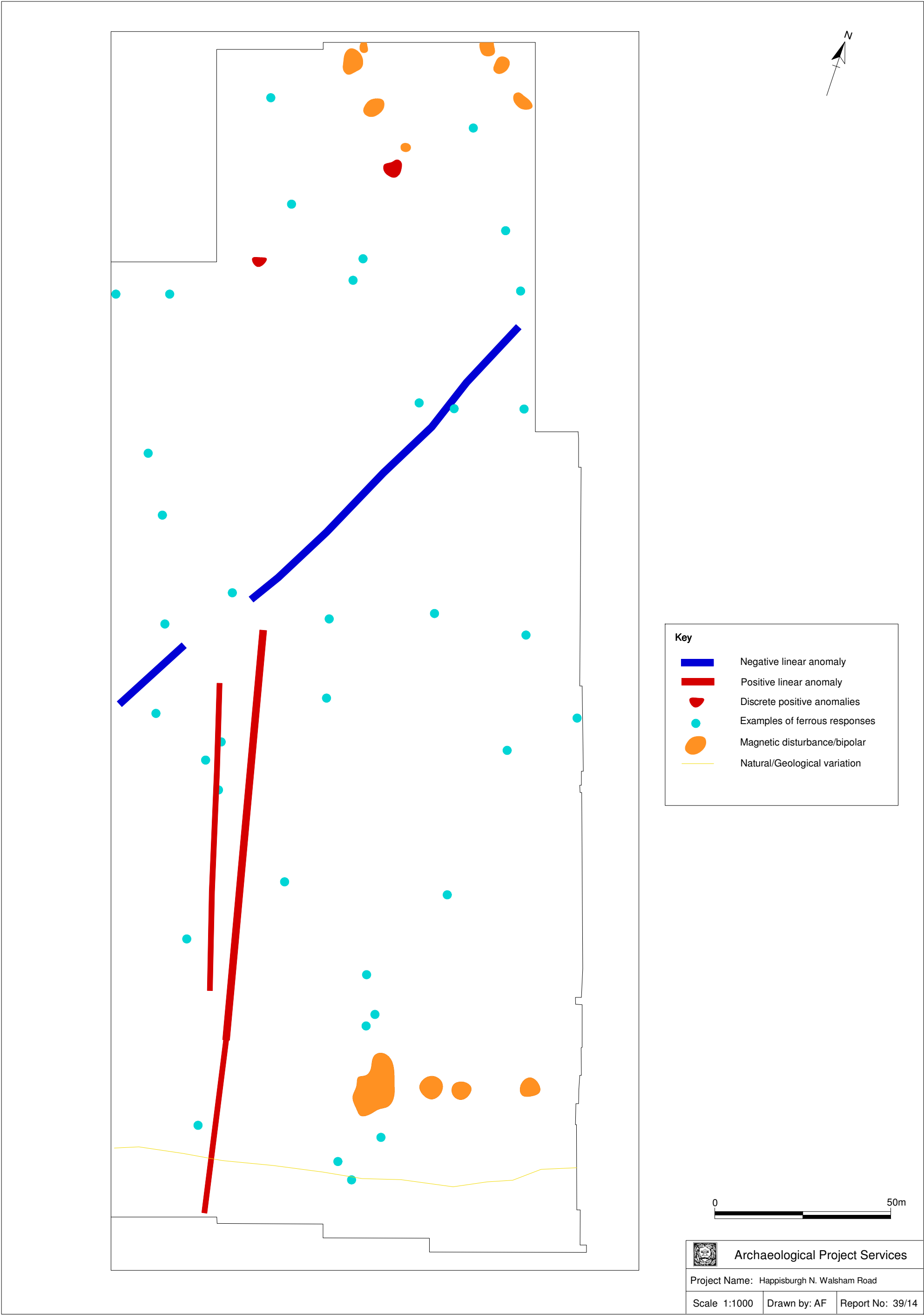
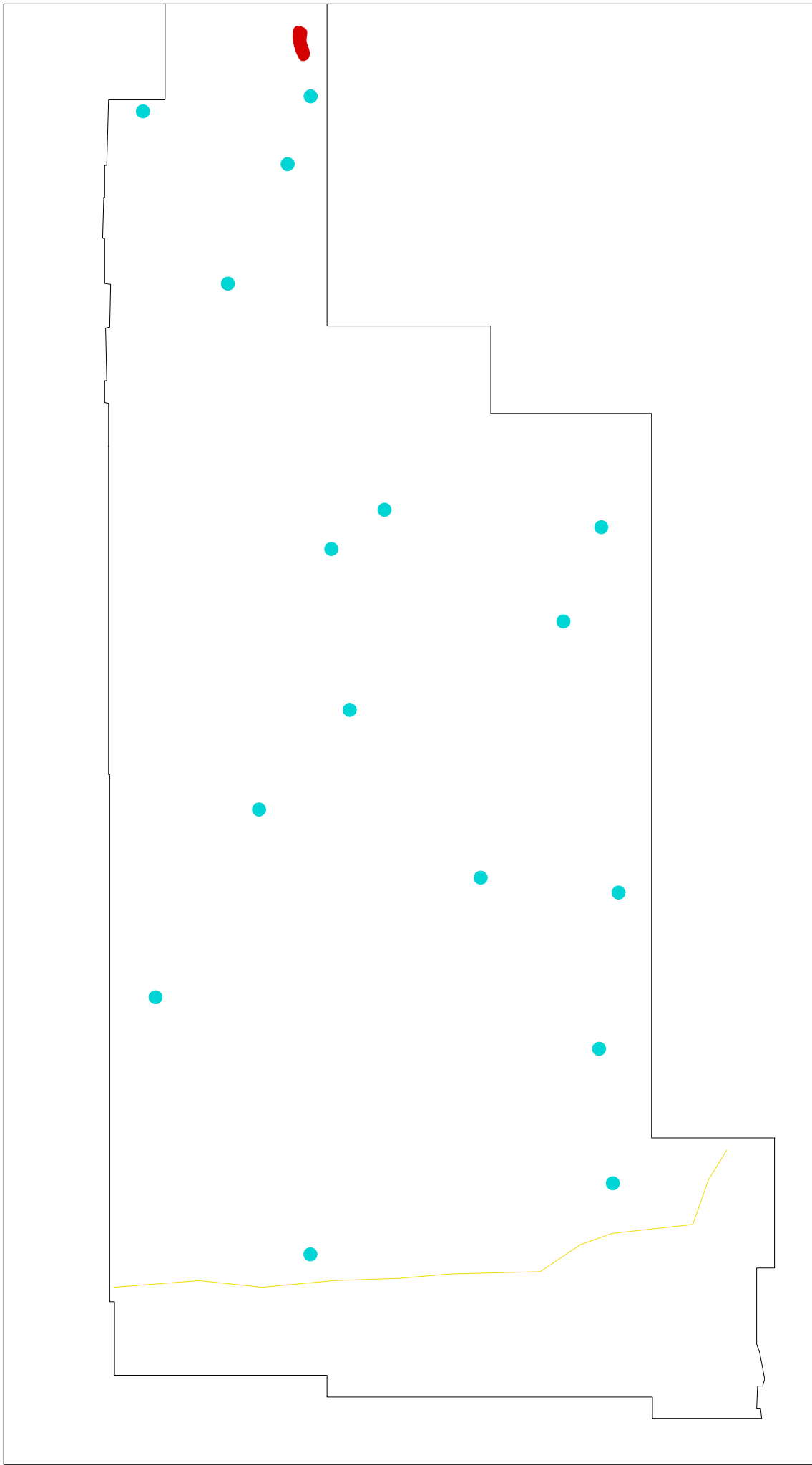


Figure 12 - Field A: Interpretative plot



Key	
	Negative linear anomaly
	Positive linear anomaly
	Discrete positive anomalies
	Examples of ferrous responses
	Magnetic disturbance/bipolar
	Natural/Geological variation



	Archaeological Project Services	
Project Name: Happisburgh N. Walsham Rd		
Scale 1:1000	Drawn by: AF	Report No: 39/14

Figure 13 - Field B: Interpretative plot




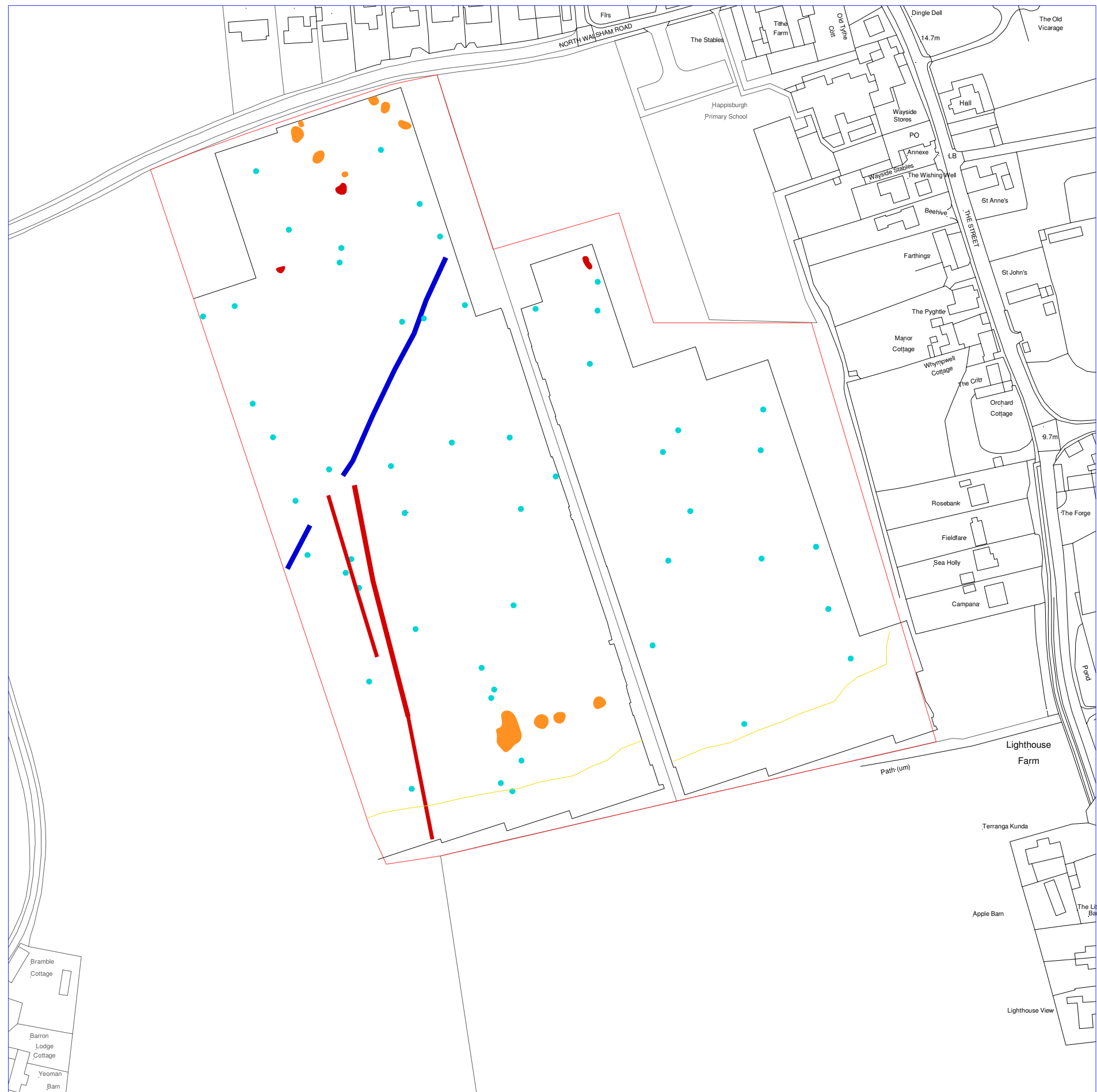
 Archaeological Project Services		
Project Name: Happisburgh N. Walsham Rd		
Scale: 1:2000	Drawn by: AF	Report No: 39/14

Figure 14 - Processed geophysical survey greyscale combined plot



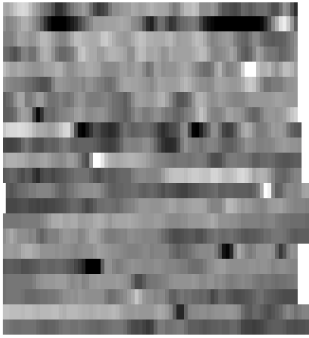
Key

- Negative linear anomaly
- Positive linear anomaly
- Discrete positive anomalies
- Examples of ferrous responses
- Magnetic disturbance/bipolar
- Natural/Geological variation

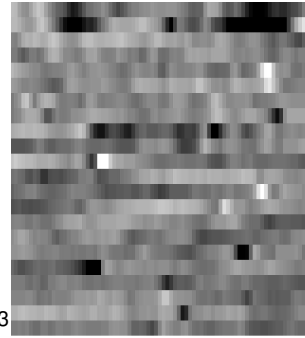


Archaeological Project Services		
Project Name: Happisburgh N. Walsham Rd.		
Scale: 1:2000	Drawn by: AF	Report No: 39/14

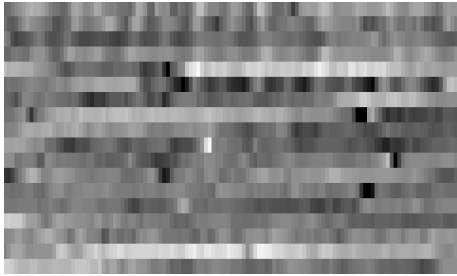
Figure 15 - Geophysical survey combined interpretative plot



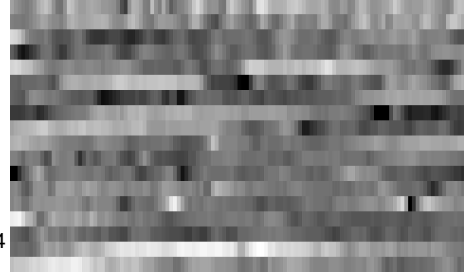
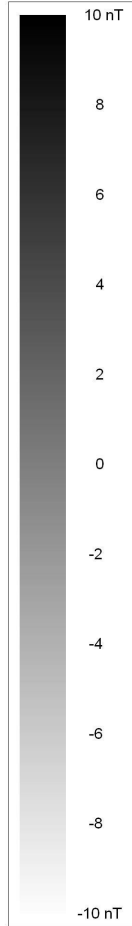
G1



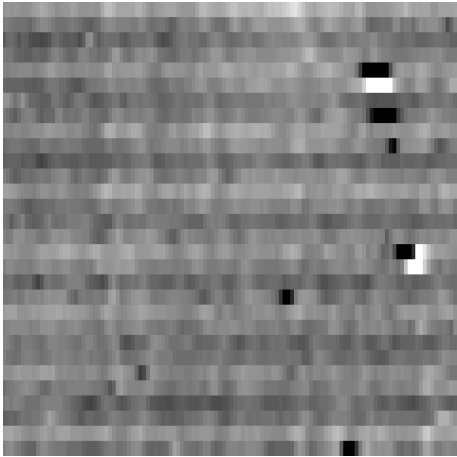
G3



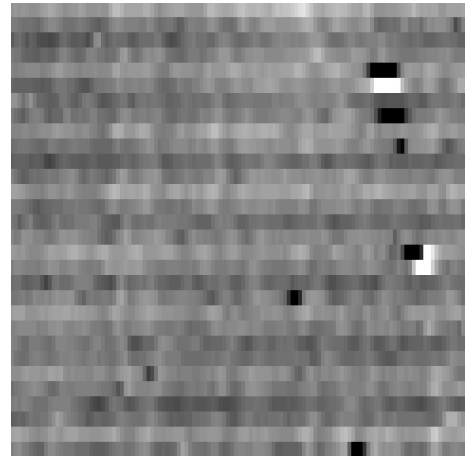
G4



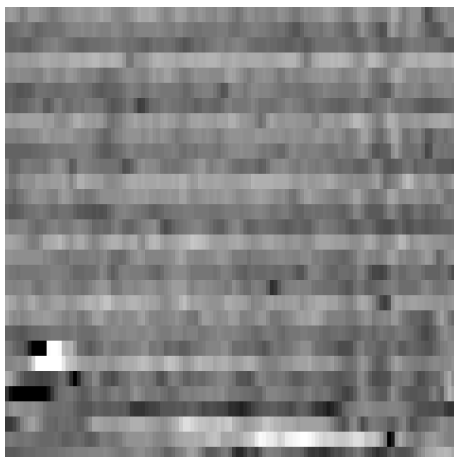
G34



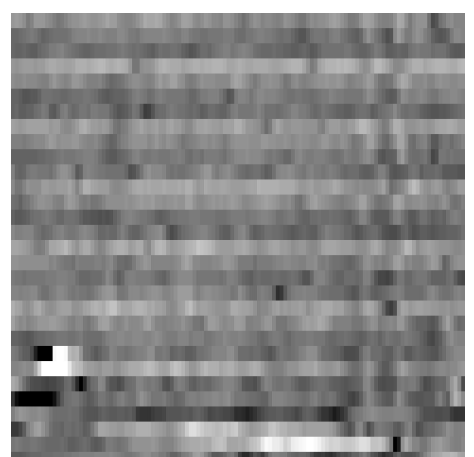
G35



G64



G65



G95



Archaeological Project Services



Project Name: Happisburgh N. Walsham Rd

Scale 1:500

Drawn by: AF

Report No: 39/14

Appendix 1 Re-surveyed grid squares (clip +/-10 nT)

Appendix 2 THE ARCHIVE

The archive consists of:

- 1 Site survey layout plan
- 1 Report text and illustrations
- Digital data

File names	HPG1001- HPG1094.DAT	HPG1001- HPG1094.GRD	HPG1001- HPG1094.GRS
Explanation of codes used in file names	DAT files are Geoplot data files, named with site code and number in the order surveyed. GRD files are data files, named with site code and number in the order surveyed. GRS files are statistics files, named with site code and number in the order surveyed.		
Description of file formats	All files are in plain text xml format with header data defining survey and processing parameters		
List of codes used in files	D indicates a "dummy" value within the composite data		
Hardware, software and operating systems	ArcheoSurveyor 2.5.15 running under Windows XP Service Pack 3		
Date of last modification	08/04/14		
Indications of known areas of weakness in data			

All primary records are currently kept at:

Archaeological Project Services, The Old School, Cameron Street, Heckington, Sleaford, Lincolnshire
NG34 9RW

The ultimate destination of the project archive is:

Norfolk Museums Service
Union House
Gressenhall
Dereham
Norfolk
NR204DR

Norfolk HER Event No.:

ENF133768

Archaeological Project Services shall retain full copyright of any commissioned reports under the *Copyright, Designs and Patents Act 1988* with all rights reserved; excepting that it hereby provides an exclusive licence to the client for the use of such documents by the client in all matters directly relating to the project as described in the Project Specification.

OASIS DATA COLLECTION FORM: England

[List of Projects](#) | [Manage Projects](#) | [Search Projects](#) | [New project](#) | [Change your details](#) | [HER coverage](#) | [Change country](#) | [Log out](#)

Printable version

OASIS ID: archaeol1-176686

Project details

Project name	Geophysical survey of land at North Walsham Road, Happisburgh, Norfolk
Short description of the project	Geophysical survey in an area of cropmarks and other remains identified few magnetic anomalies. A linear negative anomaly corresponded to a footpath shown on 19th-20th century maps and a linear positive anomaly represent a removed field boundary recorded on the 1840 tithe map but removed soon after. A few pit anomalies were also recorded. Large bipolar responses were probably caused by metal items and pieces of farm machinery were noted in the area of some of these. Otherwise, no significant archaeological remains were noted.
Project dates	Start: 17-03-2014 End: 20-03-2014
Previous/future work	No / Not known
Any associated project reference codes	HNWR14 - Sitecode
Any associated project reference codes	ENF133768 - HER event no.
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 2 - Operations to a depth less than 0.25m
Monument type	LINEAR POSITIVE ANOMALY Uncertain
Monument type	LINEAR NEGATIVE ANOMALY Uncertain
Monument type	DISCRETE POSITIVE ANOMALY Uncertain
Significant Finds	NONE None
Methods & techniques	""Geophysical Survey""
Development type	caravan park
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	Not known / Not recorded

Solid geology	CHALK (INCLUDING RED CHALK)
Drift geology	SAND AND GRAVEL OF UNCERTAIN AGE OR ORIGIN
Techniques	Magnetometry

Project location

Country	England
Site location	NORFOLK NORTH NORFOLK HAPPISBURGH North Walsham Road
Study area	7.75 Hectares
Site coordinates	TG 3770 3067 52.8205355192 1.52827685324 52 49 13 N 001 31 41 E Point

Project creators

Name of Organisation	Archaeological Project Services
Project brief originator	Norfolk Historic Environment Service
Project design originator	Gary Taylor
Project director/manager	Gary Taylor
Project supervisor	Paul Johnson, Andy Failes
Type of sponsor/funding body	Developer

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Norfolk Museums Service
Digital Contents	"Survey"
Digital Media available	"Geophysics", "Survey"
Paper Archive recipient	Norfolk Museums Service
Paper Contents	"Survey"
Paper Media available	"Correspondence", "Map", "Plan", "Report", "Survey "

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	North Walsham Road, Happisburgh, Norfolk Geophysical Survey
Author(s)/Editor(s)	FAILES, A. and TAYLOR, G.
Other	39/14

bibliographic
details

Date 2014

Issuer or publisher APS

Place of issue or
publication HECKINGTON

Description A4 comb-bound with A3 inserts

Entered by Gary Taylor (info@apsarchaeology.co.uk)

Entered on 9 April 2014

OASIS:

Please e-mail [English Heritage](#) for OASIS help and advice

© ADS 1996-2012 Created by [Jo Gilham and Jen Mitcham](#), email Last modified Wednesday 9 May 2012

Cite only: <http://www.oasis.ac.uk/form/print.cfm> for this page